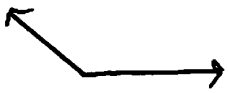
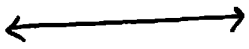
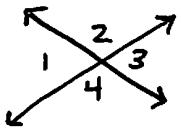
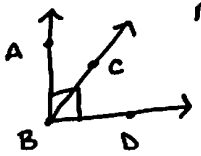
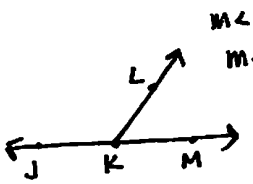
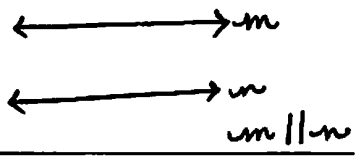
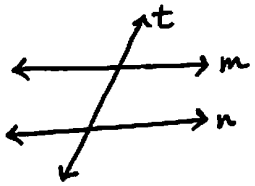
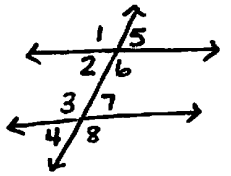
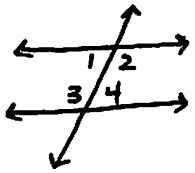
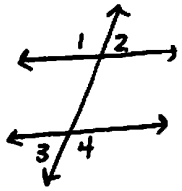
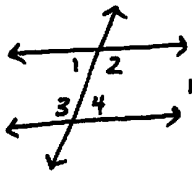
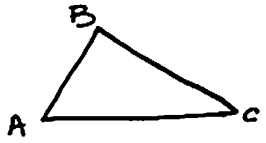
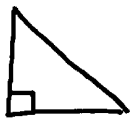
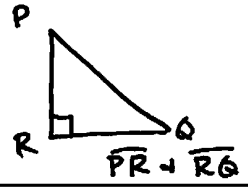
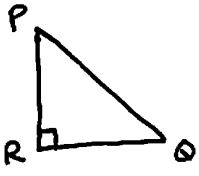
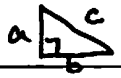
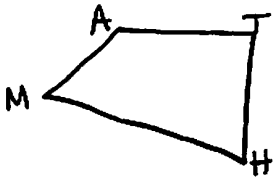
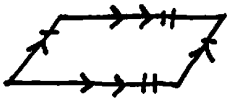
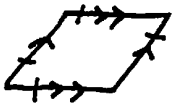
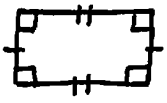
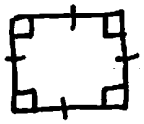
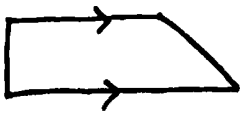
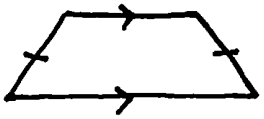
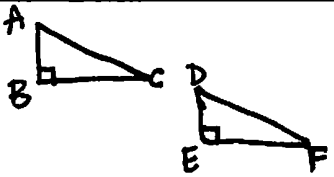
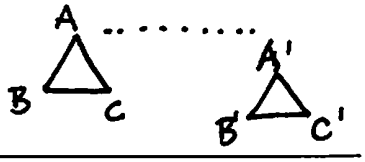
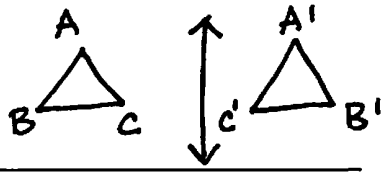
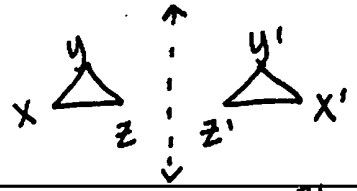
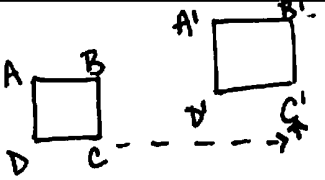
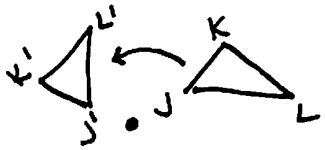
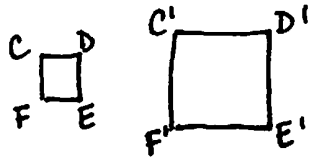
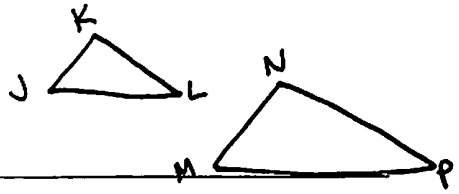
GEOMETRY DICTIONARY

TERM	DEFINITION	EXAMPLE OR VISUAL
ACUTE ANGLE	An angle less than 90°	
RIGHT ANGLE	An angle equal to 90°	
OBTUSE ANGLE	An angle greater than 90°	
STRAIGHT ANGLE	An angle equal to 180°	
VERTICAL ANGLES	Angles that are across from each other when 2 lines intersect.	 $\angle 1 \cong \angle 3$ $\angle 2 \cong \angle 4$
ADJACENT ANGLES	Angles that share a common ray & vertex; angles that are next to eachother.	
COMPLEMENTARY ANGLES	Angles that sum to 90°	 $m\angle ABC + m\angle CBD = 90°$
SUPPLEMENTARY ANGLES	Angles that sum to 180°	 $m\angle JKL + m\angle LKM = 180°$

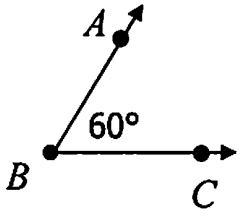
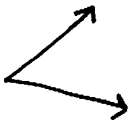
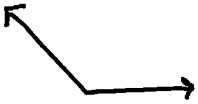
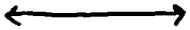
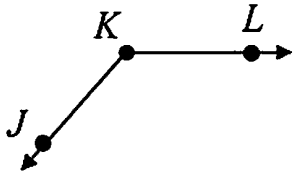
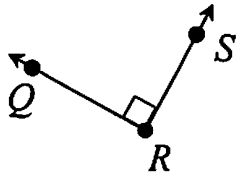
TERM	DEFINITION	EXAMPLE OR VISUAL
PARALLEL LINES	Two lines that never intersect.	
TRANSVERSAL	A line that intersects 2 or more lines.	
COORESPONDING ANGLES	Angles that are in the same position on the parallel lines in relation to the transversal. (≅ angles)	 ∠1 ≅ ∠3 ∠2 ≅ ∠4 ∠5 ≅ ∠7 ∠6 ≅ ∠8
ALTERNATE INTERIOR ANGLES	Angles that are inside the parallel lines and on opposite sides of the transversal. (≅ angles)	 ∠1 ≅ ∠4 ∠2 ≅ ∠3
ALTERNATE EXTERIOR ANGLES	Angles that are outside the parallel lines and on opposite sides of the transversal. (≅ angles)	 ∠1 ≅ ∠4 ∠2 ≅ ∠3
CONSECUTIVE INTERIOR ANGLES	Angles that are inside the parallel lines and on the same side of the transversal. (supplementary angles)	 m∠1 + m∠3 = 180° m∠2 + m∠4 = 180°
TRIANGLE	A three sided figure; angles sum to 180°	 m∠A + m∠B + m∠C = 180
EQUILATERAL TRIANGLE	A triangle with 3 equal sides + 3 equal angles.	
ISOSCELES TRIANGLE	A triangle with 2 equal sides + 2 equal angles.	

TERM	DEFINITION	EXAMPLE OR VISUAL
SCALENE TRIANGLE	A triangle with no equal sides or angles.	
RIGHT TRIANGLE	A triangle containing a 90° angle	
LEGS	The two sides of a right triangle that form the 90° angle.	 $\overline{PR}$ and $\overline{RQ}$
HYPOTENUSE	The side opposite the 90° angle in a right triangle.	 $\overline{PQ}$
PYTHAGOREAN THEOREM	A formula used to find sides of a right triangle.	$a^2+b^2=c^2$ 
QUADRILATERAL	A four sided figure; angles sum to 360°	 $m\angle M + m\angle A + m\angle T + m\angle H = 360$
PARALLELOGRAM	A quadrilateral in which opposite sides are parallel and congruent.	
RHOMBUS	A parallelogram in which all four sides are congruent.	
RECTANGLE	A parallelogram with four right angles.	

TERM	DEFINITION	EXAMPLE OR VISUAL
SQUARE	A parallelogram with four congruent sides and four right angles.	
TRAPEZOID	A quadrilateral with one pair of parallel sides.	
ISOSCELES TRAPEZOID	A trapezoid with one pair of congruent sides.	
POLYGON	A closed figure formed by three or more line segments called sides.	
SUM OF THE INTERIOR ANGLES OF A POLYGON	The sum can be determined by the number of triangles that can be drawn within a Polygon	$S = (n-2) \cdot 180$
CONGRUENT POLYGONS	Polygons with the same size and shape	
CONGRUENCY STATEMENT	A valid congruency statement must match all corresponding angles and sides.	$\triangle ABC \cong \triangle DEF$
TRANFORMATION	An operation that maps an original figure (pre-image) onto a new figure (image).	
REFLECTION	A flip over a line called the line of reflection	

TERM	DEFINITION	EXAMPLE OR VISUAL
LINE OF REFLECTION	The line in which a reflection occurs.	
TRANSLATION	A vertical or horizontal slide	
ROTATION	A turn around a fixed point called the center of rotation	
DILATION	An enlargement or reduction of a figure	
SCALE FACTOR	Indicates how much the figure will enlarge / reduce.	$k > 1$: enlarge $k < 1$: reduce
SIMILAR FIGURES	Polygons with the same shape but different size.	 $\Delta JKL \sim \Delta MNP$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
ANGLES  	**Parts of an Angle:** • An angle is formed by two rays with a common endpoint. • This common endpoint is called the vertex. • The rays are called the sides. **Naming Angles:** • Symbol for an angle: ∠ • Angles are typically named using three letters. *The middle letter must always represent the vertex. • Angles can also be named using just the vertex if it is the only angle located at that vertex. **Angle Measures:** • When referring to the measure of an angle, use a lowercase m. **Example:** m∠ABC = 60°
TYPES OF ANGLES	 Acute: Less than 90°  Right: Equal to 90°  Obtuse: More than 90°  Straight: Equal to 180°
EXAMPLE 1  	a) Name the vertex of the angle. K b) Name the sides of the angle. $\overrightarrow{KL}$, $\overrightarrow{KJ}$ c) Give three ways to name the angle. ∠JKL, ∠LKJ, ∠K d) Classify the angle: obtuse
EXAMPLE 2  	a) Name the vertex of the angle. R b) Name the sides of the angle. $\overrightarrow{QR}$, $\overrightarrow{RS}$ c) Give three ways to name the angle. ∠QRS, ∠SRQ, ∠R d) Classify the angle: right

Solving for Angle Measures

1. The measure of $\angle A$ is $(12x - 5)°$. If $x = 9$, find the measure of $\angle A$, then classify the angle.

$12(9) - 5$
$108 - 5$
$= 103$

$m\angle A = 103°$, Obtuse

2. The measure of $\angle R$ is $(7x + 19)°$. If $x = 23$, find the measure of $\angle R$, then classify the angle.

$7(23) + 19$
$161 + 19$
$= 180$

$m\angle R = 180°$, Straight

3. The measure of $\angle H$ is $(14 - 2x)°$. If $x = -6$, find the measure of $\angle H$, then classify the angle.

$14 - 2(-6)$
$14 + 12$
26

$m\angle H = 26°$, acute

4. The measure of $\angle Y$ is $(4x + 22)°$. If $x = 17$, find the measure of $\angle Y$, then classify the angle.

$4(17) + 22$
$68 + 22$
$= 90$

$m\angle Y = 90°$, right

5. The measure of $\angle C$ is $(19x - 3)°$ and the measure of $\angle D$ is $(8x + 10)°$. If the sum of the measures of the angles is 115°, find the measure of each angle.

$19x - 3 + 8x + 10 = 115$
$27x + 7 = 115$
$27x = 108$
$x = 4$

$m\angle C = 19(4) - 3$
$m\angle C = 76 - 3$
$m\angle C = 73°$

$m\angle D = 8(4) + 10$
$m\angle D = 32 + 10$
$m\angle D = 42°$

6. The measure of $\angle J$ is $(x + 7)°$ and the measure of $\angle K$ is $(12x - 27)°$. If the sum of the measures of the angles is 123°, find the measure of each angle.

$x + 7 + 12x - 27 = 123$
$13x - 20 = 123$
$13x = 143$
$x = 11$

$m\angle J = 7 + 11$
$m\angle J = 18°$

$m\angle K = 12(11) - 27$
$m\angle K = 132 - 27$
$m\angle K = 105°$

7. The measure of $\angle E$ is eighteen degrees more than the measure of $\angle F$. If the sum of the measures of the two angles is 96°, find the measure of each angle.

$m\angle E = x + 18$
$m\angle F = x$

$x + x + 18 = 96$
$2x + 18 = 96$
$2x = 78$
$x = 39$

$m\angle E = 39 + 18$
$m\angle E = 57°$

$m\angle F = 39°$

8. The measure of $\angle R$ is three degrees less than twice the measure of $\angle S$. If the sum of the measures of the two angles is 72°, find the measure of each angle.

$m\angle R = 2x - 3$
$m\angle S = x$

$2x - 3 + x = 72$
$3x - 3 = 72$
$3x = 75$
$x = 25$

$m\angle R = 2(25) - 3$
$m\angle R = 50 - 3$
$m\angle R = 47°$

$m\angle S = 25°$

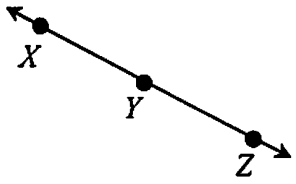
Name: _____ **Unit 7:** Geometry

Date: _____ **Per:** _____ **Homework 1:** Introduction to Angles

**** This is a 2-page document! ****

Directions: For each angle, a) name the vertex, b) name the sides, c) name the angle three ways, and d) classify the angle.

1.

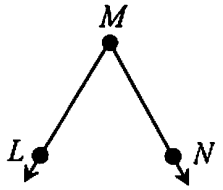


1. a) Y b) $\overrightarrow{YX}$, $\overrightarrow{YZ}$

c) ∠XYZ, ∠ZYX, ∠Y

d) Straight

2.

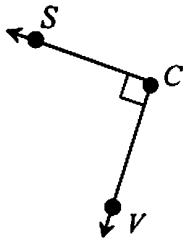


2. a) M b) $\overrightarrow{LM}$, $\overrightarrow{MN}$

c) ∠LMN, ∠NML, ∠M

d) Acute

3.

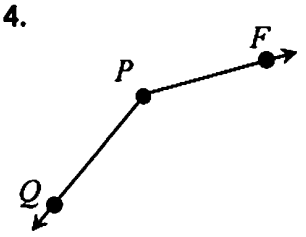


3. a) C b) $\overrightarrow{CS}$, $\overrightarrow{CV}$

c) ∠SCV, ∠VCS, ∠C

d) right

4.



4. a) P b) $\overrightarrow{QP}$, $\overrightarrow{PF}$

c) ∠QPF, ∠FPQ, ∠P

d) obtuse

Directions: Read each problem carefully and solve.

5. If $m\angle P = (7x - 22)°$ and $\angle P$ is a right angle, find the value of x.

$7x - 22 = 90$

$7x = 112$

$\boxed{x = 16}$

6. If $m\angle A = (5x + 45)°$ and $\angle A$ is a straight angle, find the value of x.

$5x + 45 = 180$

$5x = 135$

$\boxed{x = 27}$

7. The measure of $\angle N$ is $(15x + 47)°$. If $x = 8$, find the measure of $\angle N$, then classify the angle.

$15(8) + 47$

$120 + 47$

167

$\boxed{m\angle N = 167°, \text{ obtuse}}$

8. The measure of $\angle H$ is $(11x - 29)°$. If $x = 19$, find the measure of $\angle H$, then classify the angle.

$11(19) - 29$

$209 - 29$

180

$\boxed{m\angle H = 180°, \text{ Straight}}$

9. The measure of $\angle B$ is $(-8x + 58)°$. If $x = -4$, find the measure of $\angle B$, then classify the angle.

$-8(-4) + 58$

$32 + 58$

90

$\boxed{m\angle B = 90°, \text{ right}}$

10. The measure of $\angle Z$ is $(4x - 5)°$. If $x = 7$, find the measure of $\angle Z$, then classify the angle.

$4(7) - 5$

$28 - 5$

23

$\boxed{m\angle Z = 23°, \text{ acute}}$

11. If $m\angle J = (7x + 13)°$, $m\angle K = (83 - 2x)°$, and the sum of the measures of the angles is 141°, find the measure of each angle.

$7x+13+83-2x=141$

$5x+96=141$

$5x=45$

$x=9$

$m\angle J = 7(9)+13$

$m\angle J = 63+13$

$\boxed{m\angle J = 76°}$

$m\angle K = 83-2(9)$

$m\angle K = 83-18$

$\boxed{m\angle K = 65°}$

12. If $m\angle T = (2x + 85)°$, $m\angle V = (5x + 29)°$, and the sum of the measures of the angles is 93°, find the measure of each angle.

$2x+85+5x+29=93$

$7x+114=93$

$7x=-21$

$x=-3$

$m\angle T = 2(-3)+85$

$m\angle T = -6+85$

$\boxed{m\angle T = 79°}$

$m\angle V = 5(-3)+29$

$m\angle V = -15+29$

$\boxed{m\angle V = 14°}$

13. If $m\angle Y = (2x - 3)°$, $m\angle Z = (13x - 41)°$, and $\angle Z$ is a straight angle, find the sum of the measures of the two angles.

$\angle Z$: $13x-41=180$

$13x=221$

$x=17$

$m\angle Y = 2(17)-3$

$m\angle Y = 34-3$

$m\angle Y = 31°$

$m\angle Z = 13(17)-41$

$m\angle Z = 221-41$

$m\angle Z = 180°$

$31° + 180° = \boxed{211°}$

14. If $m\angle A = (11x + 13)°$, $m\angle B = (9x - 24)°$, and $\angle A$ is a right angle, find the difference in the measures of the two angles.

$\angle A$: $11x+13=90$

$11x=77$

$x=7$

$m\angle A = 11(7)+13$

$m\angle A = 77+13$

$m\angle A = 90°$

$m\angle B = 9(7)-24$

$m\angle B = 63-24$

$m\angle B = 39°$

$90° - 39° = \boxed{51°}$

15. The measure of $\angle M$ is seven degrees less than the measure of $\angle N$. If the sum of the measures of the two angles is 59°, find the measure of each angle.

$m\angle M = x-7$

$m\angle N = x$

$x+x-7=59$

$2x-7=59$

$2x=66$

$x=33$

$m\angle M = 33-7$

$\boxed{m\angle M = 26°}$

$\boxed{m\angle N = 33°}$

16. The measure of $\angle W$ is nineteen degrees more than three times the measure of $\angle V$. If the sum of the measures of the two angles is 199°, find the measure of each angle.

$m\angle W = 3x+19$

$m\angle V = x$

$x+3x+19=199$

$4x+19=199$

$4x=180$

$x=45$

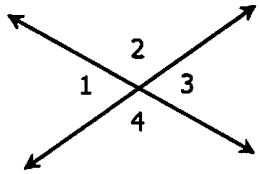
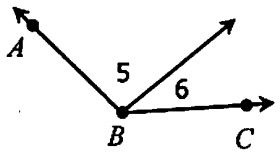
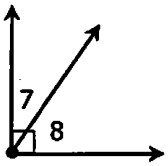
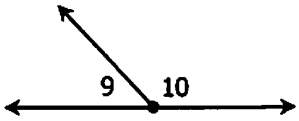
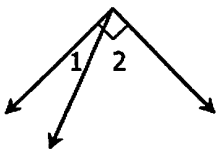
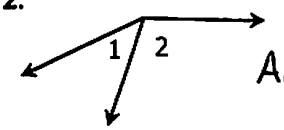
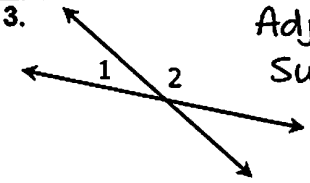
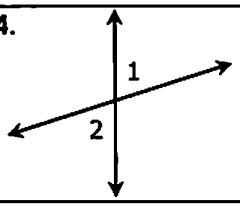
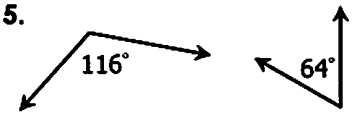
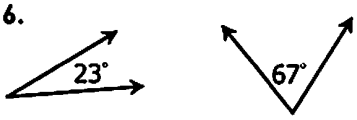
$m\angle W = 3(45)+19$

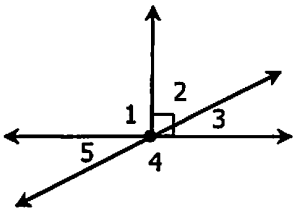
$m\angle W = 135+19$

$\boxed{m\angle W = 154°}$

$\boxed{m\angle V = 45°}$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples	
	Diagram	**Description**
VERTICAL ANGLES		**Vertical angles** are two angles that are across of each other when two lines intersect. These angles are congruent. $\angle 1 \cong \angle 3, \angle 2 \cong \angle 4$ ($m\angle 1 = m\angle 3$, $m\angle 2 = m\angle 4$)
ADJACENT ANGLES		**Adjacent angles** are two angles that share a common vertex and side. They are next to each other. $m\angle 5 + m\angle 6 = m\angle ABC$
COMPLEMENTARY ANGLES		**Complementary angles** are any two angles in which the sum of their measures is 90°. $m\angle 7 + m\angle 8 = 90°$
SUPPLEMENTARY ANGLES		**Supplementary angles** are any two angles in which the sum of their measures is 180°. $m\angle 9 + m\angle 10 = 180°$
	Complementary and supplementary angles do NOT have to be adjacent!	
Classifying Angles	**Directions:** Classify each pair of angles using all names that apply.	
	1.  Adjacent, Complimentary	2.  Adjacent
	3.  Adjacent, Supplementary	4.  Vertical
	5.  Supplementary	6.  Complementary



Directions: Using the diagram to the left, classify each angle pair using all names that apply.

7. $\angle 2$ and $\angle 3$

Adjacent, Complementary

8. $\angle 3$ and $\angle 4$

Adjacent, Supplementary

9. $\angle 1$ and $\angle 2$

Adjacent

10. $\angle 3$ and $\angle 5$

Vertical

11. $\angle 4$ and $\angle 5$

Adjacent, Supplementary

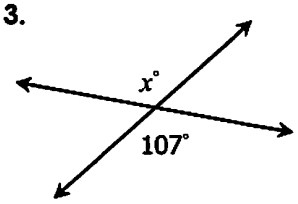
12. $\angle 1$ and $\angle 5$

Adjacent

Finding Angle Measures

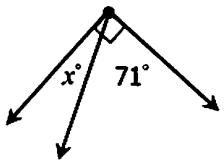
Directions: Find each missing angle measure.

13.



$X = 107°$

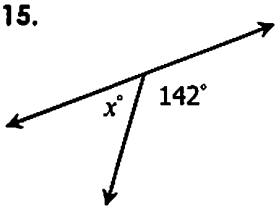
14.



$X + 71 = 90$

$X = 19°$

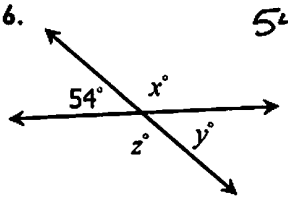
15.



$X + 142 = 180$

$X = 38°$

16.



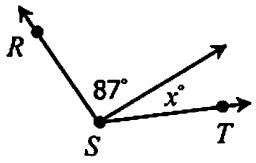
$54 + X = 180$

$X = 126°$

$Y = 54°$

$Z = 126°$

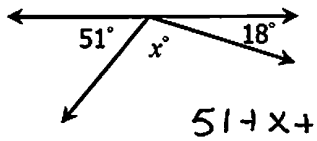
17. Given: $m\angle RST = 112°$



$87 + X = 112$

$X = 25°$

18.

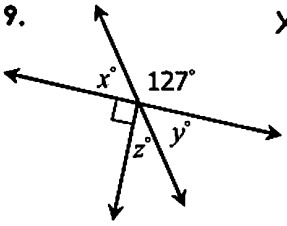


$51 + X + 18 = 180$

$X + 69 = 180$

$X = 111°$

19.



$X + 127 = 180$

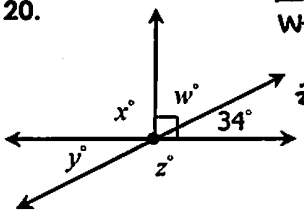
$X = 53°$

$Y = 53°$

$Z + 53 = 90$

$Z = 37°$

20.



$W + 34 = 90$

$W = 56°$

$Z + 34 = 180$

$Z = 146°$

$Y = 34°$

$X = 90°$

Word Problems

21. If $\angle G$ and $\angle H$ are supplementary angles and $m\angle H = 51°$, find $m\angle G$.

$X + 51 = 180$

$X = 129$

$m\angle G = 129°$

22. If $\angle 1$ and $\angle 2$ are vertical angles and $m\angle 1 = 128°$, find $m\angle 2$.

$m\angle 2 = 128°$

23. If $\angle J$ and $\angle K$ are complementary angles and $m\angle K = 73°$, find $m\angle J$.

$X + 73 = 90$

$X = 17$

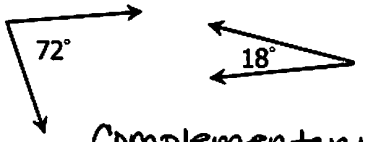
$m\angle J = 17°$

Name: _____ **Unit 7:** Geometry

Date: _____ **Per:** _____ **Homework 2:** Angle Relationships

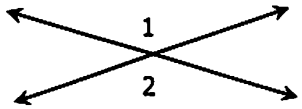
Directions: Classify the angle pair using all names that apply.

1.



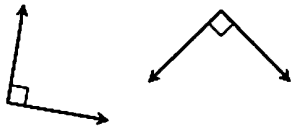
Complementary

2.



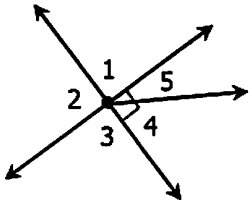
Vertical

3.



Supplementary

Directions: Using the diagram below, classify the angle pairs using all names that apply.



4. $\angle 3$ and $\angle 4$

Adjacent

5. $\angle 1$ and $\angle 3$

Vertical, Supplementary

6. $\angle 2$ and $\angle 3$

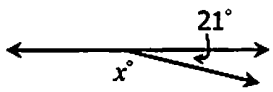
Adjacent, Supplementary

7. $\angle 4$ and $\angle 5$

Adjacent, Complementary

Directions: Find each missing measure.

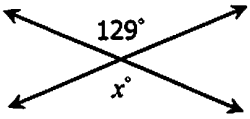
8.



$x + 21 = 180$

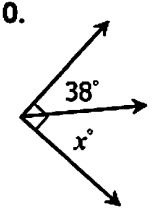
$x = 159°$

9.



$x = 129°$

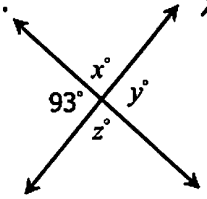
10.



$x + 38 = 90$

$x = 52°$

11.



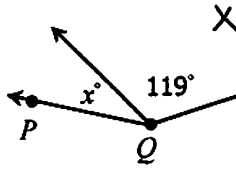
$x + 93 = 180$

$x = 87°$

$y = 93°$

$z = 87°$

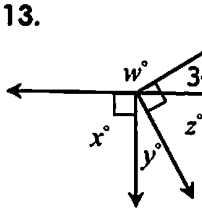
12. Given: $m\angle PQR = 147°$



$x + 119 = 147$

$x = 28°$

13.



$w + 34 = 180$

$w = 146°$

$z + 34 = 90$

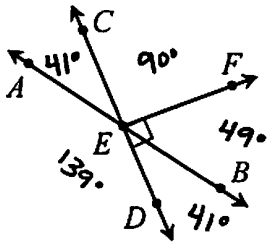
$z = 56°$

$x = 90°$

$90 + y + 56 = 180$

$y = 34°$

Directions: Use the diagram below, if $m\angle AEC = 41°$, find each angle measure.



14. $m\angle AED$

$41 + x = 180$

$x = 139°$

15. $m\angle CEF$

$90°$

16. $m\angle DEB$

$41°$

17. $m\angle BEF$

$41 + x = 90$

$x = 49°$

18. $m\angle CEB$

$90 + 49 = x$

$139°$

19. $m\angle AEF$

$41 + 90 = x$

$131°$

20. If $\angle PQR$ and $\angle SQT$ are vertical angles and $m\angle SQT = 109°$, find $m\angle PQR$.

$m\angle PQR = 109°$

21. If $\angle 2$ and $\angle 3$ are complementary angles and $m\angle 2 = 24°$, find $m\angle 3$.

$24 + x = 90$

$x = 66$

$m\angle 3 = 66°$

22. If $\angle K$ and $\angle L$ are supplementary angles and $m\angle K = 56°$, find $m\angle L$.

$56 + x = 180$

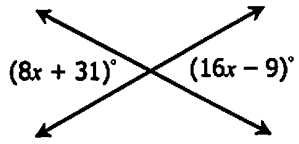
$x = 124$

$m\angle L = 124°$

ANGLE RELATIONSHIPS & Algebra

Directions: Classify the angle pair as vertical, complementary, or supplementary, then find the value of x.

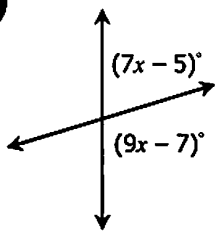
1



Vertical

$8x+31=16x-9$
$31=8x-9$
$40=8x$
$\boxed{5=x}$

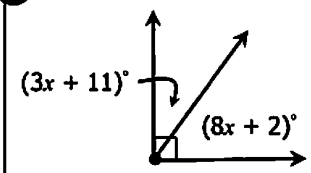
2



Supplementary

$7x-5+9x-7=180$
$16x-12=180$
$16x=192$
$\boxed{x=12}$

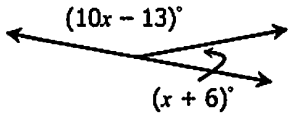
3



Complementary

$3x+11+8x+2=90$
$11x+13=90$
$11x=77$
$\boxed{x=7}$

4

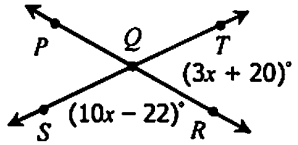


Supplementary

$10x-13+x+6=180$
$11x-7=180$
$11x=187$
$\boxed{x=17}$

Directions: Find each angle measure.

5

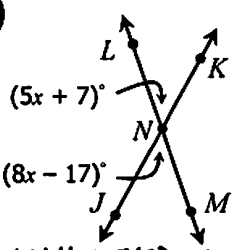


$10x-22+3x+20=180$
$13x-2=180$
$13x=182$
$x=14$

$m\angle SQR = 10(14)-22 = 140-22 = 118$
$m\angle QRT = 3(14)+20 = 42+20 = 62$

$m\angle SQR =$ 118°
$m\angle RQT =$ 62°

6

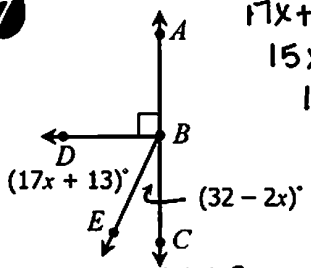


$5x+7=8x-17$
$7=3x-17$
$24=3x$
$x=8$

$m\angle LNK = 5(8)+7 = 40+7 = 47$
$m\angle JNM = 8(8)-17 = 64-17 = 47$

$m\angle LNK =$ 47°
$m\angle JNM =$ 47°

7

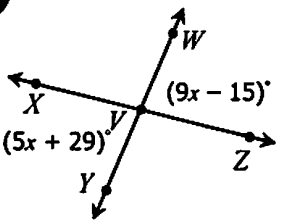


$17x+13+32-2x=90$
$15x+45=90$
$15x=45$
$x=3$

$m\angle DBE = 17(3)+13 = 51+13 = 64$
$m\angle CBE = 32-2(3) = 32-6 = 26$

$m\angle DBE =$ 64°
$m\angle CBE =$ 26°

8

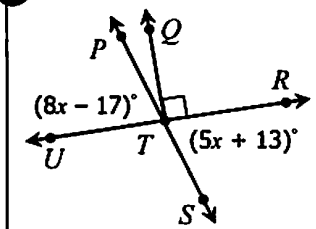


$9x-15=5x+29$
$4x-15=29$
$4x=44$
$x=11$

$m\angle WVZ = 9(11)-15 = 99-15 = 84$
$m\angle XVW = 180-84 = 96$

$m\angle WVZ =$ 84°
$m\angle XVW =$ 96°

9

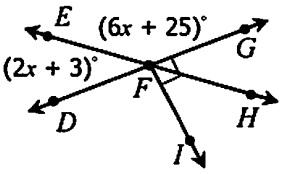


$8x-17=5x+13$
$3x-17=13$
$3x=30$
$x=10$

$m\angle RTS = 5(10)+13 = 50+13 = 63$
$m\angle PTQ = 90-63 = 27$

$m\angle RTS =$ 63°
$m\angle PTQ =$ 27°

10

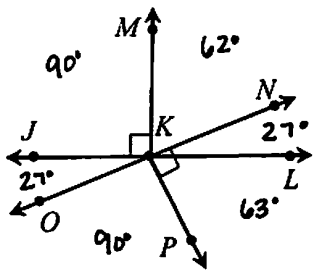


$2x+3+6x+25=180$
$8x+28=180$
$8x=152$
$x=19$

$m\angle EFG = 6(19)+25 = 139$
$m\angle IFH = 90-41 = 49$

$m\angle EFG =$ 139°
$m\angle IFH =$ 49°

11 Given $m\angle JKN = (15x - 13)^\circ$ and $m\angle NKL = (3x - 5)^\circ$, find each angle measure.



$15x - 13 + 3x - 5 = 180$
$18x - 18 = 180$
$18x = 198$
$x = 11$

$m\angle JKN = 15(11) - 13 = 165 - 13 = 152$
$m\angle NKL = 3(11) - 5 = 33 - 5 = 28$
$m\angle LKP = 90 - 28 = 62$
$m\angle JKP = 28 + 90 = 118$

$m\angle JKN =$ 152°
$m\angle NKL =$ 28°
$m\angle LKP =$ 62°
$m\angle JKP =$ 118°

12 $\angle R$ and $\angle S$ are complementary angles. If $m\angle R = (2x + 7)^\circ$ and $m\angle S = (4x - 13)^\circ$, find $m\angle R$.

$2x + 7 + 4x - 13 = 90$
$6x - 6 = 90$
$6x = 96$
$x = 16$

$m\angle R = 2(16) + 7$
$= 32 + 7$
$= 39°$

13 $\angle 1$ and $\angle 2$ are vertical angles. If $m\angle 1 = (7x + 1)^\circ$ and $m\angle 2 = (5x + 47)^\circ$, find $m\angle 2$.

$7x + 1 = 5x + 47$
$2x + 1 = 47$
$2x = 46$
$x = 23$

$m\angle 2 = 5(23) + 47$
$= 115 + 47$
$= 162°$

14 $\angle C$ and $\angle D$ are supplementary angles. If $m\angle C = (12x - 7)^\circ$ and $m\angle D = (16x + 19)^\circ$, find $m\angle C$.

$12x - 7 + 16x + 19 = 180$
$28x + 12 = 180$
$28x = 168$
$x = 6$

$m\angle C = 12(6) - 7$
$= 72 - 6$
$= 65°$

15 $\angle P$ and $\angle Q$ are supplementary angles. If $m\angle P$ is 21 degrees less than twice the measure of $\angle Q$, find the measure of each angle.

$m\angle P = 2x - 21$
$m\angle Q = x$

$2x - 21 + x = 180$
$3x - 21 = 180$
$3x = 201$
$x = 67$

$m\angle P = 2(67) - 21$
$= 134 - 21$
$= 113°$
$m\angle Q = 67°$

16 $\angle A$ and $\angle B$ are complementary angles. If $m\angle B$ is five degrees more than four times $m\angle A$, find the measure of each angle.

$m\angle A = x$
$m\angle B = 4x + 5$

$x + 4x + 5 = 90$
$5x + 5 = 90$
$5x = 85$
$x = 17$

$m\angle A = 17°$
$m\angle B = 4(17) + 5$
$= 68 + 5$
$= 73°$

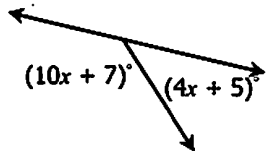
Name: _____ **Unit 7:** Geometry

Date: _____ **Per:** _____ **Homework 3:** Angle Relationships & Algebra

**** This is a 2-page document! ****

Directions: Classify the angle pair as vertical, complementary, or supplementary, then find the value of x.

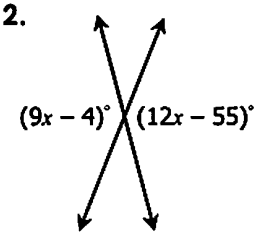
1.



Supplementary

$10x+7+4x+5=180$
$14x+12=180$
$14x=168$
$\boxed{x=12}$

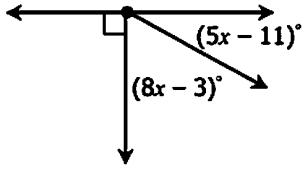
2.



Vertical

$9x-4=12x-55$
$-4=3x-55$
$51=3x$
$\boxed{x=17}$

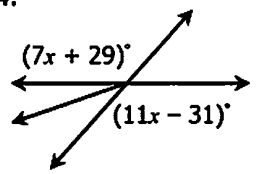
3.



Complementary

$8x-3+5x-11=90$
$13x-14=90$
$13x=104$
$\boxed{x=8}$

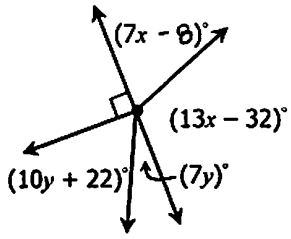
4.



Vertical

$7x+29=11x-31$
$29=4x-31$
$60=4x$
$\boxed{x=15}$

5. Find the value of x and y.

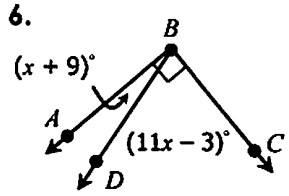


$7x-8+13x-32=180$
$20x-40=180$
$20x=220$
$\boxed{x=11}$

$10y+22+7y=90$
$17y+22=90$
$17y=68$
$\boxed{y=4}$

Directions: Find each angle measure.

6.

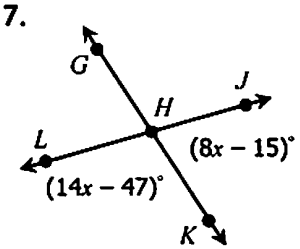


$x+9+11x-3=90$
$12x+6=90$
$12x=84$
$x=7$

$m\angle ABD = 7+9 = 16$
$m\angle DBC = 11(7)-3 = 77-3 = 74$

$m\angle ABD =$ 16°
$m\angle DBC =$ 74°

7.

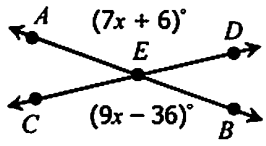


$14x-47+8x-15=180$
$22x-62=180$
$22x=242$
$x=11$

$m\angle LHK = 14(11)-47 = 154-47 = 107$
$m\angle KHJ = 8(11)-15 = 88-15 = 73$

$m\angle LHK =$ 107°
$m\angle KHJ =$ 73°

8.

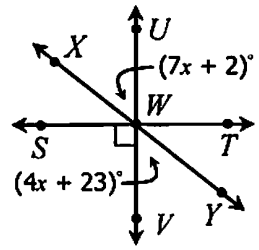


$7x+6=9x-36$
$6=2x-36$
$42=2x$
$x=21$

$m\angle AED = 7(21)+6 = 147+6 = 153$
$m\angle DEB = 180-153 = 27$

$m\angle AED =$ 153°
$m\angle DEB =$ 27°

9.

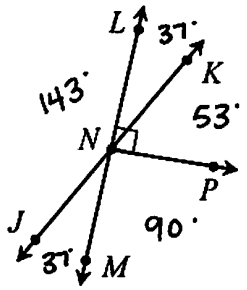


$7x+2=4x+23$
$3x+2=23$
$3x=21$
$x=7$

$m\angle VWY = 4(7)+23 = 28+23 = 51$
$m\angle SWX = 90-51 = 39$

$m\angle VWY =$ 51°
$m\angle SWX =$ 39°

10. Given $m\angle JNM = (7x + 2)^\circ$ and $m\angle KNP = (10x+3)^\circ$, find each angle measure.



$10x+3+90+7x+2=180$
$17x+95=180$
$17x=85$
$x=5$

$m\angle KNP = 10(5)+3 = 53$
$m\angle LNK = 90-53 = 37$
$m\angle JNL = 180-37 = 143$
$m\angle JNP = 37+90 = 127$

$m\angle KNP = 53^\circ$
$m\angle LNK = 37^\circ$
$m\angle JNL = 143^\circ$
$m\angle JNP = 127^\circ$

11. $\angle E$ and $\angle F$ are vertical angles. If $m\angle E = (5x + 55)^\circ$ and $m\angle F = (11x - 53)^\circ$, find $m\angle E$.

$5x+55 = 11x-53$
$55 = 6x-53$
$108 = 6x$
$x = 18$

$m\angle E = 5(18)+55$
$= 90+55$
$= 145^\circ$

12. $\angle Q$ and $\angle R$ are complementary angles. If $m\angle Q = (31 - 3x)^\circ$ and $m\angle R = (19x - 5)^\circ$, find $m\angle R$.

$31-3x+19x-5=90$
$16x+26=90$
$16x=64$
$x=4$

$m\angle R = 19(4)-5$
$= 76-5$
$= 71^\circ$

13. $\angle 1$, $\angle 2$, and $\angle 3$ are adjacent angles, with $\angle 1$ supplementary to $\angle 2$ and $\angle 2$ complementary to $\angle 3$. If $m\angle 1 = (8x + 3)^\circ$ and $m\angle 2 = (5x - 18)^\circ$, find $m\angle 3$.

$8x+3+5x-18 = 180$
$13x-15 = 180$
$13x = 195$
$x = 15$

$m\angle 2 = 5(15)-18$
$= 75-18$
$= 57$
$m\angle 3 = 90-57$
$= 33$

$m\angle 3 = 33^\circ$

14. $\angle A$ and $\angle B$ are complementary angles. If $m\angle B$ is fourteen degrees more than the measure of $\angle A$, find the measure of each angle.

$m\angle A = x$
$m\angle B = x+14$

$x+x+14=90$
$2x+14=90$
$2x=76$
$x=38$

$m\angle A = 38^\circ$

$m\angle B = 38+14$
$= 52^\circ$

15. $\angle V$ and $\angle W$ are supplementary angles. If $m\angle V$ is two degrees less than six times the measure of $\angle W$, find the measure of each angle.

$m\angle V = 6x-2$
$m\angle W = x$

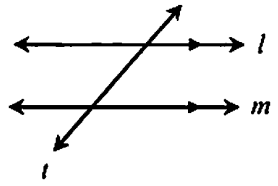
$6x-2+x = 180$
$7x-2 = 180$
$7x = 182$
$x = 26$

$m\angle V = 6(26)-2$
$= 156-2$
$= 154^\circ$
$m\angle W = 26^\circ$

Name:	Date:
Topic:	Class:

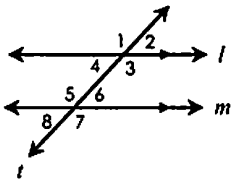
Main Ideas/Questions	Notes/Examples

PARALLEL LINES & Transversals



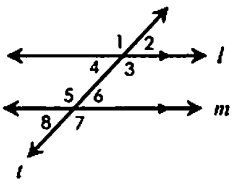
- Two lines that never intersect are called **parallel lines.**
- Arrows on lines indicate that they are parallel.
- Symbol for parallel: ||
- A line that intersect two or more lines is called a **transversal.**
- In the diagram to the left, $l \parallel m$ and the transversal is t.

SPECIAL ANGLE PAIRS



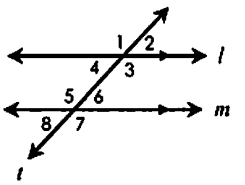
Corresponding Angles are in the **same position** on the parallel lines in relation to the transversal. These angles are always congruent.

$\angle 1 \cong \angle 5$, $\angle 2 \cong \angle 6$, $\angle 3 \cong \angle 7$, $\angle 4 \cong \angle 8$



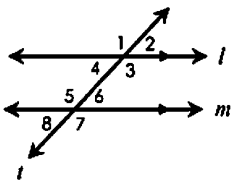
Alternate Interior Angles are **inside** the parallel lines and on **opposite** sides of the transversal. These angles are always congruent.

$\angle 4 \cong \angle 6$, $\angle 3 \cong \angle 5$



Alternate Exterior Angles are **outside** the parallel lines and on **opposite** sides of the transversal. These angles are always congruent.

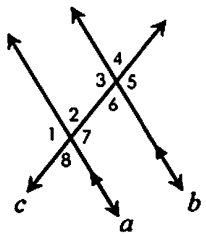
$\angle 1 \cong \angle 7$, $\angle 2 \cong \angle 8$



Consecutive Interior Angles are on the **same side** of the transversal and **inside** the parallel lines. These angles are always supplementary.

$m\angle 3 + m\angle 6 = 180$, $m\angle 4 + m\angle 5 = 180$

Practice Classifying



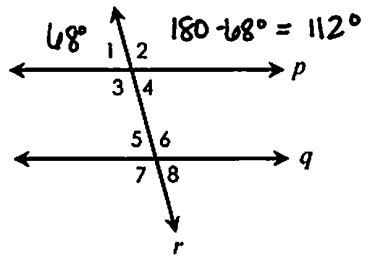
Directions: Using the diagram to the left, classify each angle pair and indicate whether they are congruent or supplementary.

1. $\angle 1$ and $\angle 5$ Alternate Exterior, Congruent	2. $\angle 6$ and $\angle 8$ Corresponding, Congruent
3. $\angle 2$ and $\angle 3$ Consecutive Interior, Supplementary	4. $\angle 3$ and $\angle 7$ Alternate Interior, Congruent
5. $\angle 2$ and $\angle 4$ Corresponding, Congruent	6. $\angle 6$ and $\angle 7$ Consecutive Interior, Supplementary
7. $\angle 2$ and $\angle 6$ Alternate Interior, Congruent	8. $\angle 4$ and $\angle 8$ Alternate Exterior, Congruent

Finding Angle Measures

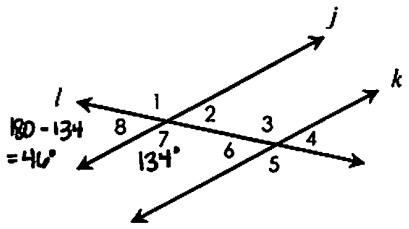
Directions: Find each angle measure.

1. Given: $p \parallel q$; $m\angle 1 = 68°$



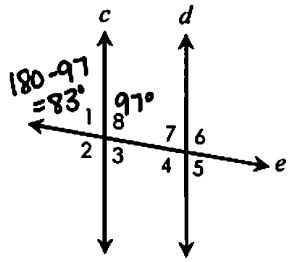
$m\angle 2 =$ 112°	$m\angle 6 =$ 112°
$m\angle 3 =$ 112°	$m\angle 7 =$ 112°
$m\angle 4 =$ 68°	$m\angle 8 =$ 68°
$m\angle 5 =$ 68°	

2. Given: $j \parallel k$; $m\angle 7 = 134°$



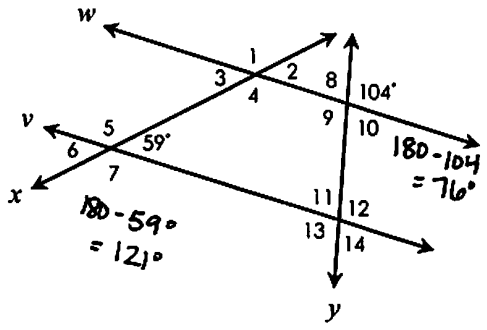
$m\angle 1 =$ 134°	$m\angle 5 =$ 134°
$m\angle 2 =$ 46°	$m\angle 6 =$ 46°
$m\angle 3 =$ 134°	$m\angle 8 =$ 46°
$m\angle 4 =$ 46°	

3. Given: $c \parallel d$; $m\angle 8 = 97°$



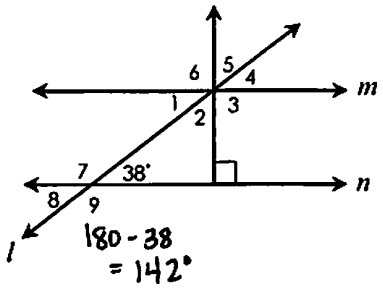
$m\angle 1 =$ 83°	$m\angle 5 =$ 83°
$m\angle 2 =$ 97°	$m\angle 6 =$ 97°
$m\angle 3 =$ 83°	$m\angle 7 =$ 83°
$m\angle 4 =$ 97°	

4. Given: $w \parallel v$



$m\angle 1 =$ 121°	$m\angle 8 =$ 76°
$m\angle 2 =$ 59°	$m\angle 9 =$ 104°
$m\angle 3 =$ 59°	$m\angle 10 =$ 76°
$m\angle 4 =$ 121°	$m\angle 11 =$ 76°
$m\angle 5 =$ 121°	$m\angle 12 =$ 104°
$m\angle 6 =$ 59°	$m\angle 13 =$ 104°
$m\angle 7 =$ 121°	$m\angle 14 =$ 76°

5. Given: $m \parallel n$

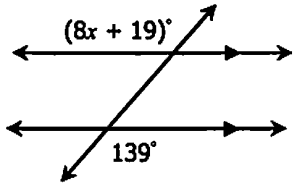


$m\angle 1 =$ 38°	$m\angle 6 =$ 90°
$m\angle 2 =$ 52°	$m\angle 7 =$ 142°
$m\angle 3 =$ 90°	$m\angle 8 =$ 38°
$m\angle 4 =$ 38°	$m\angle 9 =$ 142°
$m\angle 5 =$ 52°	

PARALLEL LINES, TRANSVERSALS & Algebra

Directions: Classify the angle pair as corresponding, alternate interior, alternate exterior, or consecutive interior. Then find the value of x.

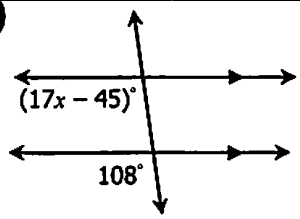
1



Alternate Exterior (≅)

$8x+19=139$
$8x=120$
$\boxed{x=15}$

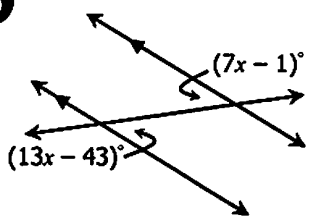
2



Corresponding (≅)

$17x-45=108$
$17x=153$
$\boxed{x=9}$

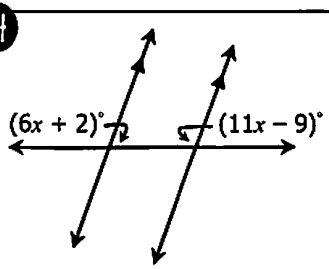
3



Alternate Interior (≅)

$13x-43=7x-1$
$6x-43=-1$
$6x=42$
$\boxed{x=7}$

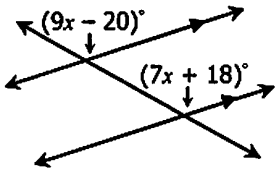
4



Consecutive Interior (180)

$6x+2+11x-9=180$
$17x-7=180$
$17x=187$
$\boxed{x=11}$

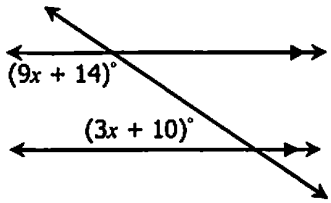
5



Corresponding (≅)

$9x-20=7x+18$
$2x-20=18$
$2x=38$
$\boxed{x=19}$

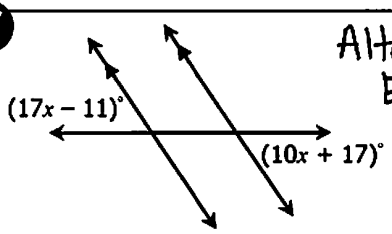
6



Consecutive Interior (180)

$9x+14+3x+10=180$
$12x+24=180$
$12x=156$
$\boxed{x=13}$

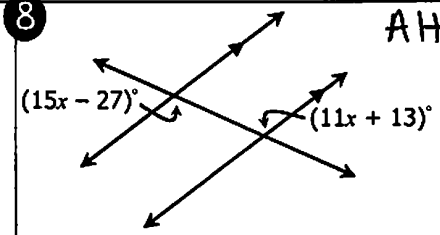
7



Alternate Exterior (≅)

$17x-11=10x+17$
$7x-11=17$
$7x=28$
$\boxed{x=4}$

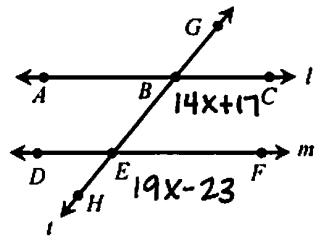
8



Alternate Interior (≅)

$15x-27=11x+13$
$4x-27=13$
$4x=40$
$\boxed{x=10}$

9 If $l \parallel m$, $m\angle CBE = (14x + 17)^\circ$, and $m\angle FEH = (19x - 23)^\circ$, find $m\angle CBE$.

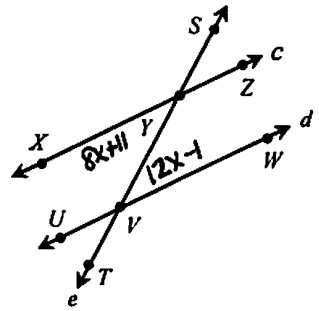


Corresponding ($\cong$)

$14x+17 = 19x-23$
$17 = 5x-23$
$40 = 5x$
$8 = x$

$m\angle CBE = 14(8)+17$
$= 112+17$
$= 129^\circ$

10 If $c \parallel d$, $m\angle XYV = (8x + 11)^\circ$, and $m\angle YVW = (12x - 1)^\circ$, find $m\angle YVW$.

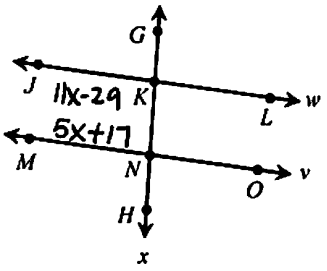


Alternate Interior ($\cong$)

$8x+11 = 12x-1$
$8x+12 = 12x$
$12 = 4x$
$3 = x$

$m\angle YVW = 12(3)-1$
$= 36-1$
$= 35^\circ$

11 If $w \parallel v$, $m\angle JKN = (11x - 29)^\circ$, and $m\angle MNK = (5x + 17)^\circ$, find $m\angle JKN$.

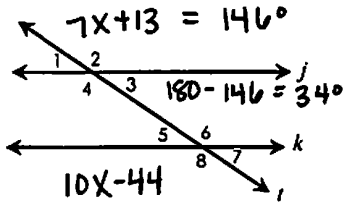


Consecutive Interior (180)

$11x-29+5x+17 = 180$
$16x-12 = 180$
$16x = 192$
$x = 12$

12 If $j \parallel k$, $m\angle 2 = (7x + 13)^\circ$, and $m\angle 8 = (10x - 44)^\circ$, find each angle measure.

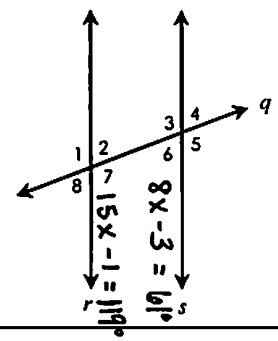
Alt. Exterior ($\cong$)



$7x+13 = 10x-44$
$13 = 3x-44$
$57 = 3x$
$19 = x$

$m\angle 1 =$ 34° $m\angle 5 =$ 34°
$m\angle 2 =$ 146° $m\angle 6 =$ 146°
$m\angle 3 =$ 34° $m\angle 7 =$ 34°
$m\angle 4 =$ 146° $m\angle 8 =$ 146°

13 If $r \parallel s$, $m\angle 6 = (8x - 3)^\circ$, and $m\angle 7 = (15x - 1)^\circ$, find each angle measure.



Consecutive Interior (180)

$8x-3+15x-1 = 180$
$23x-4 = 180$
$23x = 184$
$x = 8$

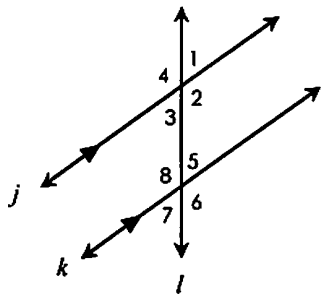
$m\angle 1 =$ 119° $m\angle 5 =$ 119°
$m\angle 2 =$ 61° $m\angle 6 =$ 61°
$m\angle 3 =$ 119° $m\angle 7 =$ 119°
$m\angle 4 =$ 61° $m\angle 8 =$ 61°

Name: _____ **Unit 7:** Geometry

Date: _____ **Per:** _____ **Homework 4:** Parallel Lines & Transversals

**** This is a 2-page document! ****

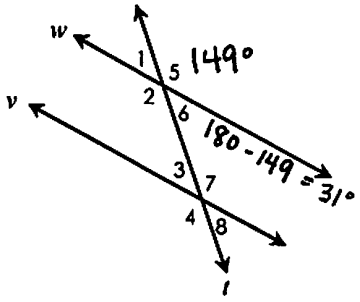
Directions: Classify each angle pair and indicate whether they are congruent or supplementary.



1. $\angle 3$ and $\angle 5$ Alternate Interior, Congruent	**2.** $\angle 4$ and $\angle 8$ Corresponding, Congruent
3. $\angle 2$ and $\angle 5$ Consecutive Interior, Supplementary	**4.** $\angle 2$ and $\angle 8$ Alternate Interior, Congruent
5. $\angle 1$ and $\angle 7$ Alternate Exterior, Congruent	**6.** $\angle 2$ and $\angle 6$ Corresponding, Congruent

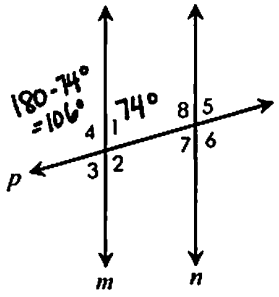
Directions: Find each angle measure.

7. Given: $w \parallel v$; $m\angle 5 = 149°$



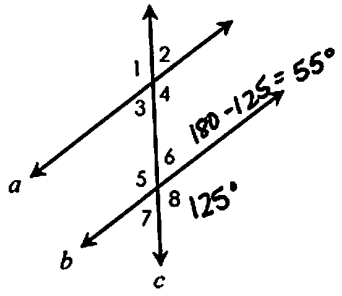
$m\angle 1 = 31°$	$m\angle 2 = 149°$
$m\angle 3 = 31°$	$m\angle 4 = 149°$
$m\angle 6 = 31°$	$m\angle 7 = 149°$
$m\angle 8 = 31°$	

8. Given: $m \parallel n$; $m\angle 1 = 74°$



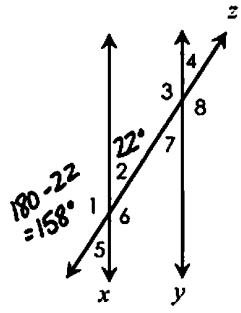
$m\angle 2 = 106°$	$m\angle 3 = 74°$
$m\angle 4 = 106°$	$m\angle 5 = 74°$
$m\angle 6 = 106°$	$m\angle 7 = 74°$
$m\angle 8 = 106°$	

9. Given: $a \parallel b$; $m\angle 8 = 125°$



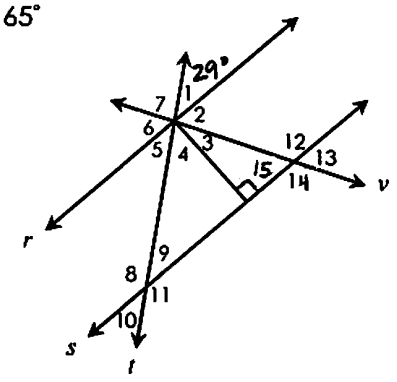
$m\angle 1 = 125°$	$m\angle 2 = 55°$
$m\angle 3 = 55°$	$m\angle 4 = 125°$
$m\angle 5 = 125°$	$m\angle 6 = 55°$
$m\angle 7 = 55°$	

10. Given: $a \parallel b$; $m\angle 2 = 22°$



$m\angle 1 = 158°$	$m\angle 3 = 158°$
$m\angle 4 = 22°$	$m\angle 5 = 22°$
$m\angle 6 = 158°$	$m\angle 7 = 22°$
$m\angle 8 = 158°$	

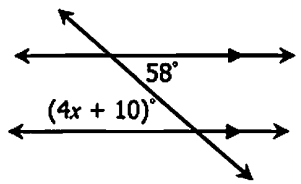
11. Given: $r \parallel s$; $m\angle 1 = 29°$; $m\angle 15 = 65°$



$m\angle 2 = 65°$	$m\angle 9 = 29°$
$m\angle 3 = 25°$	$m\angle 10 = 29°$
$m\angle 4 = 61°$	$m\angle 11 = 151°$
$m\angle 5 = 29°$	$m\angle 12 = 115°$
$m\angle 6 = 65°$	$m\angle 13 = 65°$
$m\angle 7 = 86°$	$m\angle 14 = 115°$
$m\angle 8 = 151°$	

Directions: Classify each angle pair, then find the value of x.

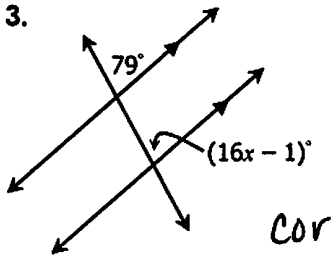
12.



Alternate Interior ($\cong$)

$4x+10 = 58$
$4x = 48$
$\boxed{x = 12}$

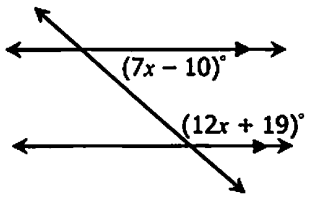
13.



Corresponding ($\cong$)

$16x-1 = 79$
$16x = 80$
$\boxed{x = 5}$

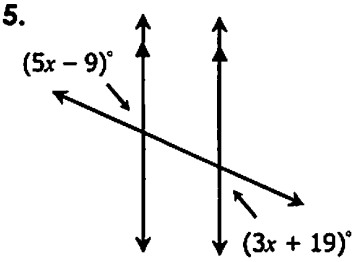
14.



Consecutive Interior (180)

$7x-10+12x+19 = 180$
$19x+9 = 180$
$19x = 171$
$\boxed{x = 9}$

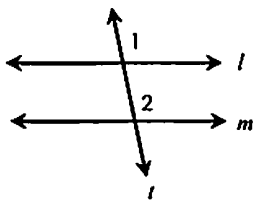
15.



Alternate Exterior ($\cong$)

$5x-9 = 3x+19$
$2x-9 = 19$
$2x = 28$
$\boxed{x = 14}$

16. If $l \parallel m$, $m\angle 1 = (6x + 5)°$, and $m\angle 2 = (9x - 46)°$, find $m\angle 1$.

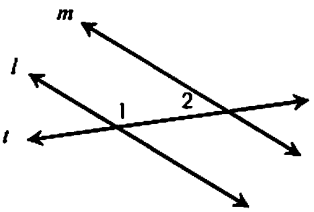


Corresponding ($\cong$)

$6x+5 = 9x-46$
$5 = 3x-46$
$51 = 3x$
$x = 17$

$m\angle 1 = 6(17)+5$
$= 102+5$
$= \boxed{107°}$

17. If $l \parallel m$, $m\angle 1 = (13x + 24)°$, and $m\angle 2 = (5x - 6)°$, find $m\angle 2$.

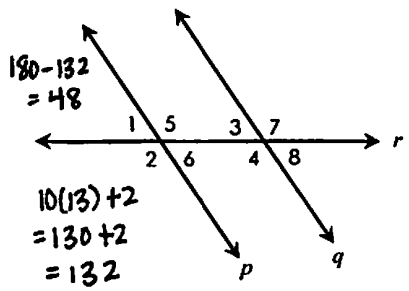


Consecutive Interior (180)

$13x+24+5x-6 = 180$
$18x+18 = 180$
$18x = 162$
$x = 9$

$m\angle 2 = 5(9)-6$
$= 45-6$
$= \boxed{39°}$

18. If $p \parallel q$, $m\angle 2 = (10x + 2)°$, and $m\angle 7 = (14x - 50)°$, find each angle measure.



180 − 132 = 48

10(13) + 2
= 130 + 2
= 132

Alternate Exterior ($\cong$)

$10x+2 = 14x-50$
$2 = 4x-50$
$52 = 4x$
$x = 13$

$m\angle 1 = \underline{48°}$ $m\angle 5 = \underline{132°}$
$m\angle 2 = \underline{132°}$ $m\angle 6 = \underline{48°}$
$m\angle 3 = \underline{48°}$ $m\angle 7 = \underline{132°}$
$m\angle 4 = \underline{132°}$ $m\angle 8 = \underline{48°}$

Name: _____ **Pre-Algebra**

Date: _____ **Per:** _____ **Unit 7:** Geometry

Quiz 7-1: Angles & Angle Relationships

1. If $m\angle A = (11x + 37)^\circ$ and $x = 13$, find $m\angle A$ and classify the angle.

$11(13) + 37$

$143 + 37$

$m\angle A =$ 180°

- ☐ Acute
- ☐ Right
- ☐ Obtuse
- ☑ Straight

2. If $m\angle P = (19x - 5)^\circ$ and $x = 4$, find $m\angle P$ and classify the angle.

$19(4) - 5$

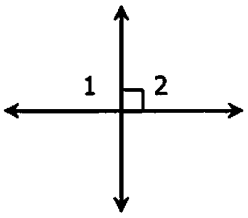
$76 - 5$

$m\angle P =$ 71°

- ☑ Acute
- ☐ Right
- ☐ Obtuse
- ☐ Straight

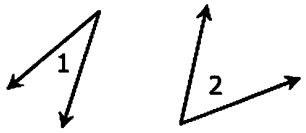
For questions 3 and 4, classify ∠1 and ∠2 using all names that apply.

3.



- ☑ Vertical
- ☑ Adjacent
- ☐ Complementary
- ☑ Supplementary

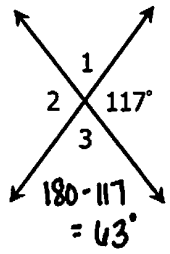
4. Given: $m\angle 1 = 28^\circ$; $m\angle 2 = 62^\circ$



- ☐ Vertical
- ☐ Adjacent
- ☑ Complementary
- ☐ Supplementary

For questions 5 and 6, find each angle measure.

5.

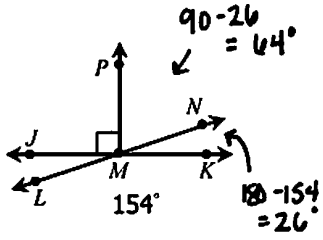


$m\angle 1 =$ 63°

$m\angle 2 =$ 117°

$m\angle 3 =$ 63°

6.



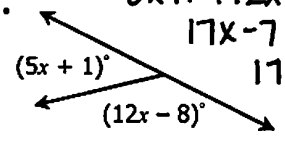
$m\angle JML =$ 26°

$m\angle PMN =$ 64°

$m\angle NMK =$ 26°

For questions 7 and 8, find the value of x.

7.



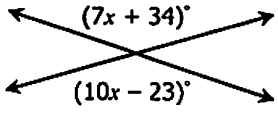
$5x + 1 + 12x - 8 = 180$

$17x - 7 = 180$

$17x = 187$

$x = 11$

8.



$7x + 34 = 10x - 23$

$34 = 3x - 23$

$57 = 3x$

$x = 19$

7. $x = 11$

8. $x = 19$

9. 141°

10. 108°

9. If $\angle R$ and $\angle S$ are supplementary angles and $m\angle R = 39^\circ$, find $m\angle S$.

$180 - 39 = 141$

10. If $\angle 1$ and $\angle 2$ are vertical angles and $m\angle 2 = 108^\circ$, find $m\angle 1$.

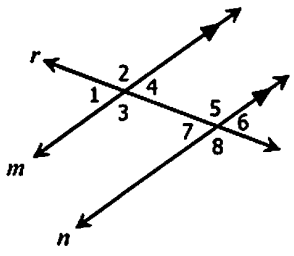
11. If $\angle C$ and $\angle D$ are complementary angles, $m\angle C = (4x + 3)^\circ$, and $m\angle D = (15x - 8)^\circ$, find $m\angle D$.

$4x+3+15x-8=90$
$19x-5=90$
$19x=95$
$x=5$

$m\angle D = 15(5)-8$
$= 75-8$
$= 67$

11. 67°

Using the diagram below, classify each angle pair as corresponding, alternate interior, alternate exterior, or consecutive interior.



12. $\angle 1$ and $\angle 6$ Alternate Exterior

13. $\angle 2$ and $\angle 5$ Corresponding

14. $\angle 4$ and $\angle 5$ Consecutive Interior

15. $\angle 3$ and $\angle 5$ Alternate Interior

16. Using the diagram above, if $m\angle 2 = 107^\circ$, find each angle measure.

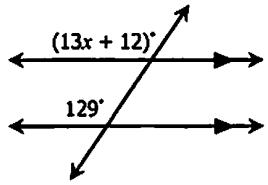
180-107 = 73

$m\angle 1 =$ 73° $m\angle 4 =$ 73° $m\angle 6 =$ 73° $m\angle 8 =$ 107°

$m\angle 3 =$ 107° $m\angle 5 =$ 107° $m\angle 7 =$ 73°

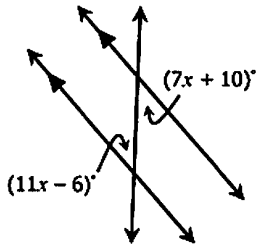
For questions 17 and 18, find the value of x.

17.



$13x+12=129$
$13x=117$
$x=9$

18.



$11x-6=7x+10$
$4x-6=10$
$4x=16$
$x=4$

17. x=9

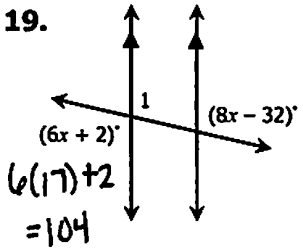
18. x=4

19. 104°

20. 29°

For questions 19 and 20, find $m\angle 1$.

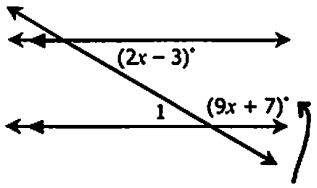
19.



$6x+2=8x-32$
$6x+34=8x$
$34=2x$
$17=x$

$6(17)+2$
$=104$

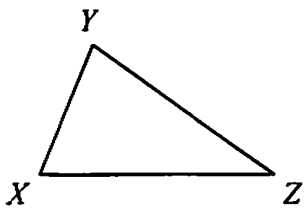
20.



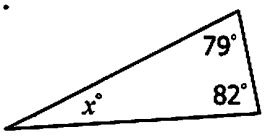
$2x-3+9x+7=180$
$11x+4=180$
$11x=176$
$x=16$

$9(16)+7$
$=144+7$
$=151$

Name:	Date:
Topic:	Class:

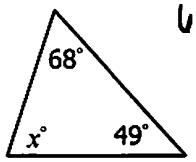
Main Ideas/Questions	Notes/Examples
Triangles  	• A triangle is a polygon with 3 sides and 3 angles. • On the triangle to the left, the **sides** are $\overline{XY}$, $\overline{YZ}$, and $\overline{XZ}$; the **angles** are $\angle X$, $\angle Y$, and $\angle Z$. • The angle sum theorem states that the sum of the measures of the three angles is always 180. Therefore, $m\angle X + m\angle Y + m\angle Z = 180$
Examples	**Directions:** Find each missing measure.

1.



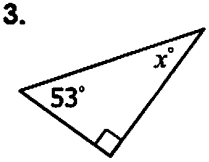
$79+82+x=180$
$x+161=180$
$\boxed{x=19°}$

2.



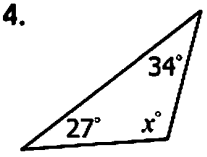
$68+49+x=180$
$x+117=180$
$\boxed{x=63°}$

3.



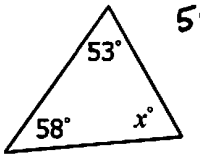
$53+90+x=180$
$143+x=180$
$\boxed{x=37°}$

4.



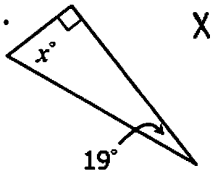
$27+34+x=180$
$61+x=180$
$\boxed{x=119°}$

5.



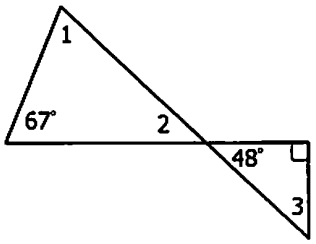
$58+53+x=180$
$111+x=180$
$\boxed{x=69°}$

6.



$x+90+19=180$
$x+109=180$
$\boxed{x=71°}$

7.

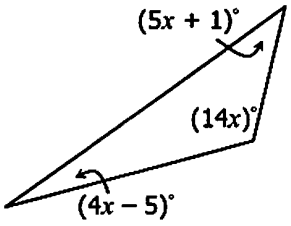


$48+90+x=180$
$138+x=180$
$x=42$

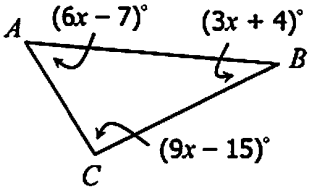
$67+48+y=180$
$115+y=180$
$y=65$

$m\angle 1 = 65°$
$m\angle 2 = 48°$
$m\angle 3 = 42°$

8. Find the value of x.



$5x+1+14x+4x-5=180$
$23x-4=180$
$23x=184$
$\boxed{x=8}$



9. Find the value of x, then find each angle measure.

$6x-7+3x+4+9x-15=180$

$18x-18=180$

$18x=198$

$x=11$

$m\angle A = 6(11)-7 = 66-7$ $m\angle A = \underline{59°}$

$m\angle B = 3(11)+4 = 33+4$ $m\angle B = \underline{37°}$

$m\angle C = 9(11)-15 = 99-15$ $m\angle C = \underline{84°}$

Types of Triangles

CLASSIFYING BY ANGLES

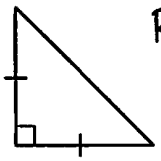
All Acute Angles	One Obtuse Angle	One Right Angle
		
Acute	Obtuse	Right

CLASSIFYING BY SIDES

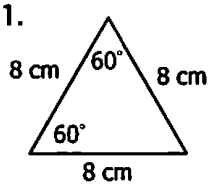
No Congruent Sides	Two Congruent Sides	All Sides Congruent
		
Scalene	Isosceles	Equilateral

Examples

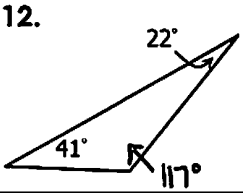
Directions: Classify each triangle by its angles and sides.

10. 

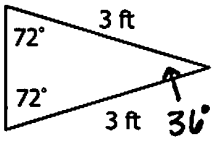
Right, Isosceles

11. 

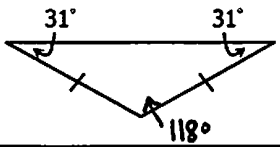
Acute, Equilateral

12. 

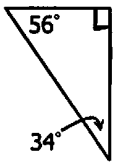
Obtuse, Scalene

13. 

Acute, Isosceles

14. 

Obtuse, Isosceles

15. 

Right, Scalene

16. In ΔJKL, $m\angle J = (5x-3)°$, $m\angle K = (11x+13)°$, and $m\angle L = (9x-5)°$. Find the measure of each angle, then classify ΔJKL by its angles.

$5x-3+11x+13+9x-5=180$

$25x+5=180$

$25x=175$

$x=7$

$m\angle J: 5(7)-3 = \boxed{32°}$

$m\angle K: 11(7)+13 = \boxed{90°}$

$m\angle L: 9(7)-5 = \boxed{58°}$

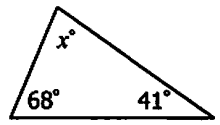
Right

Name: _____ **Unit 7:** Geometry

Date: _____ **Per:** _____ **Homework 5:** Triangles - Angles & Classifying

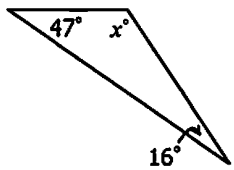
Directions: Find each missing measure.

1.



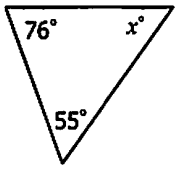
$X = 71°$

2.



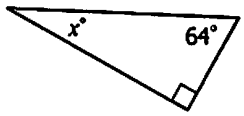
$X = 117°$

3.



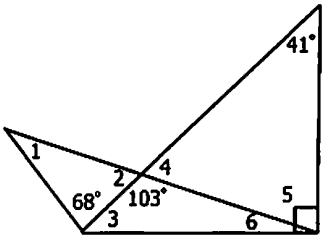
$X = 49°$

4.



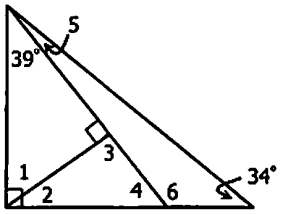
$X = 26°$

5.



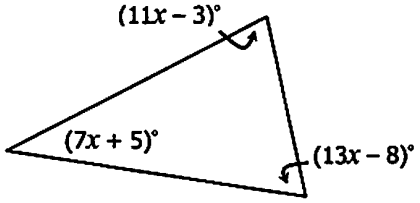
$m\angle 1 = 35°$
$m\angle 2 = 77°$
$m\angle 3 = 49°$
$m\angle 4 = 77°$
$m\angle 5 = 62°$
$m\angle 6 = 28°$

6.



$m\angle 1 = 51°$
$m\angle 2 = 39°$
$m\angle 3 = 90°$
$m\angle 4 = 51°$
$m\angle 5 = 17°$
$m\angle 6 = 129°$

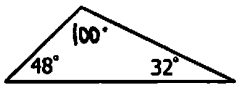
7. Find the value of x.



$11x - 3 + 7x + 5 + 13x - 8 = 180$
$31x - 6 = 180$
$31x = 186$
$\boxed{x = 6}$

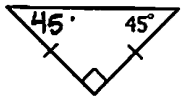
Directions: Classify each triangle by its angles and its sides.

8.



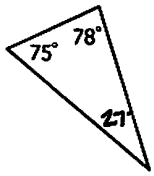
Obtuse, Scalene

9.



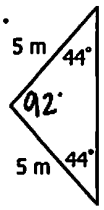
Right, Isosceles

10.



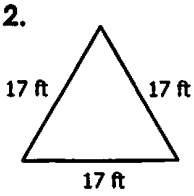
Acute, Scalene

11.



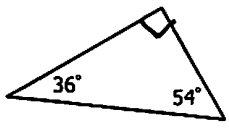
Obtuse, Isosceles

12.



Acute, Equilateral

13.



Right, Scalene

14. In ΔQRS, $m\angle Q = (4x - 17)°$, $m\angle R = (x + 6)°$, and $m\angle S = (10x - 4)°$. Find the measure of each angle, then classify ΔQRS by its angles.

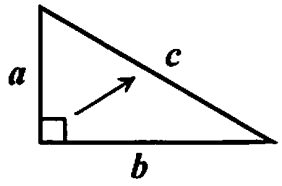
$4x - 17 + x + 6 + 10x - 4 = 180$
$15x - 15 = 180$
$15x = 195$
$x = 13$

$m\angle Q = 4(13) - 17$
$m\angle R = 13 + 6$
$m\angle S = 10(13) - 4$

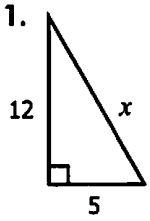
$m\angle Q = 35°$
$m\angle R = 19°$
$m\angle S = 126°$

Classify: Obtuse

Name:	Date:
Topic:	Class:

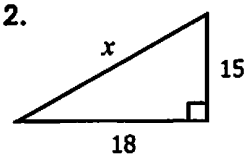
Main Ideas/Questions	Notes/Examples
Parts of a Right Triangle	 • Sides a and b are called legs • Side c is called the hypotenuse
What is the Pythagorean Theorem?	The **Pythagorean Theorem** is used to find a **missing side length** on a right triangle! **Formula:** $a^2 + b^2 = c^2$
Finding the Hypotenuse	**Directions:** Find x. Round to the nearest tenth when necessary.

1.



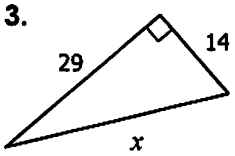
$12^2 + 5^2 = x^2$
$144 + 25 = x^2$
$169 = x^2$
$\sqrt{169} = \sqrt{x^2}$
$x = 13$

2.



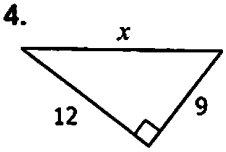
$18^2 + 15^2 = x^2$
$324 + 225 = x^2$
$549 = x^2$
$\sqrt{549} = \sqrt{x^2}$
$x = 23.4$

3.



$29^2 + 14^2 = x^2$
$841 + 196 = x^2$
$1037 = x^2$
$x = 32.2$

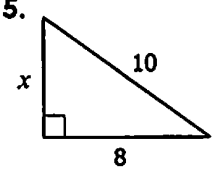
4.



$12^2 + 9^2 = x^2$
$144 + 81 = x^2$
$225 = x^2$
$x = 15$

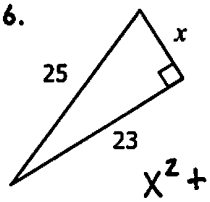
Finding a Leg	

5.



$x^2 + 8^2 = 10^2$
$x^2 + 64 = 100$
$x^2 = 36$
$x = 6$

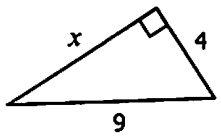
6.



$x^2 + 23^2 = 25^2$
$x^2 + 529 = 625$
$x^2 = 96$
$x = 9.8$

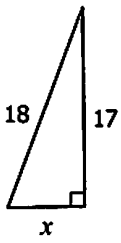
Mixed Practice

7.



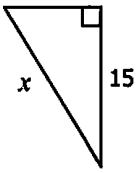
$x^2+4^2=9^2$
$x^2+16=81$
$x^2=65$
$x=8.1$

8.



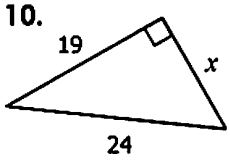
$x^2+17^2=18^2$
$x^2+289=324$
$x^2=35$
$x=5.9$

9.



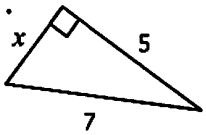
$10^2+15^2=x^2$
$100+225=x^2$
$325=x^2$
$x=18.0$

10.



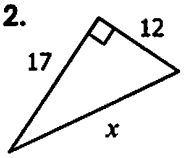
$x^2+19^2=24^2$
$x^2+361=576$
$x^2=215$
$x=14.7$

11.



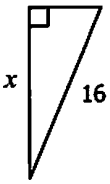
$x^2+5^2=7^2$
$x^2+25=49$
$x^2=24$
$x=4.9$

12.



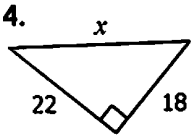
$17^2+12^2=x^2$
$289+144=x^2$
$433=x^2$
$x=20.8$

13.



$6^2+x^2=16^2$
$36+x^2=256$
$x^2=220$
$x=14.8$

14.



$22^2+18^2=x^2$
$484+324=x^2$
$808=x^2$
$x=28.4$

Testing for a Right Triangle

Directions: Determine if the three given side lengths form a right triangle.

15. 10 cm, 15 cm, 20 cm

$10^2+15^2=20^2$
$100+225=400$
$325\neq400$
No

16. 7 in, 24 in, 25 in

$7^2+24^2=25^2$
$49+576=625$
$625=625$
Yes

17. 4 ft, 9 ft, 10 ft

$4^2+9^2=10^2$
$16+81=100$
$97\neq100$
No

18. 14 m, 17m, 23 m

$14^2+17^2=23^2$
$196+289=529$
$485\neq529$
No

19. 20 yd, 21 yd, 29 yd

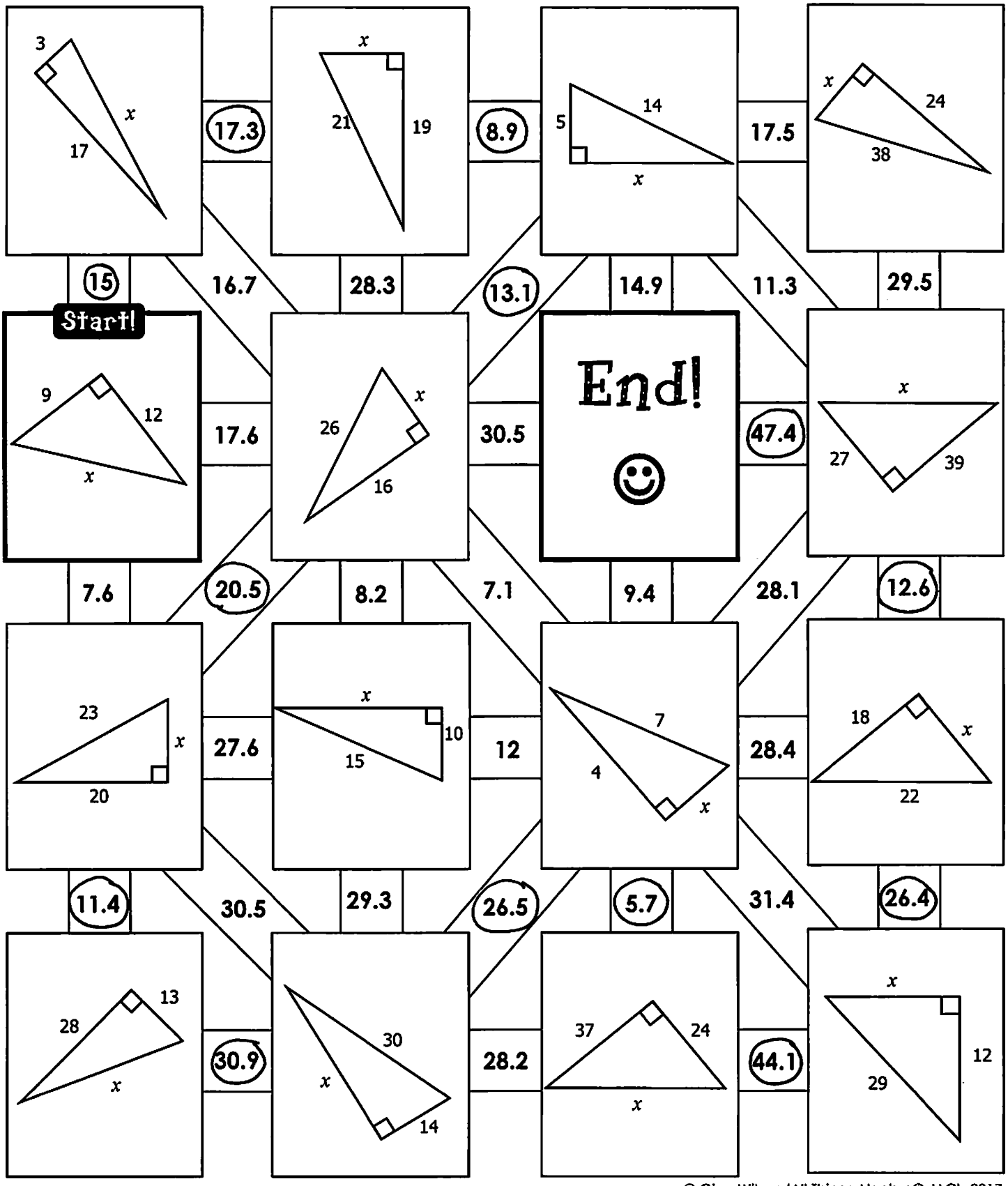
$20^2+21^2=29^2$
$400+441=841$
$841=841$
Yes

20. 8 cm, 8 cm, 11 cm

$8^2+8^2=11^2$
$64+64=121$
$128\neq121$
No

Pythagorean Theorem Maze!

Directions: Find each missing side. Round all answers to the nearest tenth.
Use your solutions to navigate through the maze. **Staple all work to this paper!**

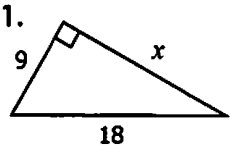


Name: _____ **Unit 7:** Geometry

Date: _____ **Per:** _____ **Homework 6:** The Pythagorean Theorem

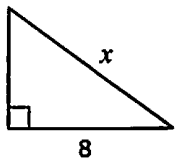
Directions: Find the missing side. Round to the nearest tenth when necessary.

1.



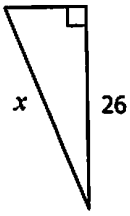
$X^2+9^2=18^2$
$X^2+81=324$
$X^2=243$
$X=15.6$

2.



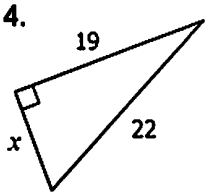
$5^2+8^2=X^2$
$25+64=X^2$
$89=X^2$
$X=9.4$

3.



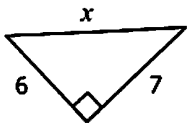
$12^2+26^2=X^2$
$144+676=X^2$
$820=X^2$
$X=28.6$

4.



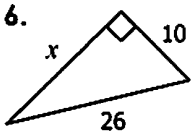
$X^2+19^2=22^2$
$X^2+361=484$
$X^2=123$
$X=11.1$

5.



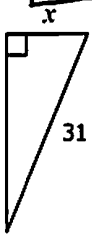
$6^2+7^2=X^2$
$36+49=X^2$
$85=X^2$
$X=9.2$

6.



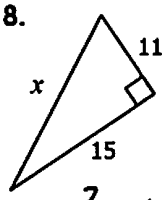
$X^2+10^2=26^2$
$X^2+100=676$
$X^2=576$
$X=24$

7.



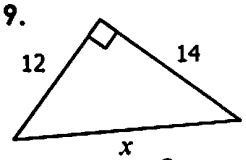
$X^2+27^2=31^2$
$X^2+729=961$
$X^2=232$
$X=15.2$

8.



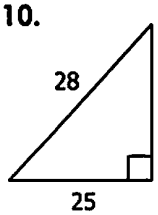
$11^2+15^2=X^2$
$121+225=X^2$
$346=X^2$
$X=18.6$

9.



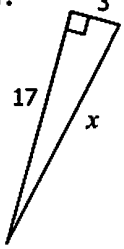
$12^2+14^2=X^2$
$144+196=X^2$
$340=X^2$
$X=18.4$

10.



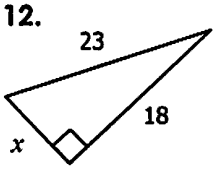
$X^2+25^2=28^2$
$X^2+625=784$
$X^2=159$
$X=12.6$

11.



$17^2+3^2=X^2$
$289+9=X^2$
$298=X^2$
$X=17.3$

12.



$X^2+18^2=23^2$
$X^2+324=529$
$X^2=205$
$X=14.3$

Directions: Determine if the three given side lengths would form a right triangle.

13. 9 ft, 12 ft, 16 ft

$9^2+12^2=16^2$
$81+144=256$
$225 \neq 256$ NO

14. 3 cm, 4 cm, 5 cm

$3^2+4^2=5^2$
$9+16=25$
$25=25$ Yes

15. 16 m, 30 m, 34 m

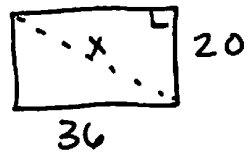
$16^2+30^2=34^2$
$256+900=1156$
$1156=1156$ yes

THE PYTHAGOREAN THEOREM *Word Problems*

Many real world problems can be modeled and solved using the Pythagorean Theorem. When solving these problems, it is always helpful to draw a picture!

1. A flat-screen TV in the shape of a rectangle has a width of 36 inches and a height of 20 inches. Find the length of the diagonal.

Picture:



Solve:

$20^2 + 36^2 = x^2$

$400 + 1296 = x^2$

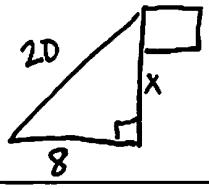
$1696 = x^2$

$x = 41.2$

Solution: 41.2 in

2. A 20-foot piece of wire is attached from the top of a flagpole to a stake in the ground 8 feet from the base of the pole. Find the height of the flagpole.

Picture:



Solve:

$x^2 + 8^2 = 20^2$

$x^2 + 64 = 400$

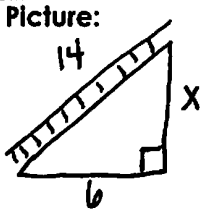
$x^2 = 336$

$x = 18.3$

Solution: 18.3 ft

3. A 14-foot ladder is leaned against a wall. If the base of the ladder is 6 feet from the wall, how high up the wall will the ladder reach?

Picture:



Solve:

$x^2 + 6^2 = 14^2$

$x^2 + 36 = 196$

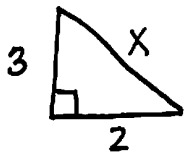
$x^2 = 160$

$x = 12.6$

Solution: 12.6 ft

4. Josh and Ben spotted a bear in the woods while riding their bikes. Josh rode 3 miles north and Ben rode 2 miles east. How far apart are the two boys?

Picture:



Solve:

$2^2 + 3^2 = x^2$

$4 + 9 = x^2$

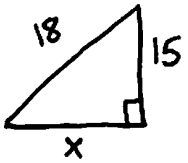
$13 = x^2$

$x = 3.6$

Solution: 3.6 mi

5. How far from the base of a house should you place a 18-foot ladder if it is to reach a window that is 15 feet high?

Picture:



Solve:

$x^2 + 15^2 = 18^2$

$x^2 + 225 = 324$

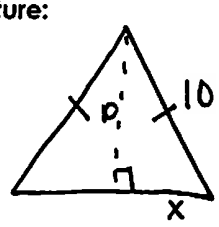
$x^2 = 99$

$x = 9.9$

Solution: 9.9 ft

6. An isosceles triangle has legs that measure 10 feet. If the height of the triangle is 7 feet, find the length of its base.

Picture:



Solve:

$7^2 + x^2 = 10^2$

$49 + x^2 = 100$

$x^2 = 51$

$x = 7.1$

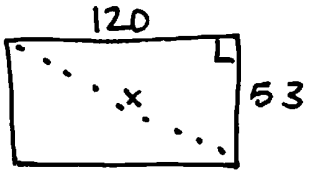
$2(7.1) = 14.2$

Solution: 14.2 ft

---

7. A football field is 120 yards long by 53 yards wide. If a player runs diagonally from one corner to the opposite corner, how far will they travel?

Picture:



Solve:

$120^2 + 53^2 = x^2$

$14400 + 2809 = x^2$

$17209 = x^2$

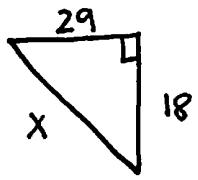
$131.2 = x$

Solution: 131.2 yd

---

8. On a map, Norristown is 18 miles south of Lincoln, and Lincoln is 29 miles west of Allenport. Find the distance from Norristown to Allenport.

Picture:



Solve:

$29^2 + 18^2 = x^2$

$841 + 324 = x^2$

$1165 = x^2$

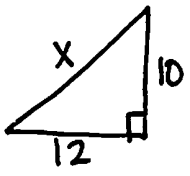
$x = 34.1$

Solution: 34.1 mi

---

9. A set of stairs is 10 feet tall and covers a horizontal distance of 12 feet. If a handrail is to be installed that extends the entire length of the stairs, what length must it be?

Picture:



Solve:

$10^2 + 12^2 = x^2$

$100 + 144 = x^2$

$244 = x^2$

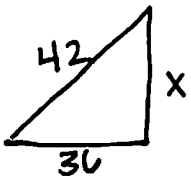
$x = 15.6$

Solution: 15.6 ft

---

10. Cara is flying a kite at the park using a string that is 42 meters long. She notices that the kite is directly above her friend Leah. If Cara and Leah are standing 36 meters apart, how high is the kite?

Picture:



Solve:

$x^2 + 36^2 = 42^2$

$x^2 + 1296 = 1764$

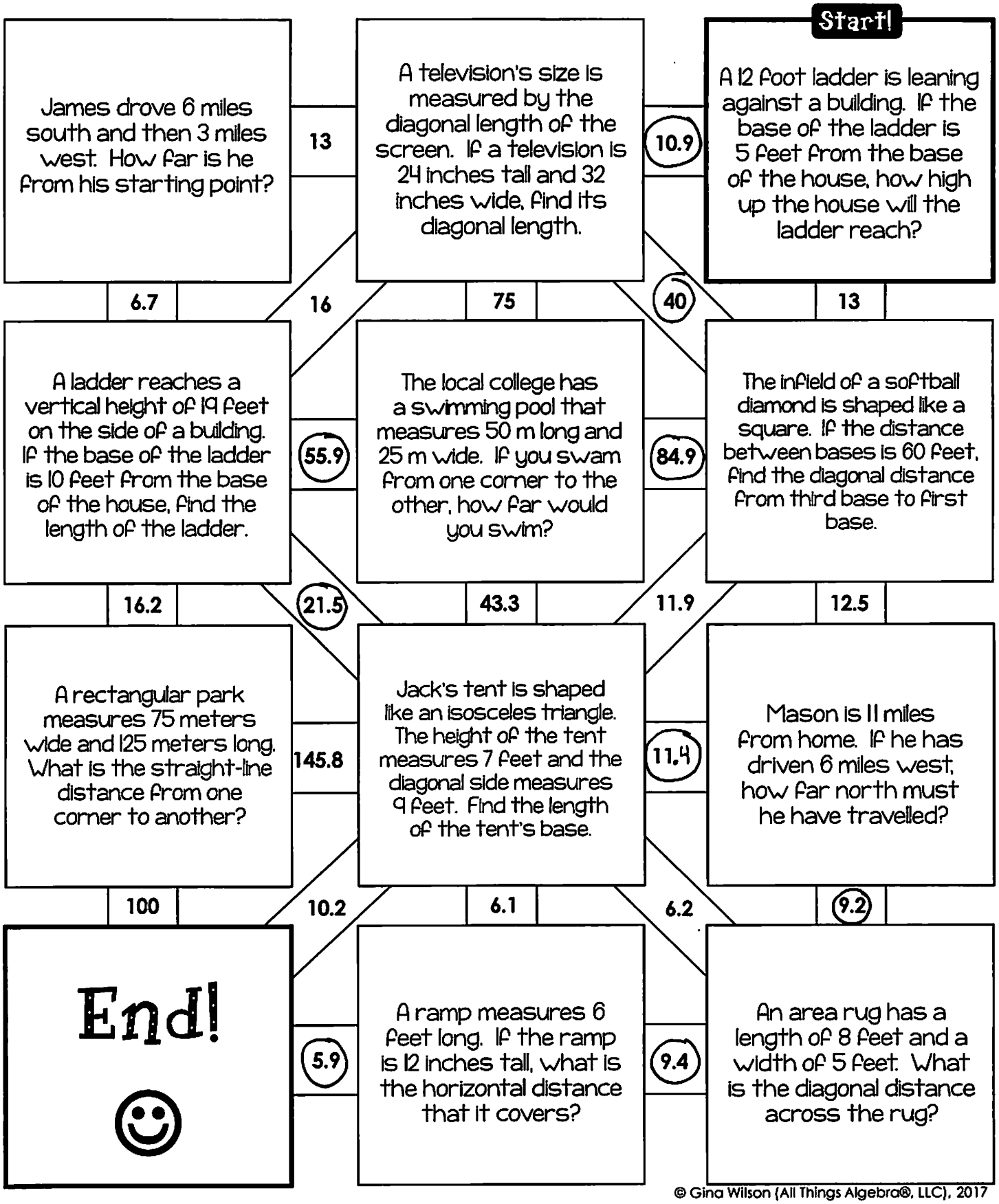
$x^2 = 468$

$x = 21.6$

Solution: 21.6 m

Pythagorean Theorem Word Problems Maze!

Directions: Solve each word problem. Round all answers to the nearest tenth.
Use your solutions to navigate through the maze. **Staple all work to this paper!**



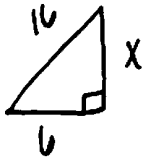
Name: _____ **Unit 7:** Geometry

Date: _____ **Per:** _____ **Homework 7:** Pythagorean Thm. Word Problems

**** This is a 2-page document! ****

Directions: Solve each problem. Round to the nearest tenth when necessary. Draw pictures!

1. A 16-foot ladder is leaning up against a wall. If the bottom of the ladder is 6 feet from the base of the wall, how far up the wall does the ladder reach?



$x^2 + 6^2 = 16^2$

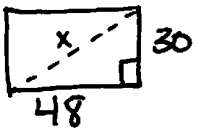
$x^2 + 36 = 256$

$x^2 = 220$

$x = 14.8$

14.8 ft

2. A flag is 30 inches wide by 48 inches long. Find the length of the diagonal of the flag.



$30^2 + 48^2 = x^2$

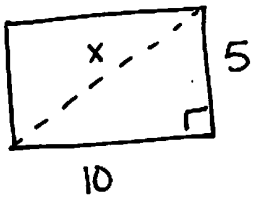
$900 + 2304 = x^2$

$3204 = x^2$

$x = 56.6$

56.6 in

3. A pool table is 5 feet wide by 10 feet long. How far is it from one corner pocket to the opposite corner pocket?



$5^2 + 10^2 = x^2$

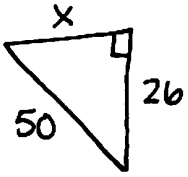
$25 + 100 = x^2$

$125 = x^2$

$x = 11.2$

11.2 ft

4. Antonio drove 26 miles north, and then drives west. At the end of his drive, it is determined that he is 50 miles from where he started. How far did he drive west?



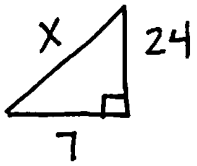
$x^2 + 26^2 = 50^2$

$x^2 + 676 = 2500$

$x^2 = 1824$

$x = 42.7$

5. A ladder is placed 7 feet from the base of a building and reaches a point on the building that is 24 feet above the ground. Find the length of the ladder.



$7^2 + 24^2 = x^2$

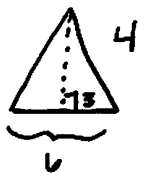
$49 + 576 = x^2$

$625 = x^2$

$x = 25$

25 ft

6. The front of a doghouse is in the shape of an isosceles triangle. If the sides measure 4 feet and the base of the house is 6 feet long, find the height of the doghouse.



$x^2 + 3^2 = 4^2$

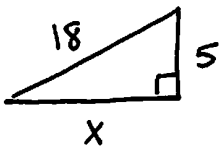
$x^2 + 9 = 16$

$x^2 = 7$

$x = 2.6$

2.6 ft

7. A 18-foot long ramp is placed at a loading dock that is 5 feet above ground. How far is the bottom of the ramp from the dock?



$5^2 + x^2 = 18^2$

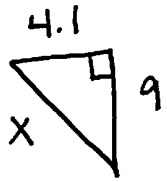
$25 + x^2 = 324$

$x^2 = 299$

$x = 17.3$

17.3 ft

8. As part of a half-marathon route, Charlie ran 4.1 miles east then 9 miles south. How far is he from his starting point?



$4.1^2 + 9^2 = x^2$

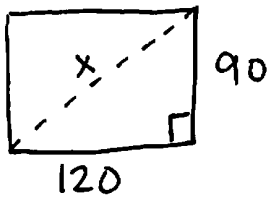
$16.81 + 81 = x^2$

$97.81 = x^2$

$x = 9.9$

9.9 mi

9. A soccer field measures 90 meters wide by 120 meters long. Starting together in one corner, you walk the diagonal to the opposite corner while you friend walks the length and width to get to the same corner. How much further does your friend walk?



$120^2 + 90^2 = x^2$

$14400 + 8100 = x^2$

$22500 = x^2$

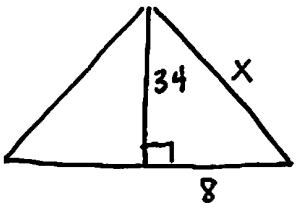
$x = 150$

$90 + 120 = 210$

$210 - 150 = 60$

60 M

10. A 34-foot tall utility pole is supported by two wires that are anchored 8 feet from the base of the pole. How many feet of wire is needed for the support wires?



$34^2 + 8^2 = x^2$

$1156 + 64 = x^2$

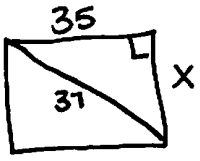
$1220 = x^2$

$34.9 = x$

$2(34.9) = 69.8$

69.8 ft

11. A 37-foot walkway runs the diagonal of a rectangular garden. If the length of the garden is 35 feet, find the perimeter of the garden.



$35^2 + x^2 = 37^2$

$1225 + x^2 = 1369$

$x^2 = 144$

$x = 12$

$2(35) + 2(12) = 94$

94 ft

12. A baseball diamond is a square with sides measuring 90 feet. If the pitcher's mound is 60 feet from home plate, how far would the pitcher need to throw the ball to reach second base?

$90^2 + 90^2 = x^2$

$8100 + 8100 = x^2$

$16200 = x^2$

$x = 127.3$

$127.3 - 60 = 67.3$

67.3 ft

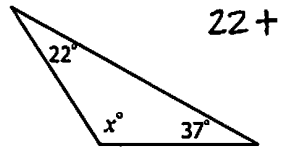
Name: _____ **Pre-Algebra**

Date: _____ **Per:** _____ **Unit 7:** Geometry

Quiz 7-2: Triangles & The Pythagorean Theorem

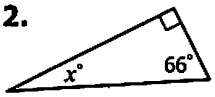
Find each missing measure.

1.



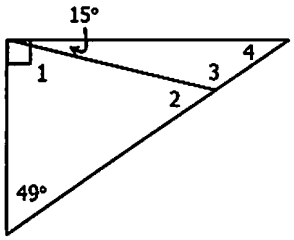
$22+37+x=180$

2.

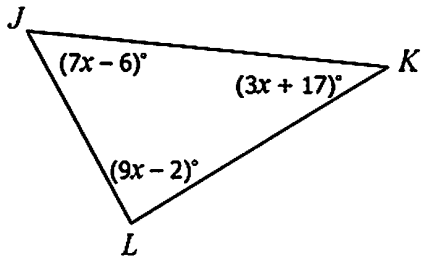


$x+66+90=180$

3.



4. Find the value of x, then find each angle measure.



$7x-6+3x+17+9x-2=180$

$19x+9=180$

$19x=171$

$x=9$

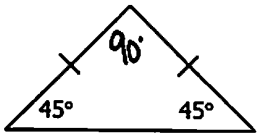
$m\angle J=7(9)-6$

$m\angle K=3(9)+17$

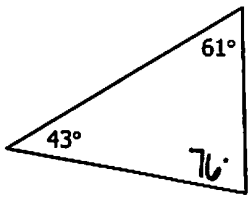
$m\angle L=9(9)-2$

Classify each triangle by its angles and its sides.

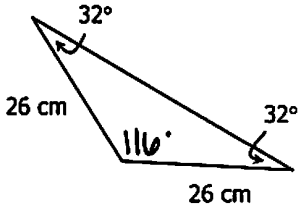
5.



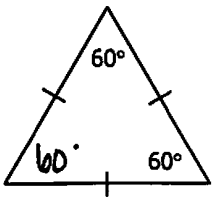
6.



7.



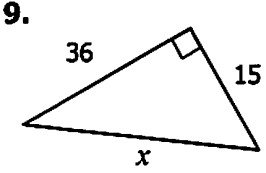
8.



1. $x=121°$
2. $x=24°$
3. $m\angle 1=75°$
   $m\angle 2=56°$
   $m\angle 3=124°$
   $m\angle 4=41°$
4. $x=9$
   $m\angle J=57°$
   $m\angle K=44°$
   $m\angle L=79°$
5. Right
   Isosceles
6. Acute
   Scalene
7. Obtuse
   Isosceles
8. Acute
   Equilateral

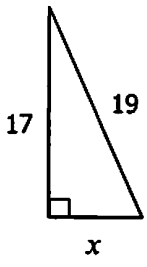
Find each side length. Round to the nearest tenth if necessary.

9.



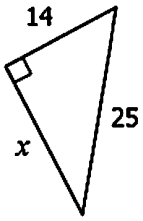
$15^2+36^2=x^2$
$225+1296=x^2$
$1521=x^2$

10.



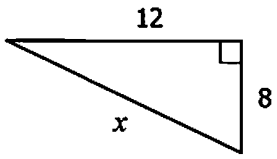
$x^2+17^2=19^2$
$x^2+289=361$
$x^2=72$

11.



$14^2+x^2=25^2$
$196+x^2=625$
$x^2=429$

12.



$12^2+8^2=x^2$
$144+64=x^2$
$208=x^2$

9.	$x=39$
10.	$x=8.5$
11.	$x=20.7$
12.	$x=14.4$
13.	yes
14.	no
15.	37.1 ft
16.	28.8 m

Determine whether the side lengths could represent a right triangle. Answer yes/no.

13. 11, 60, 61

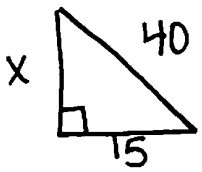
$11^2+60^2=61^2$
$121+3600=3721$
$3721=3721$

14. 14, 21, 25

$14^2+21^2=25^2$
$196+441=625$
$637\neq 625$

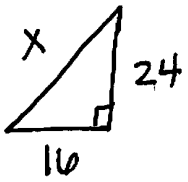
Solve each problem, using a picture to assist you. Round to the nearest tenth if necessary.

15. If a 40-foot tall ladder is placed 15 feet from the base of a house, how high up the house will the ladder reach?



$x^2+15^2=40^2$
$x^2+225=1600$
$x^2=1375$
$x=37.1$

16. Starting from the same spot in the woods, Presley ran 24 meters north to camp while her sister Ava ran 16 meters west. From this point, how far will Ava need to travel to reach camp?

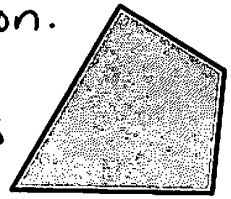


$16^2+24^2=x^2$
$256+576=x^2$
$832=x^2$
$x=28.8$

Classifying Quadrilaterals

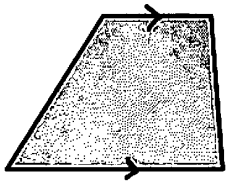
QUADRILATERAL

- 4 sided polygon.
- Sum of interior angles is 360°.



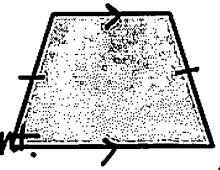
TRAPEZOID

- One pair of parallel sides.



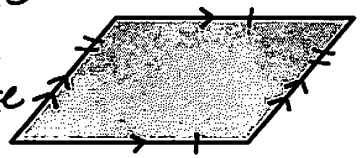
ISOSCELES TRAPEZOID

- One pair of parallel sides.
- Non-parallel sides are congruent.



PARALLELOGRAM

- Opposite sides are parallel.
- Opposite sides are congruent.



RHOMBUS

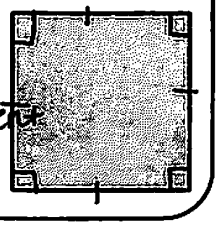
- Opposite sides are parallel.
- All sides are congruent.

RECTANGLE

- Opposite sides are parallel and congruent.
- All angles are 90°.

SQUARE

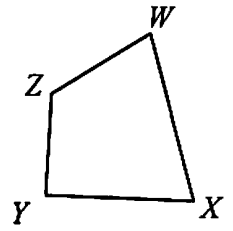
- Opposite sides are parallel.
- All sides are congruent.
- All angles are 90°.



Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples

QUADRILATERALS



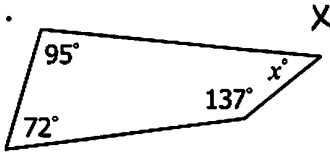
- A **quadrilateral** is a polygon with 4 sides and 4 angles.
- On the quadrilateral to the left, the **sides** are $\overline{WX}$, $\overline{XY}$, $\overline{YZ}$, and $\overline{ZW}$; the **angles** are $\angle W$, $\angle X$, $\angle Y$, and $\angle Z$.
- The sum of the measures of the four angles is always 360°.

Therefore, $\angle W + \angle X + \angle Y + \angle Z = 360°$

EXAMPLES

Directions: Find each missing measure.

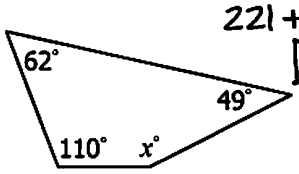
1.



$x + 304 = 360$

$x = 56°$

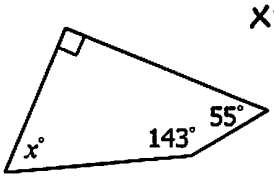
2.



$221 + x = 360$

$x = 139°$

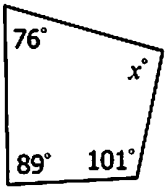
3.



$x + 288 = 360$

$x = 72°$

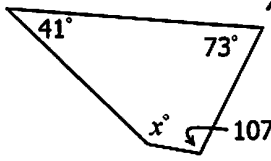
4.



$x + 266 = 360$

$x = 94°$

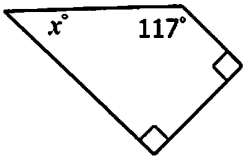
5.



$x + 221 = 360$

$x = 139°$

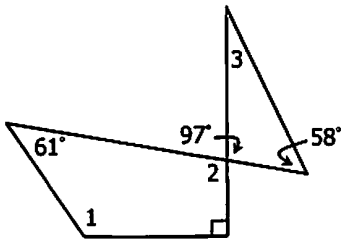
6.



$297 + x = 360$

$x = 63°$

7.

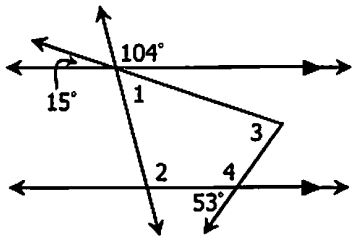


$m\angle 1 = 112°$

$m\angle 2 = 97°$

$m\angle 3 = 25°$

8.

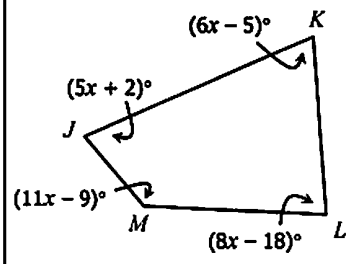


$m\angle 1 = 61°$

$m\angle 2 = 104°$

$m\angle 3 = 68°$

$m\angle 4 = 127°$



9. Find the value of x, then find each angle measure.

$5x+2+6x-5+8x-18+11x-9=360$

$30x-30=360$

$30x=390$

$x=13$

$m\angle J = 5(13)+2 = 67$

$m\angle K = 6(13)-5 = 73$

$m\angle L = 8(13)-18 =$

$m\angle M = 11(13)-9 =$

$m\angle J =$ 67°

$m\angle K =$ 73°

$m\angle L =$ 86°

$m\angle M =$ 134°

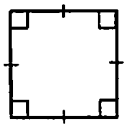
PROPERTIES OF QUADRILATERALS

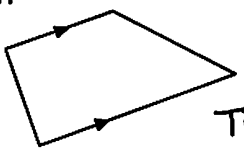
Place a checkmark on the properties that apply to each quadrilateral.

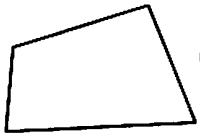
	Exactly One Pair of Opposite Sides Parallel	Both Pairs of Opposite Sides Parallel	Opposite Sides Congruent	Four Congruent Sides	Four Right Angles
Parallelogram		✓	✓		
Rhombus		✓	✓	✓	
Rectangle		✓	✓		✓
Square		✓	✓	✓	✓
Trapezoid	✓				

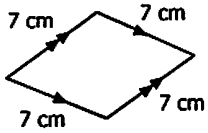
CLASSIFYING QUADRILATERALS

Classify each quadrilateral using the name that best describes it.

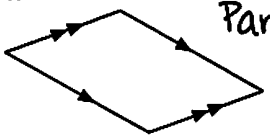
10.  Square

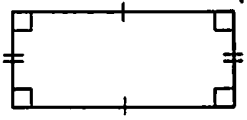
11.  Trapezoid

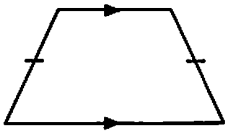
12.  Quadrilateral

13. 

Rhombus

14.  Parallelogram

15.  Rectangle

16.  Isosceles Trapezoid

17.  Quadrilateral

Determine whether the statement is always, sometimes, or never true.

18. A trapezoid is a rectangle.

Never

19. A rhombus is a parallelogram.

Always

20. A square is a rhombus.

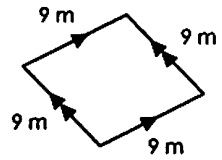
Always

21. A parallelogram is a rectangle.

Sometimes

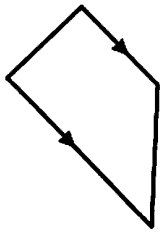
WHAT AM I? *Check all that apply.*

1



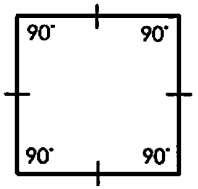
- [x] Quadrilateral
- [ ] Trapezoid
- [ ] Isosceles Trapezoid
- [x] Parallelogram
- [ ] Rectangle
- [x] Rhombus
- [ ] Square

2



- [x] Quadrilateral
- [x] Trapezoid
- [ ] Isosceles Trapezoid
- [ ] Parallelogram
- [ ] Rectangle
- [ ] Rhombus
- [ ] Square

3



- [x] Quadrilateral
- [ ] Trapezoid
- [ ] Isosceles Trapezoid
- [x] Parallelogram
- [x] Rectangle
- [x] Rhombus
- [x] Square

TRUE OR FALSE?

4 All rhombi are parallelograms.

True

5 All quadrilaterals are trapezoids.

False

6 A rectangle is never a rhombus.

False

7 A parallelogram is sometimes a square.

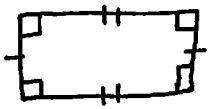
True

8 A trapezoid is sometimes a parallelogram.

False

DRAW THAT SHAPE! (*If possible!*)

9 A rectangle that is not a square.



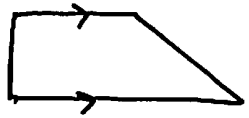
10 A parallelogram that is not a quadrilateral.

Not Possible

11 A rectangle that is not a parallelogram.

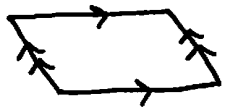
Not Possible

12 A trapezoid that is not an isosceles trapezoid.



13 A quadrilateral that is not a parallelogram.

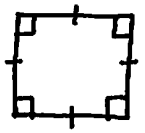
14 A parallelogram that is not a rectangle.



15 A square that is not a rhombus.

Not Possible

16 A rhombus that is a rectangle.



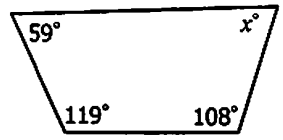
Name: _____ **Unit 7:** Geometry

Date: _____ **Per:** _____ **Homework 8:** Quadrilaterals

**** This is a 2-page document! ****

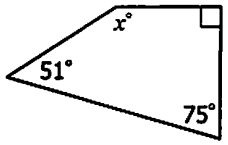
Directions: Find each missing measure.

1.



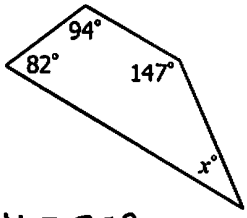
$X = 74°$

2.



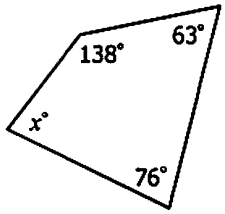
$X = 144°$

3.



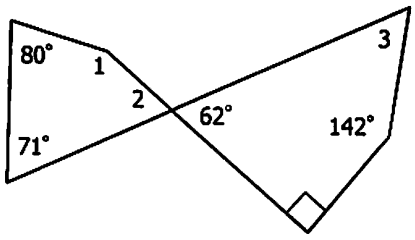
$X = 37°$

4.



$X = 83°$

5.

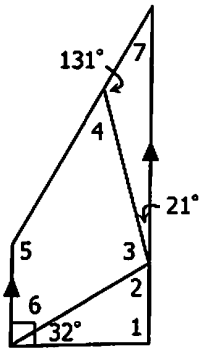


$m\angle 1 = 147°$

$m\angle 2 = 62°$

$m\angle 3 = 66°$

6.



$m\angle 1 = 90°$

$m\angle 2 = 58°$

$m\angle 3 = 101°$

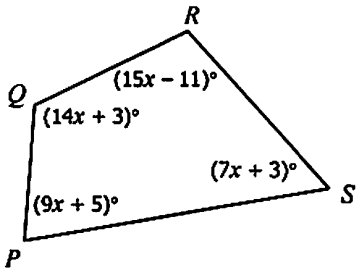
$m\angle 4 = 49°$

$m\angle 5 = 152°$

$m\angle 6 = 58°$

$m\angle 7 = 28°$

7. Find the value of x, then find each angle measure.



$15x - 11 + 14x + 3 + 9x + 5 + 7x + 3 = 360$

$45x = 360$

$x = 8$

$m\angle P = 9(8) + 5 = 77$

$m\angle Q = 14(8) + 3 = 115$

$m\angle R = 15(8) - 11 = 109$

$m\angle S = 7(8) + 3 = 59$

$x = 8$

$m\angle P = 77°$

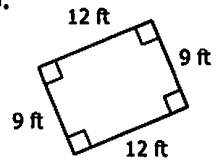
$m\angle Q = 115°$

$m\angle R = 109°$

$m\angle S = 59°$

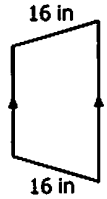
Directions: Classify each shape using the name that best describes it.

8.



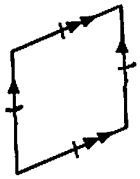
Rectangle

9.



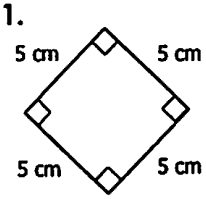
Isosceles Trapezoid

10.



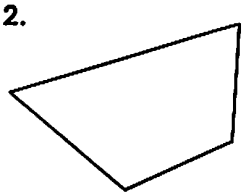
Rhombus

11.



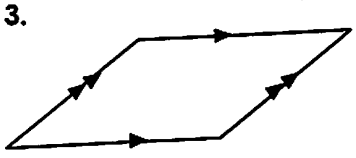
Square

12.



Quadrilateral

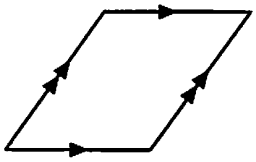
13.



Parallelogram

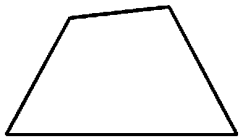
Directions: Classify each shape or the description of the shape using all names that apply.

14.



- [x] Quadrilateral
- [ ] Trapezoid
- [ ] Isosceles Trapezoid
- [x] Parallelogram
- [ ] Rectangle
- [ ] Rhombus
- [ ] Square

15.



- [x] Quadrilateral
- [ ] Trapezoid
- [ ] Isosceles Trapezoid
- [ ] Parallelogram
- [ ] Rectangle
- [ ] Rhombus
- [ ] Square

16. A four-sided figure with four right angles.

- [x] Quadrilateral
- [ ] Trapezoid
- [ ] Isosceles Trapezoid
- [x] Parallelogram
- [x] Rectangle
- [ ] Rhombus
- [ ] Square

17. A parallelogram with four congruent sides.

- [x] Quadrilateral
- [ ] Trapezoid
- [ ] Isosceles Trapezoid
- [x] Parallelogram
- [ ] Rectangle
- [x] Rhombus
- [ ] Square

18. A four-sided figure with one pair of opposite sides parallel and two congruent legs.

- [x] Quadrilateral
- [x] Trapezoid
- [x] Isosceles Trapezoid
- [ ] Parallelogram
- [ ] Rectangle
- [ ] Rhombus
- [ ] Square

19. A rectangle with four congruent sides.

- [x] Quadrilateral
- [ ] Trapezoid
- [ ] Isosceles Trapezoid
- [x] Parallelogram
- [x] Rectangle
- [x] Rhombus
- [x] Square

Directions: Determine whether the statement is **always**, **sometimes**, or **never** true.

20. A trapezoid is a rhombus.

Never

21. A quadrilateral is a parallelogram.

Sometimes

22. A square is a rectangle.

Always

23. A rectangle is a quadrilateral.

Always

24. A parallelogram is a square.

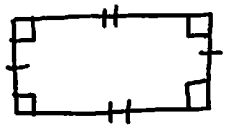
Sometimes

25. A quadrilateral is a rhombus.

Sometimes

Directions: Draw each shape, if possible.

26. A parallelogram that is not a rhombus.



27. A square that is not a rectangle.

Not Possible

28. A rectangle that is not a quadrilateral.

Not Possible

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples

Polygon

A **polygon** is a closed figure formed by three or more line segments, called sides.

Classifying Polygons

Polygons can be classified by the **number of sides** they have. Complete the table below.

# of Sides	Polygon Name	# of Sides	Polygon Name
3	Triangle	7	Heptagon
4	Quadrilateral	8	Octagon
5	Pentagon	9	Nonagon
6	Hexagon	10	Decagon

Sum of the Interior Angle Measures

The sum of the degrees of the interior angles in any polygon can be determined by the number of triangles that can be drawn within the polygon. Complete the chart below and look for a pattern.

Polygon	Number of Sides	Number of Triangles	Sum of Interior Angle Measures
Triangle 	3	1	180°
Quadrilateral 	4	2	360°
Pentagon 	5	3	540°
Hexagon 	6	4	720°

Formula

If n represents the number of sides of a polygon, then the sum of the interior angles, S, can be found using the formula:

$$S = (n-2) \cdot 180$$

Examples

Find the sum of the measures of the interior angles of each polygon.

1. heptagon
   $S = (7-2) \cdot 180$
   $S = 900°$

2. decagon
   $S = (10-2) \cdot 180$
   $S = 1440°$

3. 13-gon
   $S = (13-2) \cdot 180$
   $S = 1980°$

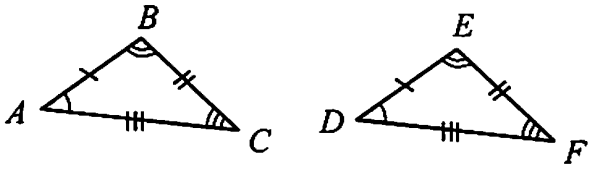
4. 25-gon
   $S = (25-2) \cdot 180$
   $S = 4140$

Congruent Polygons

- **Congruent polygons** have the same Size and shape.
- All **corresponding parts** (sides and angles) are Congruent.

Congruency Statements

When polygons are congruent, we can write a **congruency statement**.



$\Delta ABC \cong \Delta DEF$

A valid congruency statement must match all corresponding angles and sides.

Examples

Directions: Identify the congruent parts given the congruency statement.

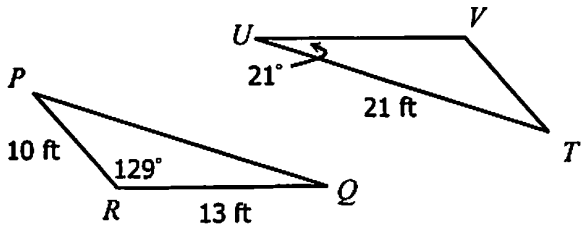
5. $\Delta WXY \cong \Delta QRS$

$\angle W \cong \angle Q$	$\overline{WX} \cong \overline{QR}$
$\angle X \cong \angle R$	$\overline{XY} \cong \overline{RS}$
$\angle Y \cong \angle S$	$\overline{WY} \cong \overline{QS}$

6. rhombus $EFGH \cong$ rhombus $JKLM$

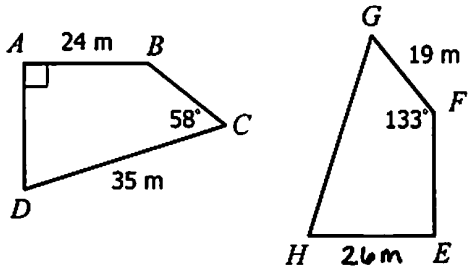
$\angle E \cong \angle J$	$\overline{EF} \cong \overline{JK}$
$\angle L \cong \angle G$	$\overline{JM} \cong \overline{EH}$
$\angle H \cong \angle M$	$\overline{GH} \cong \overline{LM}$

7. $\Delta PQR \cong \Delta TUV$



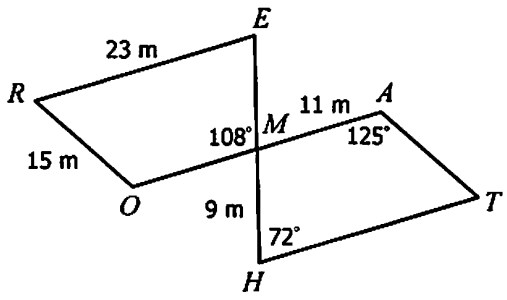
$m\angle V =$ 129°
$m\angle Q =$ 21°
$m\angle P =$ 30°
$PQ =$ 21 ft
$UV =$ 13ft

8. quadrilateral $ABCD \cong$ quadrilateral $EFGH$



$m\angle G =$ 58°
$m\angle B =$ 133°
$m\angle H =$ 79°
$AD =$ 26m
$FE =$ 24m

9. trapezoid $MORE \cong$ trapezoid $MATH$



$m\angle E =$ 72°
$m\angle T =$ 55°
$m\angle O =$ 125°
$EM =$ 9m
$HT =$ 23m

Name: _____ **Unit 7:** Geometry

Date: _____ **Per:** _____ **Homework 9:** Polygons

Directions: Find the sum of the measures of the interior angles of each polygon.

1. octagon

$S=(8-2)\cdot 180$

$S=1080°$

2. 16-gon

$S=(16-2)\cdot 180$

$S=2520°$

3. 30-gon

$S=(30-2)\cdot 180$

$S=5040°$

4. 23-gon

$S=(23-2)\cdot 180$

$S=3780°$

5. A heptagon has interior angles that measure 109°, 143°, 120°, 152°, 117°, and 84°. What must be the measure of the remaining angle?

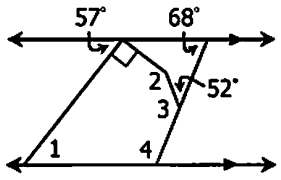
$S=(7-2)\cdot 180$

$S=900°$

$x+725=900$

$x=175°$

6. Find each missing angle measure.



$m\angle 1 = 57°$

$m\angle 2 = 153°$

$m\angle 3 = 128°$

$m\angle 4 = 112°$

7. Given $\Delta RST \cong \Delta CDE$, identify the congruent parts.

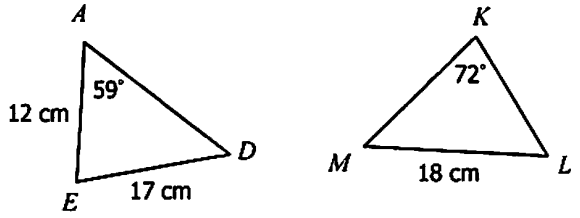
$\angle R \cong \angle C$	$\angle S \cong \angle D$	$\angle T \cong \angle E$
$\overline{RS} \cong \overline{CD}$	$\overline{RT} \cong \overline{CE}$	$\overline{ST} \cong \overline{DE}$

8. If quadrilateral *VERY* ≅ quadrilateral *FAST*, check each statement that is true.

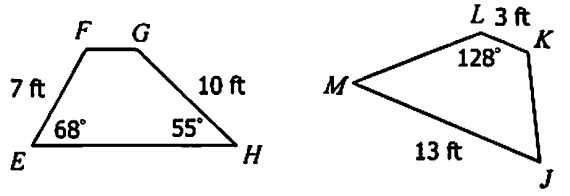
- ☐ $\angle E \cong \angle S$
- ☑ $\angle F \cong \angle V$
- ☑ $\overline{ER} \cong \overline{AS}$
- ☑ $\overline{TF} \cong \overline{YV}$
- ☐ $\overline{RY} \cong \overline{AT}$
- ☐ $\overline{FS} \cong \overline{EY}$

Directions: Given the congruent polygons, find each measure.

9. $\Delta ADE \cong \Delta LMK$

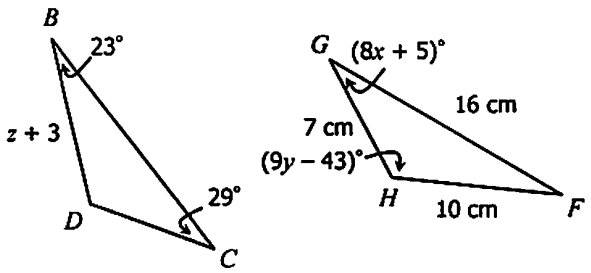


10. trapezoid *EFGH* ≅ trapezoid *JKLM*



$m\angle E = 72°$	$m\angle L = 59°$	$m\angle M = 49°$	$m\angle M = 55°$	$m\angle G = 128°$	$m\angle F = 109°$
$AD = 18\text{cm}$	$MK = 17\text{cm}$	$KL = 12\text{cm}$	$LM = 10\text{ft}$	$EH = 13\text{ft}$	$FG = 3\text{ft}$

11. If $\Delta BCD \cong \Delta FGH$, solve for *x*, *y*, and *z*.



$8x+5=29$

$8x=24$

$x=3$

$9y-43=128$

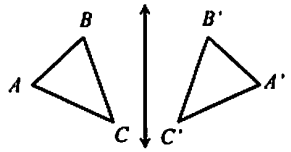
$9y=171$

$y=19$

$z+3=10$

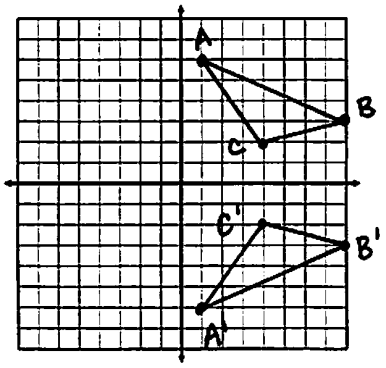
$z=7$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Transformation	• A transformation is an operation that **maps an original figure** called the pre-image onto a **new figure** called the image. • A transformation can change the size, position, or orientation of a figure. • There are **four types of transformations:** translations, reflections, rotations, and dilation.
Reflections 	• A flip over a line called the line of reflection. • Each point and its image are the same distance from the line of reflection. • The x-axis and y-axis are common lines of reflection. • Reflections result in congruent polygons.

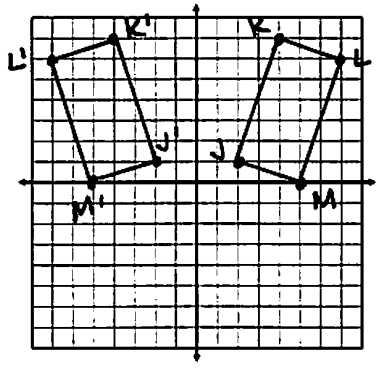
Practice! Graph and label each figure and its image under the given reflection. Give the new coordinates.

1. Triangle ABC with vertices $A(1, 6)$, $B(8, 3)$, and $C(4, 2)$ in the **x-axis.**



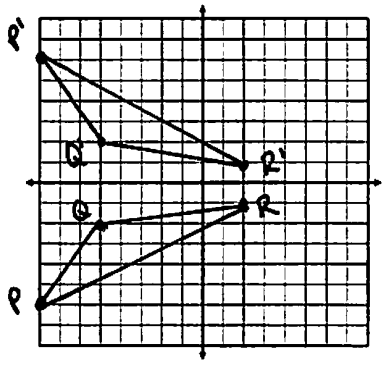
$A'(1, -6)$
$B'(8, -3)$
$C'(4, -2)$

2. Rectangle $JKLM$ with vertices $J(2, 1)$, $K(4, 7)$, $L(7, 6)$, and $M(5, 0)$ in the **y-axis.**



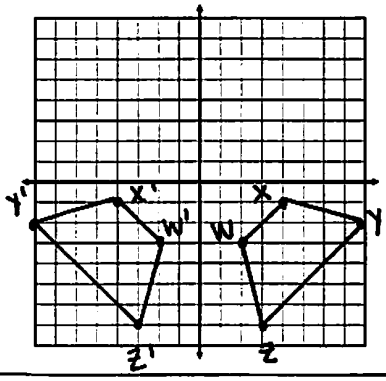
$J'(-2, 1)$
$K'(-4, 7)$
$L'(-7, 6)$
$M'(-5, 0)$

3. Triangle PQR with vertices $P(-8, -6)$, $Q(-5, -2)$, and $R(2, -1)$ in the **x-axis.**



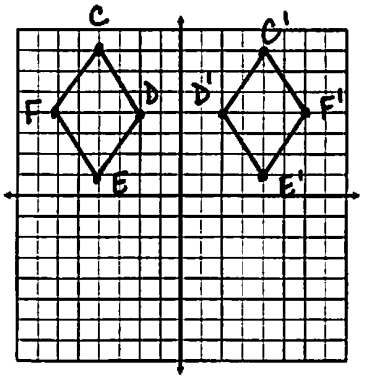
$P'(-8, 6)$
$Q'(-5, 2)$
$R'(2, 1)$

4. Trapezoid $WXYZ$ with vertices $W(2, -3)$, $X(4, -1)$, $Y(8, -2)$, and $Z(3, -7)$ in the **y-axis.**



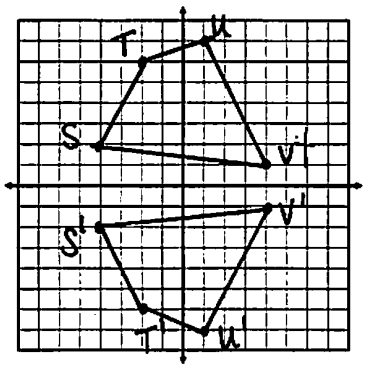
$W'(-2, -3)$
$X'(-4, -1)$
$Y'(-8, -2)$
$Z'(-3, -7)$

5. Rhombus $CDEF$ with vertices $C(-4, 7)$, $D(-2, 4)$, $E(-4, 1)$, and $F(-6, 4)$ in the **y-axis.**



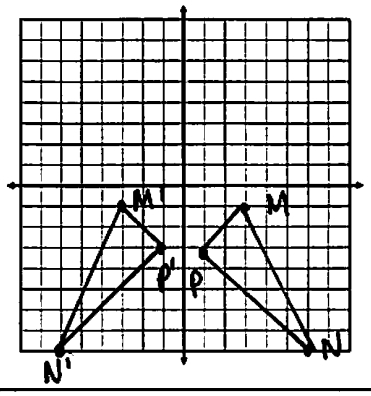
$C'(\underline{4}, \underline{7})$
$D'(\underline{2}, \underline{4})$
$E'(\underline{4}, \underline{1})$
$F'(\underline{6}, \underline{4})$

6. Quadrilateral $STUV$ with vertices $S(-4, 2)$, $T(-2, 6)$, $U(1, 7)$, and $V(4, 1)$ in the **x-axis.**



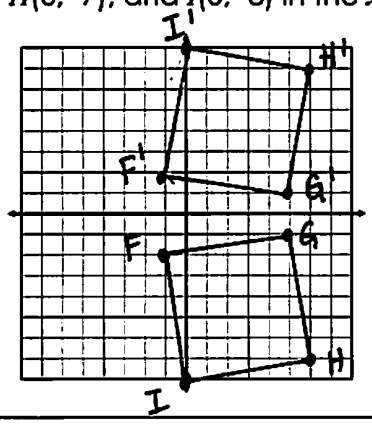
$S'(\underline{-4}, \underline{-2})$
$T'(\underline{-2}, \underline{-6})$
$U'(\underline{1}, \underline{-7})$
$V'(\underline{4}, \underline{-1})$

7. Triangle MNP with vertices $M(3, -1)$, $N(6, -8)$, and $P(1, -3)$ in the **y-axis.**



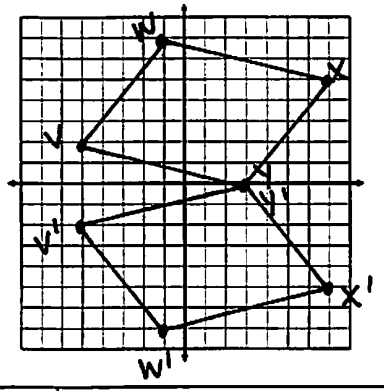
$M'(\underline{-3}, \underline{-1})$
$N'(\underline{-6}, \underline{-8})$
$P'(\underline{-1}, \underline{-3})$

8. Square $FGHI$ with vertices $F(-1, -2)$, $G(5, -1)$, $H(6, -7)$, and $I(0, -8)$ in the **x-axis.**



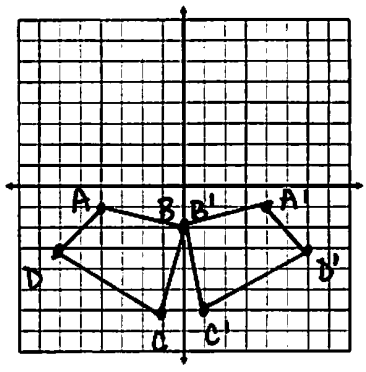
$F'(\underline{-1}, \underline{2})$
$G'(\underline{5}, \underline{1})$
$H'(\underline{6}, \underline{7})$
$I'(\underline{0}, \underline{8})$

9. Parallelogram $VWXY$ with vertices $V(-5, 2)$, $W(-1, 7)$, $X(7, 5)$, and $Y(3, 0)$ in the **x-axis.**



$V'(\underline{-5}, \underline{-2})$
$W'(\underline{-1}, \underline{-7})$
$X'(\underline{7}, \underline{-5})$
$Y'(\underline{3}, \underline{0})$

10. Quadrilateral $ABCD$ with vertices $A(-4, -1)$, $B(0, -2)$, $C(-1, -6)$, and $(-6, -3)$ in the **y-axis.**



$A'(\underline{4}, \underline{-1})$
$B'(\underline{0}, \underline{-2})$
$C'(\underline{1}, \underline{-6})$
$D'(\underline{6}, \underline{-3})$

RULE

Look for a pattern in the reflections to create general rules:

$r_{x\text{-axis}}(x, y) \rightarrow (x, -y)$

$r_{y\text{-axis}}(x, y) \rightarrow (-x, y)$

11. ΔLMN with vertices $L(-8, -2)$, $M(-3, -1)$, and $N(-1, -8)$ undergoes a reflection with new coordinates $L'(8, -2)$, $M'(3, -1)$, and $N'(1, -8)$. Name the line of reflection.

r y-axis

12. Which pair of points represents a reflection across the **x-axis**?

A. $A(-7, 2)$ and $A'(7, 2)$ **C.** $C(4, -5)$ and $C'(-4, 5)$

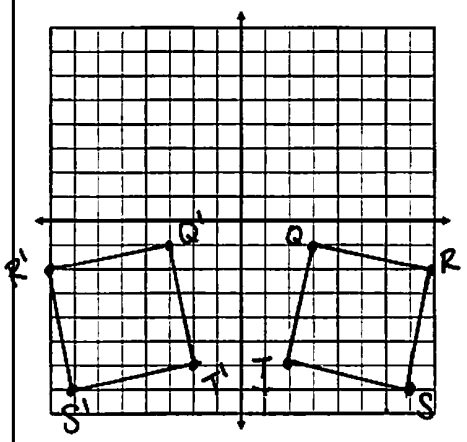
B. $B(0, 3)$ and $B'(-3, 0)$ **(D.)** $D(1, -8)$ and $D'(1, 8)$

Name: _____ **Unit 7:** Geometry

Date: _____ **Per:** _____ **Homework 10:** Reflections

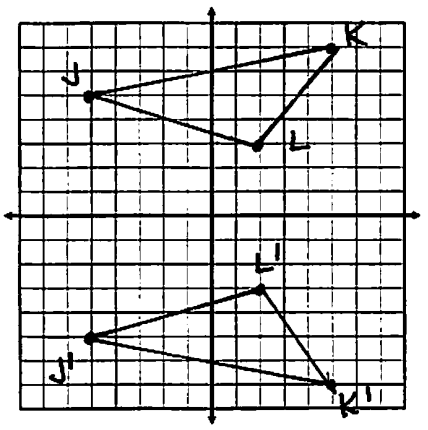
Directions: Graph and label each figure and its image under the given reflection. Then, give the new coordinates.

1. Square $QRST$ with vertices $Q(3, -1)$, $R(8, -2)$, $S(7, -7)$, and $T(2, -6)$ in the **y-axis.**



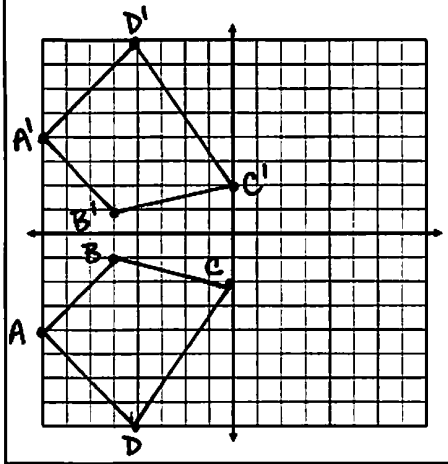
$Q'(\underline{-3}, \underline{-1})$
$R'(\underline{-8}, \underline{-2})$
$S'(\underline{-7}, \underline{-7})$
$T'(\underline{-2}, \underline{-6})$

2. Triangle JKL with vertices $J(-5, 5)$, $K(5, 7)$, and $L(2, 3)$ in the **x-axis.**



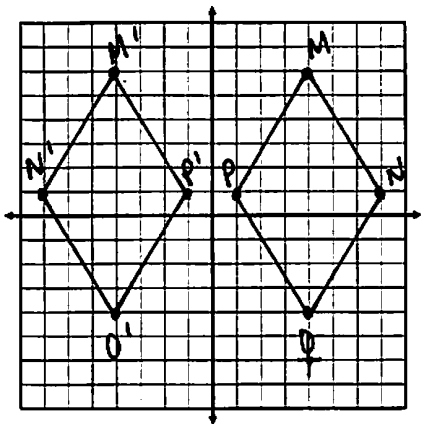
$J'(\underline{-5}, \underline{-5})$
$K'(\underline{5}, \underline{-7})$
$L'(\underline{2}, \underline{-3})$

3. Trapezoid $ABCD$ with vertices $A(-8, -4)$, $B(-5, -1)$, $C(0, -2)$, and $D(-4, -8)$ in the **x-axis.**



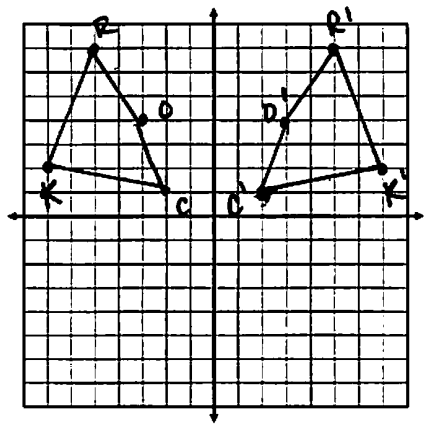
$A'(\underline{-8}, \underline{4})$
$B'(\underline{-5}, \underline{1})$
$C'(\underline{0}, \underline{2})$
$D'(\underline{-4}, \underline{8})$

4. Rhombus $MNOP$ with vertices $M(4, 6)$, $N(7, 1)$, $O(4, -4)$, and $P(1, 1)$ in the **y-axis.**



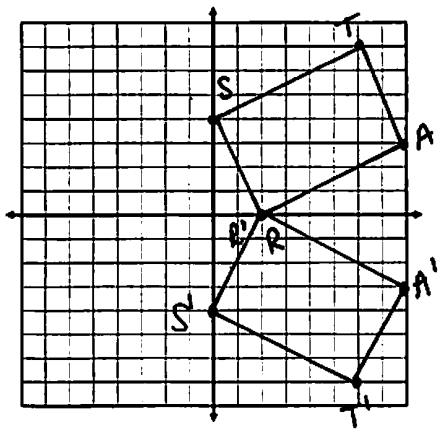
$M'(\underline{-4}, \underline{6})$
$N'(\underline{-7}, \underline{1})$
$O'(\underline{-4}, \underline{-4})$
$P'(\underline{-1}, \underline{1})$

5. Quadrilateral $ROCK$ with vertices $R(-5, 7)$, $O(-3, 4)$, $C(-2, 1)$, and $K(-7, 2)$ in the **y-axis.**



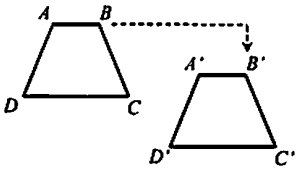
$R'(\underline{5}, \underline{7})$
$O'(\underline{3}, \underline{4})$
$C'(\underline{2}, \underline{1})$
$K'(\underline{7}, \underline{2})$

6. Rectangle $STAR$ with vertices $S(0, 4)$, $T(6, 7)$, $A(8, 3)$, and $R(2, 0)$ in the **x-axis.**



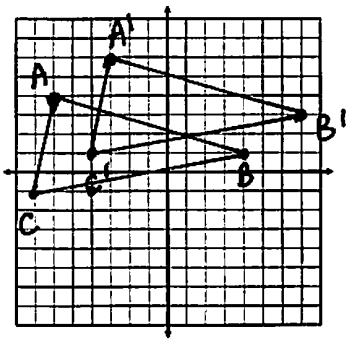
$S'(\underline{0}, \underline{-4})$
$T'(\underline{6}, \underline{-7})$
$A'(\underline{8}, \underline{-3})$
$R'(\underline{2}, \underline{0})$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
TRANSLATION 	• A **translation** is a vertical and/or horizontal slide. • **Symbolic Form:** $(x, y) \rightarrow (x+h, y+k)$ h represents the horizontal shift K represents the vertical shift • Translations result in Congruent polygons.

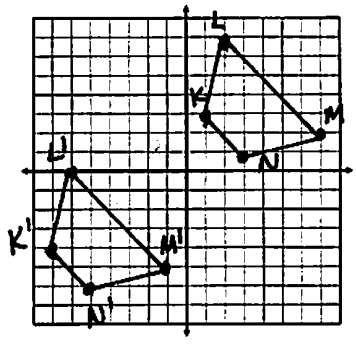
Practice! Graph and label each figure and its image under the given translation. Give the new coordinates.

1. Triangle ABC with vertices $A(-6, 4)$, $B(4, 1)$, and $C(-7, -1)$: $(x, y) \rightarrow (x + 3, y + 2)$



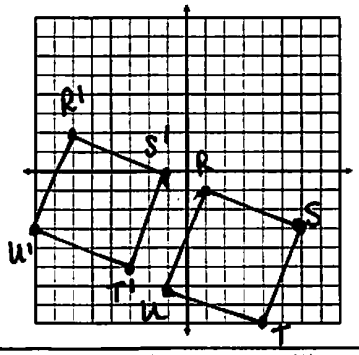
$A'(-3, 6)$
$B'(7, 3)$
$C'(-4, 1)$

2. Trapezoid $KLMN$ with vertices $K(1, 3)$, $L(2, 7)$, $M(7, 2)$, and $N(3, 1)$: $(x, y) \rightarrow (x - 8, y - 7)$



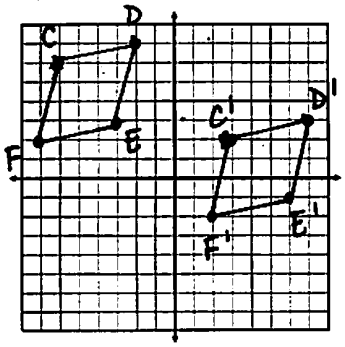
$K'(-7, -4)$
$L'(-6, 0)$
$M'(-1, -5)$
$N'(-5, -6)$

3. Square $RSTU$ with vertices $R(1, -1)$, $S(6, -3)$, $T(4, -8)$, and $U(-1, -6)$: $(x, y) \rightarrow (x - 7, y + 3)$



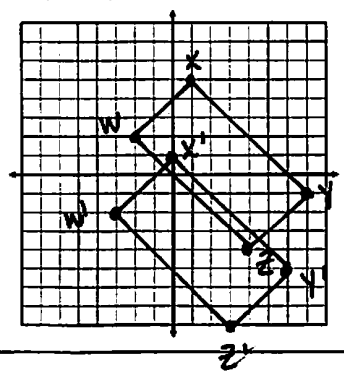
$R'(-6, 2)$
$S'(-1, 0)$
$T'(-3, -5)$
$U'(-8, -3)$

4. Rhombus $CDEF$ with vertices $C(-6, 6)$, $D(-2, 7)$, $E(-3, 3)$, and $F(-7, 2)$: $(x, y) \rightarrow (x + 9, y - 4)$



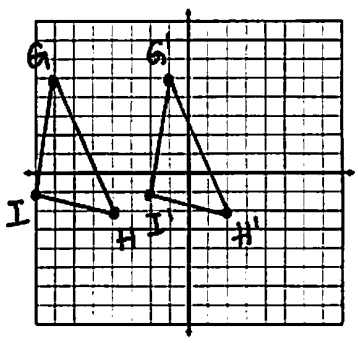
$C'(3, 2)$
$D'(7, 3)$
$E'(6, -1)$
$F'(2, -2)$

5. Rectangle $WXYZ$ with vertices $W(-2, 2)$, $X(1, 5)$, $Y(7, -1)$, and $Z(4, -4)$: $(x, y) \rightarrow (x - 1, y - 4)$



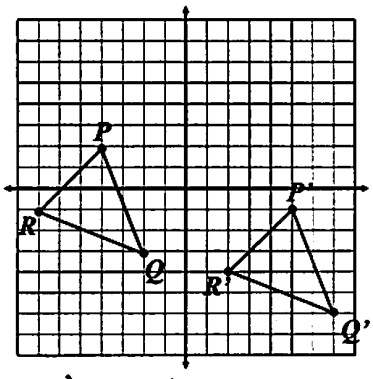
$W'(-3, -2)$
$X'(0, 1)$
$Y'(6, -5)$
$Z'(3, -8)$

6. Triangle GHI with vertices $G(-7, 5)$, $H(-4, -2)$, and $I(-8, -1)$: $(x, y) \rightarrow (x + 6, y)$



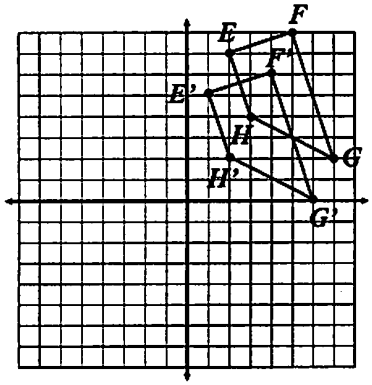
$G'(-1, 5)$
$H'(2, -2)$
$I'(-2, -1)$

7. Write a rule describing the translation below:



Rule: $(x, y) \rightarrow (x+9, y-3)$

8. Write a rule describing the translation below:

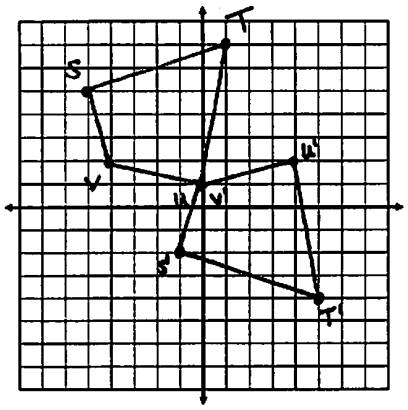


Rule: $(x, y) \rightarrow (x-1, y-2)$

Directions: Graph and label each figure and its image under the given transformations. Give the new coordinates.

9. Quadrilateral $STUV$ with vertices $S(-5, 5)$, $T(1, 7)$, $U(0, 1)$ and $Z(-4, 2)$:

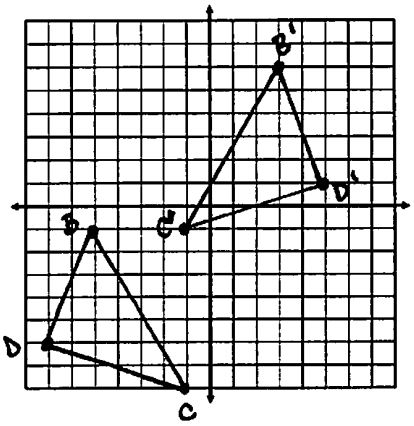
(a) Reflection: in the x-axis
(b) Translation: $(x, y) \rightarrow (x + 4, y + 3)$



$S'(-1, -2)$
$T'(5, -4)$
$U'(4, 2)$
$V'(0, 1)$

10. Triangle BCD with vertices $B(-5, -1)$, $C(-1, -8)$, and $D(-7, -6)$:

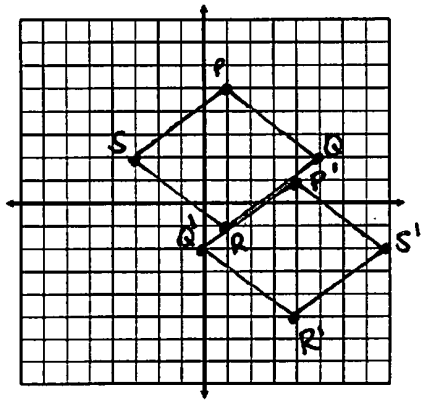
(a) Reflection: in the y-axis
(b) Translation: $(x, y) \rightarrow (x - 2, y + 7)$



$B'(3, 6)$
$C'(-1, -1)$
$D'(5, 1)$

11. Rhombus $PQRS$ with vertices $P(1, 5)$, $Q(5, 2)$, $R(1, -1)$, and $S(-3, 2)$:

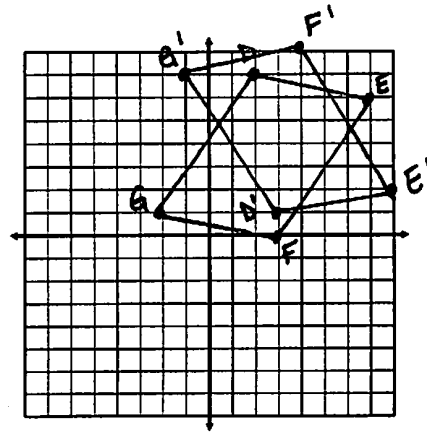
(a) Translation: $(x, y) \rightarrow (x - 5, y - 4)$
(b) Reflection: in the y-axis



$P'(4, 1)$
$Q'(0, -2)$
$R'(4, -5)$
$S'(8, -2)$

12. Parallelogram $DEFG$ with vertices $D(2, 7)$, $E(7, 6)$, $F(3, 0)$ and $G(-2, 1)$:

(a) Translation: $(x, y) \rightarrow (x + 1, y - 8)$
(b) Reflection: in the x-axis



$D'(3, 1)$
$E'(8, 2)$
$F'(4, 8)$
$G'(-1, 7)$

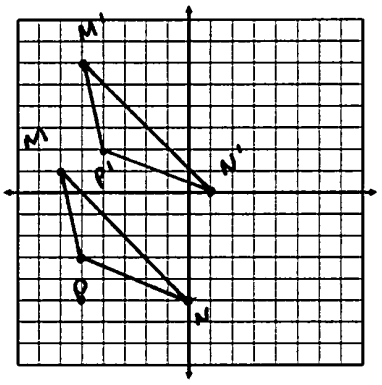
Name: _____ **Unit 7:** Geometry

Date: _____ **Per:** _____ **Homework 11:** Translations

**** This is a 2-page document! ****

Directions: Graph and label each figure and its image under the given translation. Then, give the new coordinates.

1. Triangle MNP with vertices $M(-6, 1)$, $N(0, -5)$, and $P(-5, -3)$: $(x, y) \rightarrow (x + 1, y + 5)$

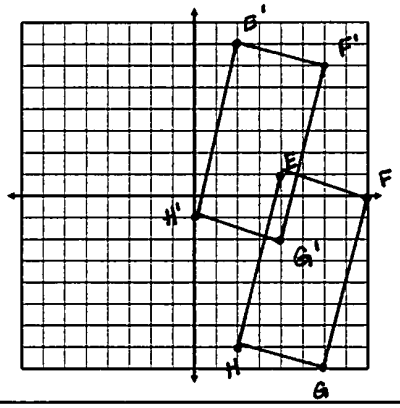


$M'(\underline{-5}, \underline{6})$

$N'(\underline{1}, \underline{0})$

$P'(\underline{-4}, \underline{2})$

2. Rectangle $EFGH$ with vertices $E(4, 1)$, $F(8, 0)$, $G(6, -8)$, and $H(2, -7)$: $(x, y) \rightarrow (x - 2, y + 6)$



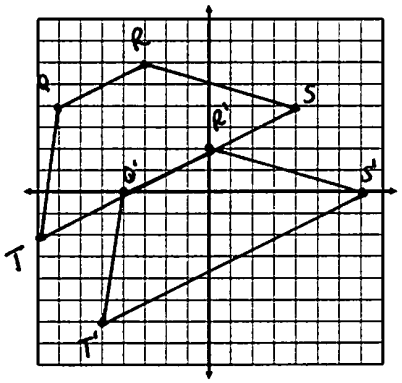
$E'(\underline{2}, \underline{7})$

$F'(\underline{6}, \underline{6})$

$G'(\underline{4}, \underline{-2})$

$H'(\underline{0}, \underline{-1})$

3. Trapezoid $QRST$ with vertices $Q(-7, 4)$, $R(-3, 6)$, $S(4, 4)$, and $T(-8, -2)$: $(x, y) \rightarrow (x + 3, y - 4)$



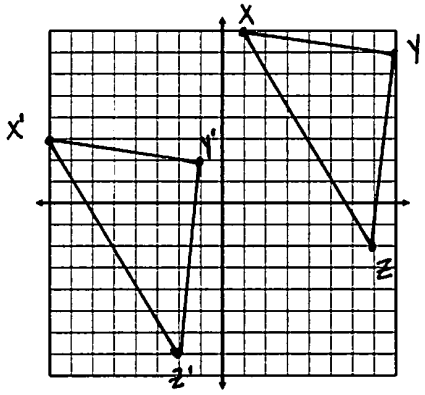
$Q'(\underline{-4}, \underline{0})$

$R'(\underline{0}, \underline{2})$

$S'(\underline{7}, \underline{0})$

$T'(\underline{-5}, \underline{-6})$

4. Triangle XYZ with vertices $X(1, 8)$, $Y(8, 7)$, and $Z(7, -2)$: $(x, y) \rightarrow (x - 9, y - 5)$



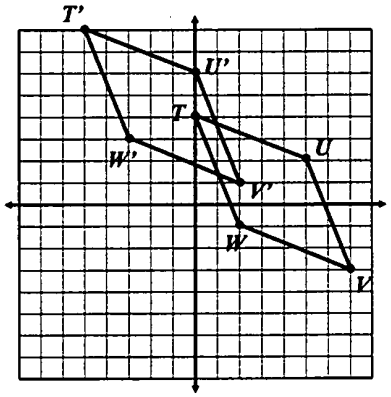
$X'(\underline{-8}, \underline{3})$

$Y'(\underline{-1}, \underline{2})$

$Z'(\underline{-2}, \underline{-7})$

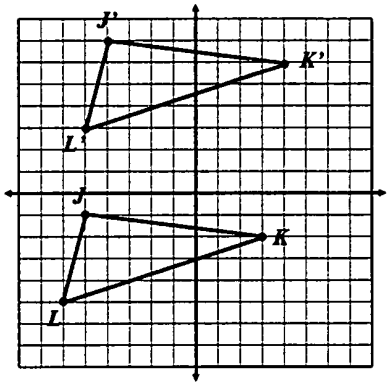
Directions: Write a rule describing each translation below.

5.



Rule: $(x, y) \rightarrow (x - 5, y + 4)$

6.

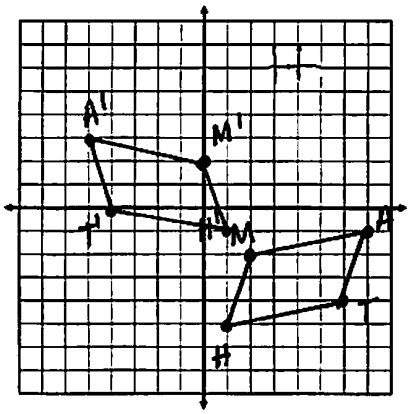


Rule: $(x, y) \rightarrow (x + 1, y + 8)$

Directions: Graph and label each figure and its image under the given transformations. Then, give the new coordinates.

7. Parallelogram $MATH$ with vertices $M(2, -2)$, $A(7, -1)$, $T(6, -4)$, and $H(1, -5)$:

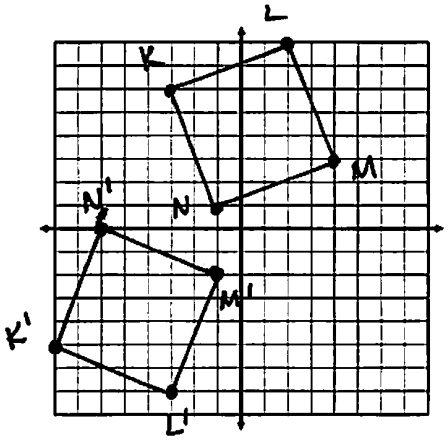
(a) Reflection: in the y-axis
(b) Translation: $(x, y) \rightarrow (x + 2, y + 4)$



M'(0 , 2)
A'(-5 , 3)
T'(-4 , 0)
H'(1 , -1)

8. Square $KLMN$ with vertices $K(-3, 6)$, $L(2, 8)$, $M(4, 3)$, and $N(-1, 1)$:

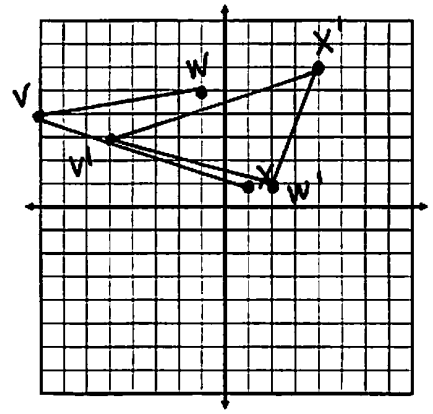
(a) Reflection: in the x-axis
(b) Translation: $(x, y) \rightarrow (x - 5, y + 1)$



K'(-8 , -5)
L'(-3 , -7)
M'(-1 , -2)
N'(-6 , 0)

9. Triangle VWX with vertices $V(-8, 4)$, $W(-1, 5)$, and $X(1, 1)$:

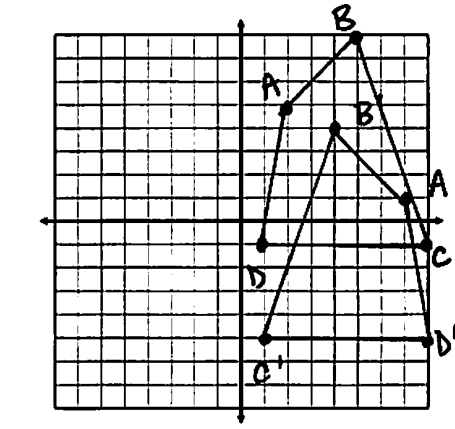
(a) Translation: $(x, y) \rightarrow (x + 3, y - 7)$
(b) Reflection: in the x-axis



V'(-5 , 3)
W'(2 , 1)
X'(4 , 6)

10. Quadrilateral $ABCD$ with vertices $A(2, 5)$, $B(5, 8)$, $C(8, -1)$, and $D(1, 1)$:

(a) Translation: $(x, y) \rightarrow (x - 9, y - 4)$
(b) Reflection: in the y-axis



A'(-7 , 1)
B'(-4 , 4)
C'(1 , -5)
D'(-8 , -5)

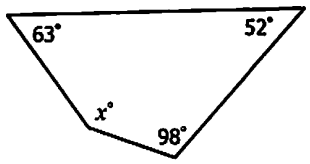
Name: _____ **Pre-Algebra**

Date: _____ **Per:** _____ **Unit 7:** Geometry

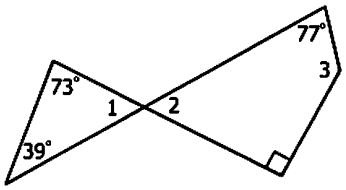
Quiz 7-3: Quadrilaterals, Polygons, Reflections, & Translations

Find each missing measure.

1.



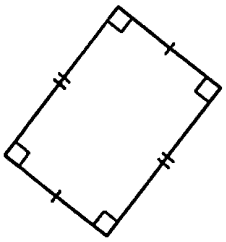
2.



1. 147°
2. $m\angle 1 =$ 68°
   $m\angle 2 =$ 68°
   $m\angle 3 =$ 125°

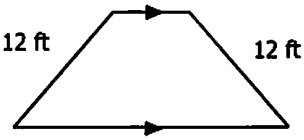
Classify each shape using all names that apply.

3.



- ☑ Quadrilateral
- ☐ Trapezoid
- ☐ Isosceles Trapezoid
- ☑ Parallelogram
- ☑ Rectangle
- ☐ Rhombus
- ☐ Square

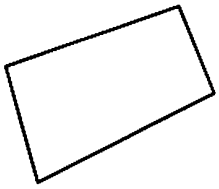
4.



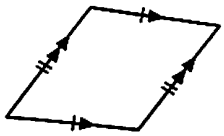
- ☑ Quadrilateral
- ☑ Trapezoid
- ☑ Isosceles Trapezoid
- ☐ Parallelogram
- ☐ Rectangle
- ☐ Rhombus
- ☐ Square

Classify each shape using the name that BEST describes it.

5.



6.



5. Quadrilateral
6. Parallelogram

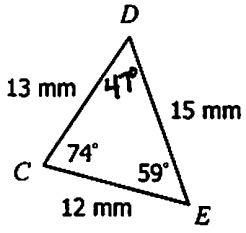
Determine whether the statement is TRUE or FALSE.

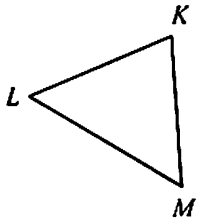
7. Every square is a rectangle. — 7. True
8. Every rhombus is a square. — 8. False
9. Every quadrilateral is a parallelogram. — 9. False
10. Every isosceles trapezoid is a trapezoid. — 10. True

11. What is the sum of the measures of the interior angles of an 18-sided polygon? $(18-2)\cdot 180$ — 11. 2880°

12. A hexagon has interior angles that measure 127°, 85°, 121°, 135°, and 139°. Find the measure of the remaining angle. (720° total) — 12. 113°

13. If $\Delta CDE \cong \Delta KLM$, find each measure.





13. $m\angle K =$ 74°

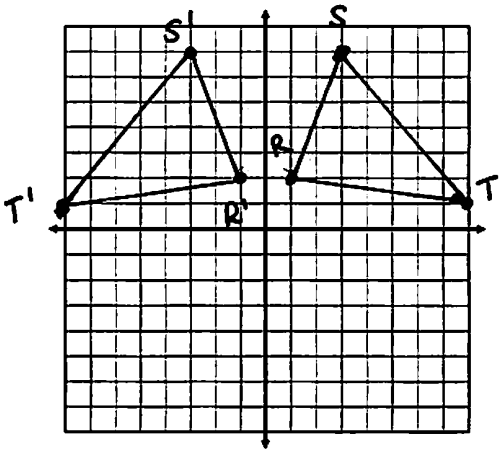
$m\angle L =$ 47°

$KM =$ 12mm

$LK =$ 13 mm

Graph each figure and its image under the given transformation. Give the new coordinates.

14. Triangle RST with vertices $R(1, 2)$, $S(3, 7)$, and $T(8, 1)$; Reflected in the y-axis.

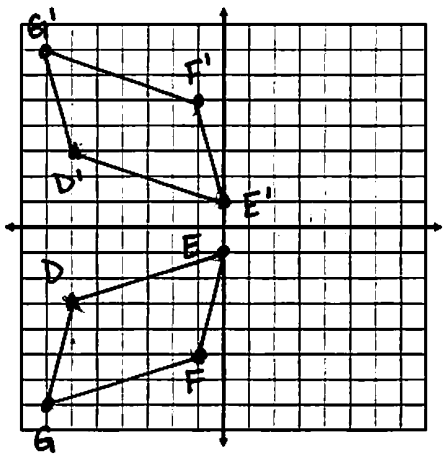


$R'($-1$,$ 2 $)$

$S'($-3$,$ 7 $)$

$T'($-8$,$ 1 $)$

15. Parallelogram $DEFG$ with vertices $D(-6, -3)$, $E(0, -1)$, $F(-1, -5)$, and $G(-7, -7)$; Reflected in the x-axis.



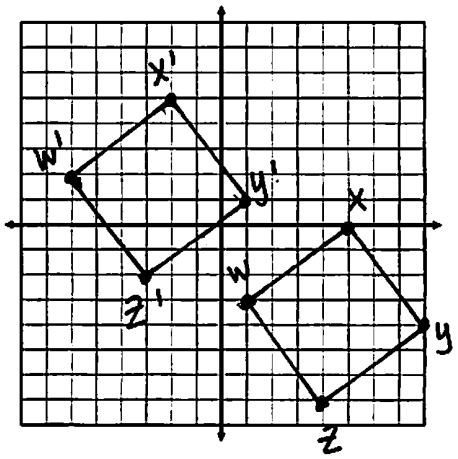
$D'($-6$,$ 3 $)$

$E'($ 0 $,$ 1 $)$

$F'($-1$,$ 5 $)$

$G'($-7$,$ 7 $)$

16. Square $WXYZ$ with vertices $W(1, -3)$, $X(5, 0)$, $Y(8, -4)$, and $Z(4, -7)$; Translated along the rule $(x, y) \rightarrow (x - 7, y + 5)$



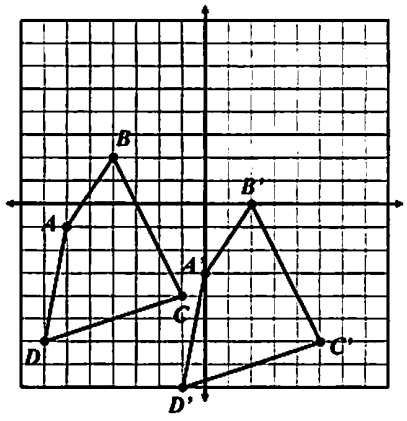
$W'($-6$,$ 2 $)$

$X'($-2$,$ 5 $)$

$Y'($ 1 $,$ 1 $)$

$Z'($-3$,$ -2 $)$

17. Write a rule to represent the transformation below.



Rule: $(x,y) \rightarrow (x+6, y-2)$

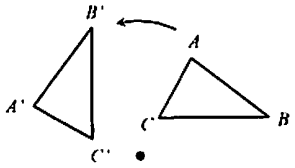
18. ΔSKY with vertices $S(-7, 2)$, $K(-1, 8)$, and $Y(-2, 1)$ undergoes a reflection with new coordinates $S'(-7, -2)$, $K'(-1, -8)$, and $Y'(-2, -1)$. Name the line of reflection.

18. X-axis

Name:	Date:
Topic:	Class:

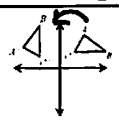
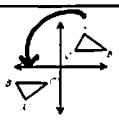
Main Ideas/Questions	Notes/Examples

ROTATION



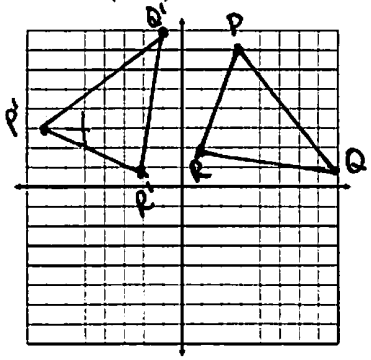
- A turn around a fixed point called the **center of rotation.**
- The figure rotates at a specific angle and direction.
- Rotations result in congruent polygons.

Rules for rotating COUNTERCLOCKWISE about the ORIGIN

90°		$(x, y) \rightarrow (-y, x)$
180°		$(x, y) \rightarrow (-x, -y)$
270°		$(x, y) \rightarrow (y, -x)$

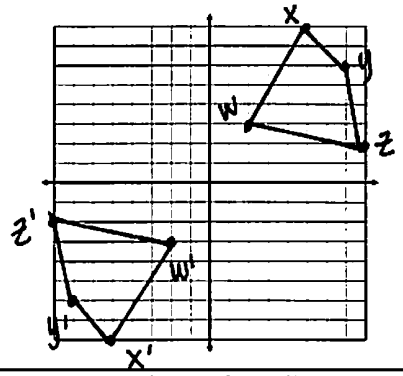
Practice! Graph and label each figure and its image under the given rotation. Give the new coordinates.

1. Triangle PQR with vertices $P(3, 7)$, $Q(8, 1)$, and $R(1, 2)$: **90° counterclockwise**



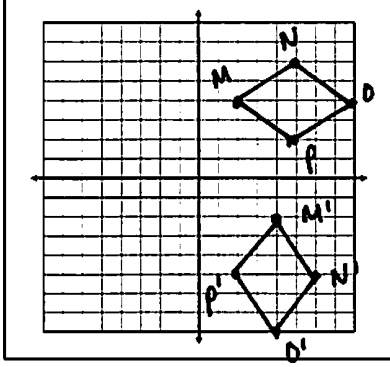
P'(-7, 3)
Q'(-1, 8)
R'(-2, 1)

2. Quadrilateral $WXYZ$ with vertices $W(2, 3)$, $X(5, 8)$, $Y(7, 6)$, and $Z(8, 2)$: **180°**



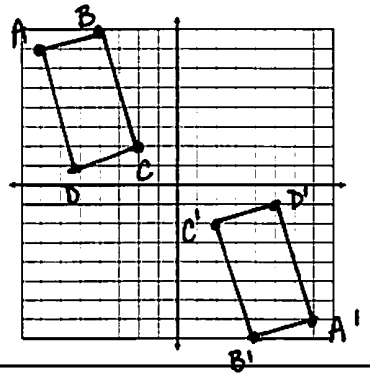
W'(-2, -3)
X'(-5, -8)
Y'(-7, -6)
Z'(-8, -2)

3. Rhombus $MNOP$ with vertices $M(2, 4)$, $N(5, 6)$, $O(8, 4)$, and $P(5, 2)$: **270° counterclockwise**



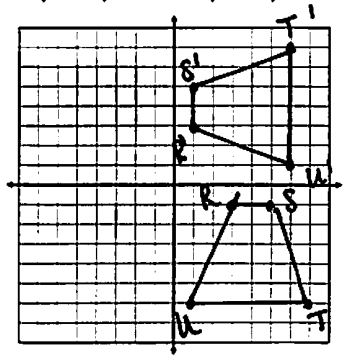
M'(4, -2)
N'(6, -5)
O'(4, -8)
P'(2, -5)

4. Rectangle $ABCD$ with vertices $A(-7, 7)$, $B(-4, 8)$, $C(-2, 2)$, and $D(-5, 1)$: **180°**



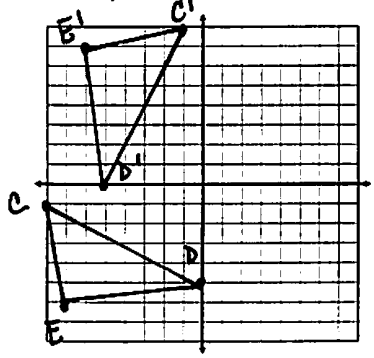
A'(7, -7)
B'(4, -8)
C'(2, -2)
D'(5, -1)

5. Trapezoid $RSTU$ with vertices $R(3, -1)$, $S(5, -1)$, $T(7, -6)$, and $U(1, -6)$: **90° counterclockwise**



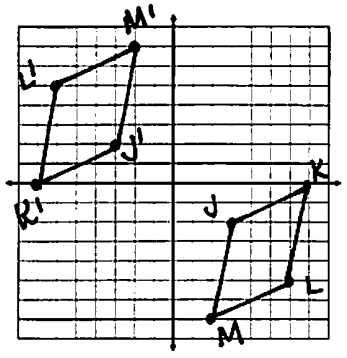
$R'(1, 3)$
$S'(1, 5)$
$T'(6, 7)$
$U'(6, 1)$

6. Triangle CDE with vertices $C(-8, -1)$, $D(0, -5)$, and $E(-7, -6)$: **270° counterclockwise**



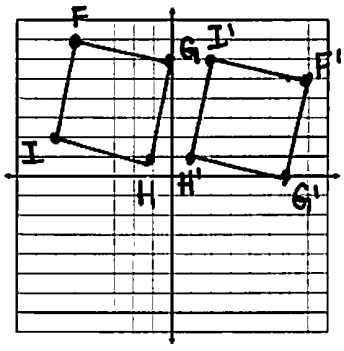
$C'(-1, 8)$
$D'(-5, 0)$
$E'(-6, 7)$

7. Parallelogram $JKLM$ with vertices $J(3, -2)$, $K(7, 0)$, $L(6, -5)$, and $M(2, -7)$: **180°**



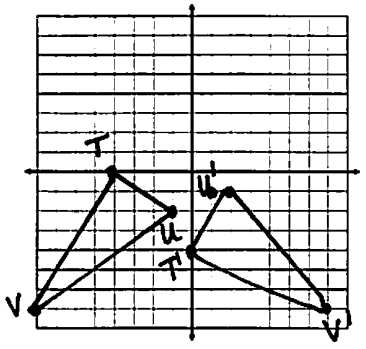
$J'(-3, 2)$
$K'(-7, 0)$
$L'(-6, 5)$
$M'(-2, 7)$

8. Square $FGHI$ with vertices $F(-5, 7)$, $G(0, 6)$, $H(-1, 1)$, and $I(-6, 2)$: **270° counterclockwise**



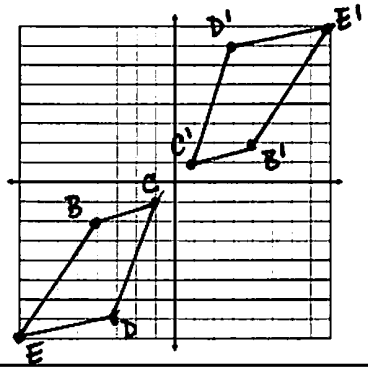
$F'(7, 5)$
$G'(6, 0)$
$H'(1, 1)$
$I'(2, 6)$

9. Triangle TUV with vertices $T(-4, 0)$, $U(-1, -2)$, and $V(-8, -7)$: **90° counterclockwise**



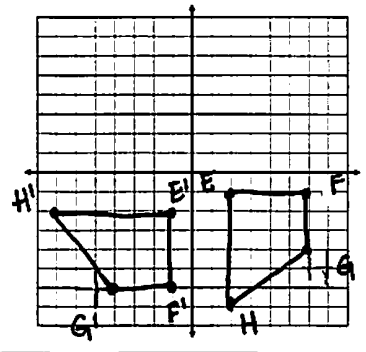
$T'(0, -4)$
$U'(2, -1)$
$V'(7, -8)$

10. Quadrilateral $BCDE$ with vertices $B(-4, -2)$, $C(-1, -1)$, $D(-3, -7)$, and $E(-8, -8)$: **180°**



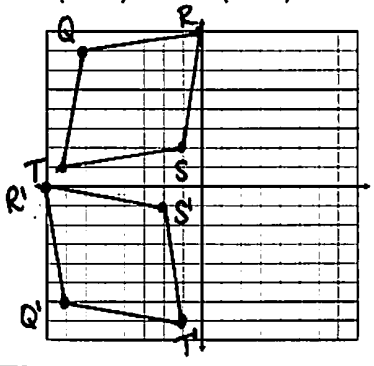
$B'(4, 2)$
$C'(1, 1)$
$D'(3, 7)$
$E'(8, 8)$

11. Trapezoid $EFGH$ with vertices $E(2, -1)$, $F(6, -1)$, $G(6, -4)$, and $H(2, -7)$: **270° counterclockwise**



$E'(-1, -2)$
$F'(-1, -6)$
$G'(-4, -6)$
$H'(-7, -2)$

12. Rhombus $QRST$ with vertices $Q(-6, 7)$, $R(0, 8)$, $S(-1, 2)$, and $T(-7, 1)$: **90° counterclockwise**



$Q'(-7, -6)$
$R'(-8, 0)$
$S'(-2, -1)$
$T'(-1, -7)$

Name: _____ **Unit 7:** Geometry

Date: _____ **Per:** _____ **Homework 12:** Rotations

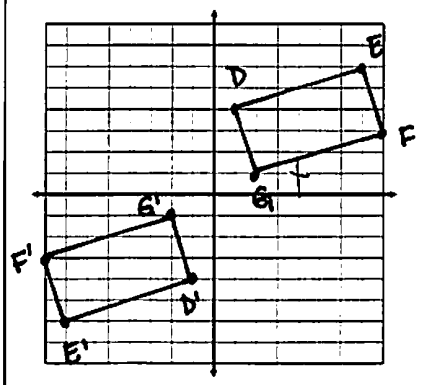
**** This is a 2-page document! ****

Give each rule for counterclockwise rotations about the origin:

90°: $(x, y) \rightarrow$ (-y, x) **180°:** $(x, y) \rightarrow$ (-x, -y) **270°:** $(x, y) \rightarrow$ (y, -x)

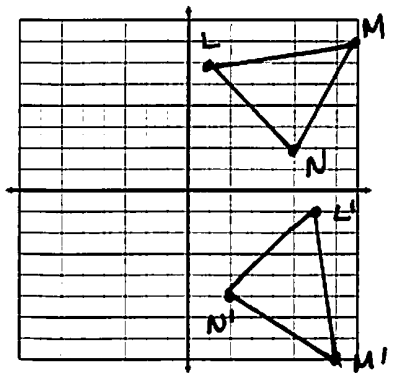
Directions: Graph and label each figure and its image under the given rotation about the origin.

1. Rectangle $DEFG$ with vertices $D(1, 4)$, $E(7, 6)$, $F(8, 3)$, and $G(2, 1)$: **180°**



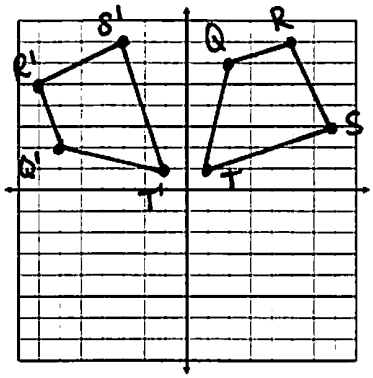
D'(-1, -4)
E'(-7, -6)
F'(-8, -3)
G'(-2, -1)

2. Triangle LMN with vertices $L(1, 6)$, $M(8, 7)$, and $N(5, 2)$: **270° counterclockwise**



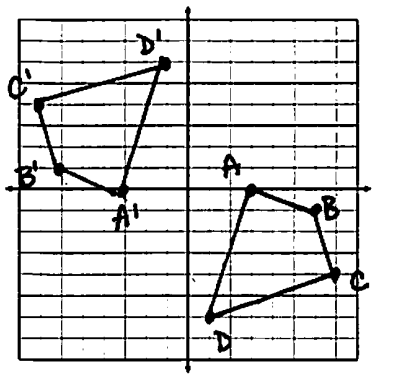
L'(6, -1)
M'(7, -8)
N'(2, -5)

3. Trapezoid $QRST$ with vertices $Q(2, 6)$, $R(5, 7)$, $S(7, 3)$, and $T(1, 1)$: **90° counterclockwise**



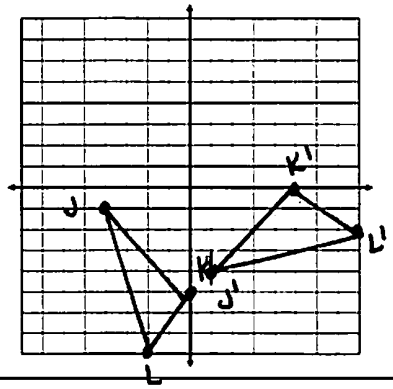
Q'(-6, 2)
R'(-7, 5)
S'(-3, 7)
T'(-1, 1)

4. Quadrilateral $ABCD$ with vertices $A(3, 0)$, $B(6, -1)$, $C(7, -4)$, and $D(1, -6)$: **180°**



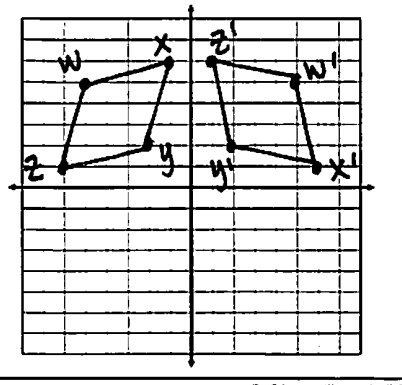
A'(-3, 0)
B'(-6, 1)
C'(-7, 4)
D'(-1, 6)

5. Triangle JKL with vertices $J(-4, -1)$, $K(0, -5)$, and $L(-2, -8)$: **90° counterclockwise**



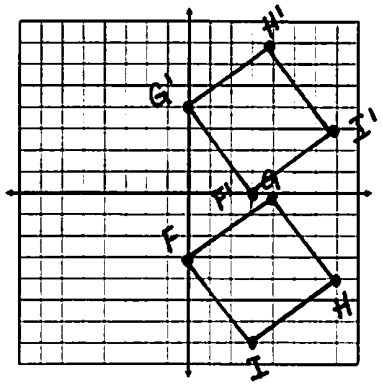
J'(1, -4)
K'(5, 0)
L'(8, -2)

6. Rhombus $WXYZ$ with vertices $W(-5, 5)$, $X(-1, 6)$, $Y(-2, 2)$, and $Z(-6, 1)$: **270° counterclockwise**



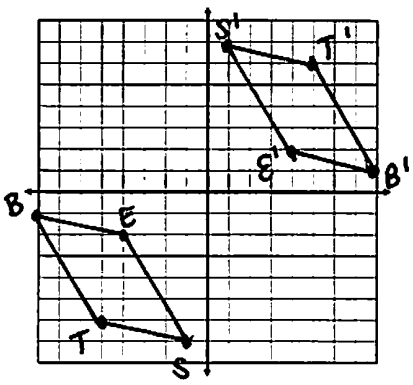
W'(5, 5)
X'(6, 1)
Y'(2, 2)
Z'(1, 6)

7. Square *FGHI* with vertices *F*(0, -3), *G*(4, 0), *H*(7, -4), and *I*(3, -7): **90° counterclockwise**



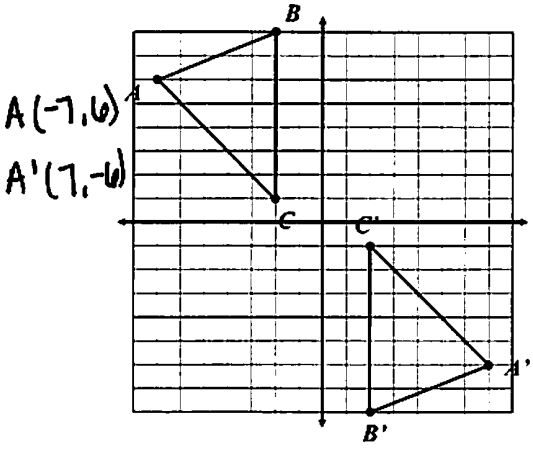
F'(3 , 0)
G'(0 , 4)
H'(4 , 7)
I'(7 , 3)

8. Parallelogram *BEST* with vertices *B*(-8, -1), *E*(-4, -2), *S*(-1, -7), and *T*(-5, -6) : **180°**



B'(8 , 1)
E'(4 , 2)
S'(1 , 7)
T'(5 , 6)

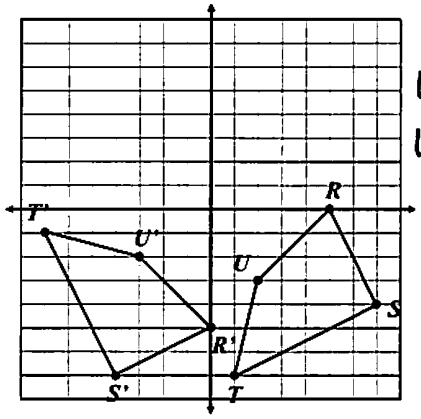
9. Identify the degree of rotation.



A(-7,6)
A'(7,-6)

Rule: 180°

10. Identify the degree of rotation.



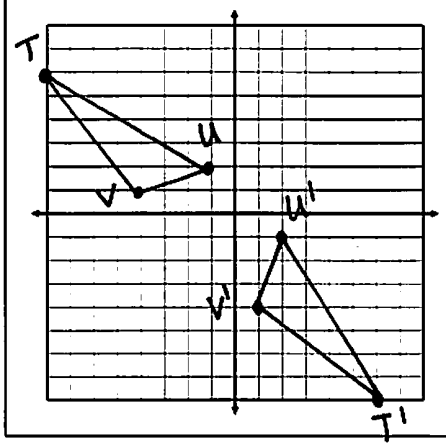
U(2,-3)
U'(-3,-2)

Rule: 270° counterclockwise

Directions: Graph and label each figure and its image under the given transformations. All rotations are about the origin.

11. Triangle *TUV* with vertices *T*(-8, 6), *U*(-1, 2), and *V*(-4, 1):

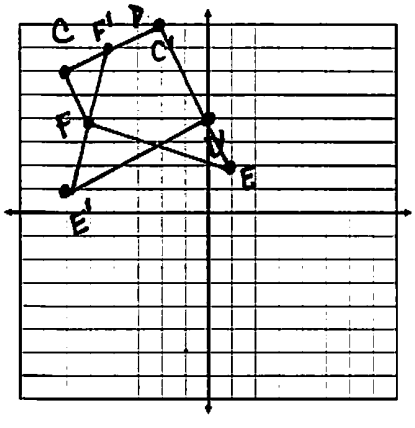
(a) Rotation: 90° counterclockwise
(b) Reflection: in the *y*-axis



T'(6 , -8)
U'(2 , -1)
V'(1 , -4)

12. Trapezoid *CDEF* with vertices *C*(-6, 6), *D*(-2, 8), *E*(1, 2), and *F*(-5, 4):

(a) Translation: $(x, y) \rightarrow (x - 2, y - 8)$
(b) Rotation: 270° counterclockwise

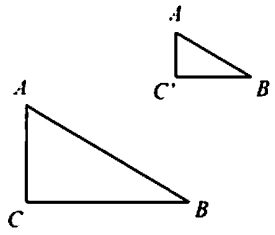


C'(-2 , 8)
D'(0 , 4)
E'(-6 , 1)
F'(-4 , 7)

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples

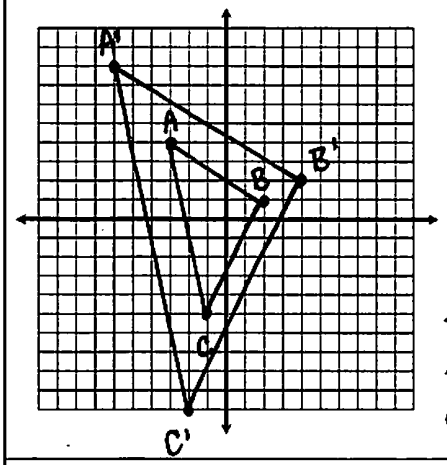
Dilation



- The enlargement or reduction of a figure.
- The scale factor indicates how much the figure will enlarge or reduce.
- Variable for scale factor: k
  - When $k > 1$, the dilation is an enlargement.
  - When $k < 1$, the dilation is a reduction.
- Dilations result in similar figures!

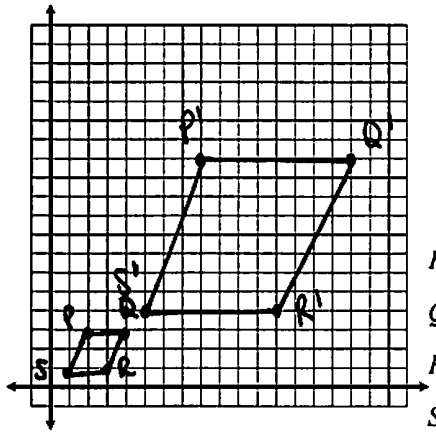
Practice! Graph and label each figure and its image under the given dilation. Give the new coordinates.

1. Triangle ABC with vertices $A(-3, 4)$, $B(2, 1)$, and $C(-1, -5)$: $k = 2$



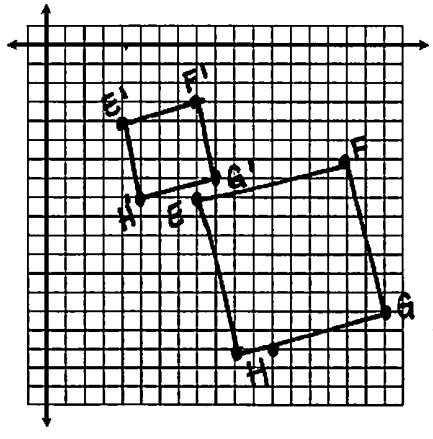
$A'(-6, 8)$
$B'(4, 2)$
$C'(-2, -10)$

2. Parallelogram $PQRS$ with vertices $P(2, 3)$, $Q(4, 3)$, $R(3, 1)$, and $S(1, 1)$: $k = 4$



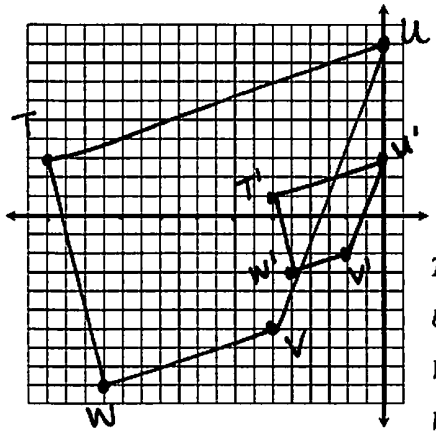
$P'(8, 12)$
$Q'(16, 12)$
$R'(12, 4)$
$S'(4, 4)$

3. Square $EFGH$ with vertices $E(8, -8)$, $F(16, -6)$, $G(18, -14)$, and $H(10, -16)$: $k = 1/2$



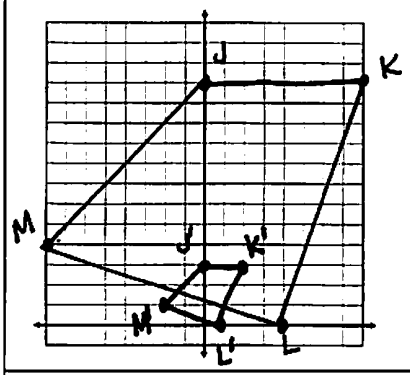
$E'(4, -4)$
$F'(8, -3)$
$G'(9, -7)$
$H'(5, -8)$

4. Trapezoid $TUVW$ with vertices $T(-18, 3)$, $U(0, 9)$, $V(6, -6)$, and $W(-15, -9)$: $k = 1/3$



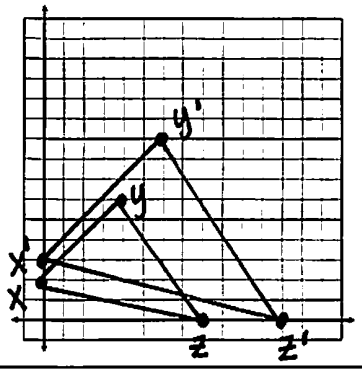
$T'(-6, 1)$
$U'(0, 3)$
$V'(-2, -2)$
$W'(-5, -3)$

5. Quadrilateral $JKLM$ with vertices $J(0, 12)$, $K(8, 12)$, $L(4, 0)$, and $M(-8, 4)$: **$k = 1/4$**



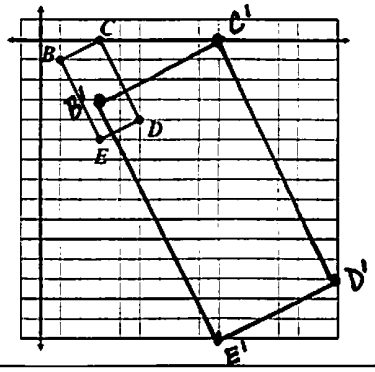
$J'($ 0 , 3 $)$
$K'($ 2 , 3 $)$
$L'($ 1 , 0 $)$
$M'($ -2 , 1 $)$

6. Triangle XYZ with vertices $X(0, 2)$, $Y(4, 6)$, and $Z(8, 0)$: **$k = 3/2$**



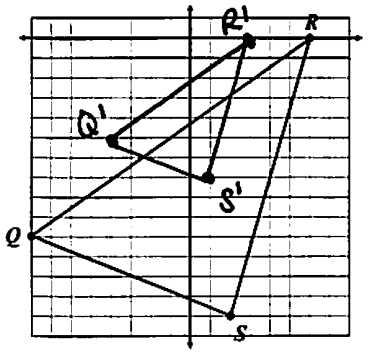
$X'($ 0 , 3 $)$
$Y'($ 6 , 9 $)$
$Z'($ 12 , 0 $)$

7. Graph the image of the rectangle below using a scale factor of **$k = 3$**.



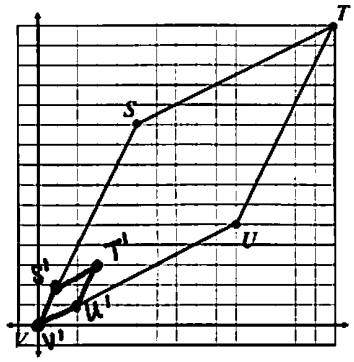
$B'($ 3 , -3 $)$
$C'($ 9 , 0 $)$
$D'($ 15 , -12 $)$
$E'($ 9 , -15 $)$

8. Graph the image of the triangle below using using a scale factor of **$k = 1/2$**.



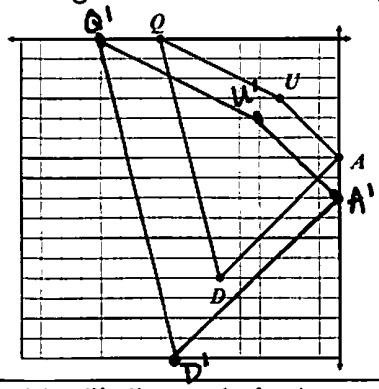
$Q'($ -4 , -5 $)$
$R'($ 3 , 0 $)$
$S'($ 1 , -7 $)$

9. Graph the image of the rhombus below using a scale factor of **$k = 1/5$**.



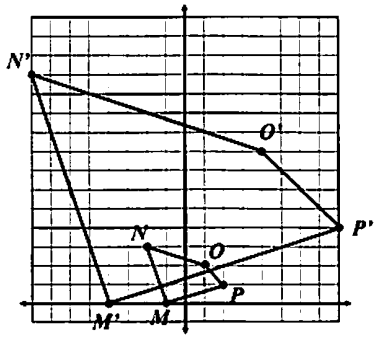
$S'($ 1 , 2 $)$
$T'($ 3 , 3 $)$
$U'($ 2 , 1 $)$
$V'($ 0 , 0 $)$

10. Graph the image of the quadrilateral below using a scale factor of **$k = 4/3$**.



$Q'($ -12 , 0 $)$
$U'($ -4 , -4 $)$
$A'($ 0 , -8 $)$
$D'($ -8 , -16 $)$

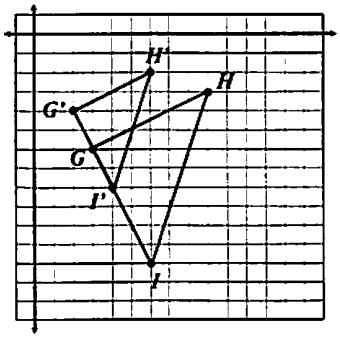
11. Identify the scale factor used to graph the image below.



P(2,1)
P'(8,4)

$k =$ 4

12. Identify the scale factor used to graph the image below.



H (9,-3)
H'(6,-2)

$k =$ 2/3

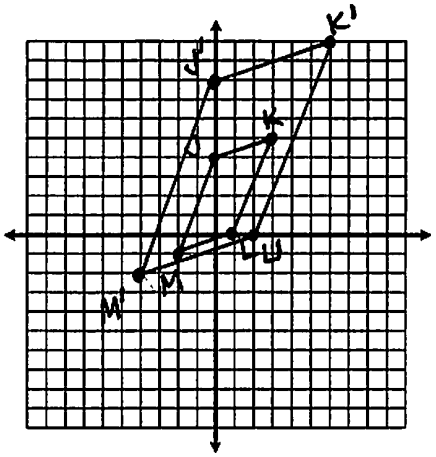
Name: _____ **Unit 7:** Geometry

Date: _____ **Per:** _____ **Homework 13:** Dilations

**** This is a 2-page document! ****

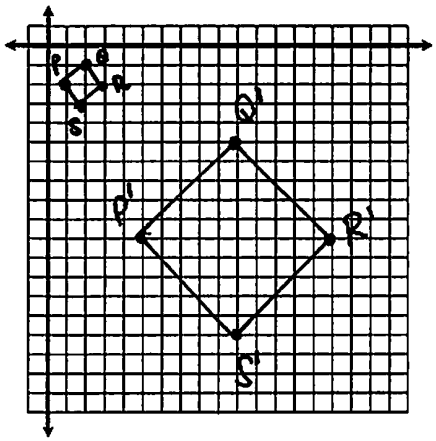
Directions: Graph and label each figure and its image under the given dilation.

1. Parallelogram $JKLM$ with vertices $J(0, 4)$, $K(3, 5)$, $L(1, 0)$, and $M(-2, -1)$: $k = 2$



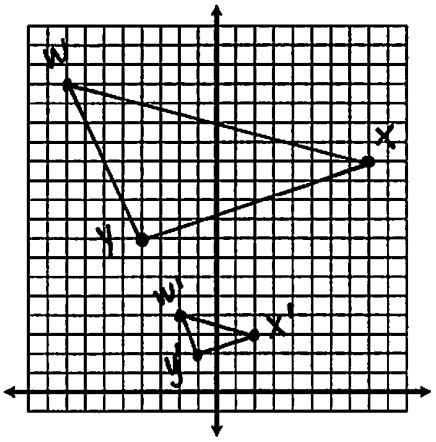
$J'(\underline{0}, \underline{8})$
$K'(\underline{6}, \underline{10})$
$L'(\underline{2}, \underline{0})$
$M'(\underline{-4}, \underline{-2})$

2. Square $PQRS$ with vertices $P(1, -2)$, $Q(2, -1)$, $R(3, -2)$, and $S(2, -3)$: $k = 5$



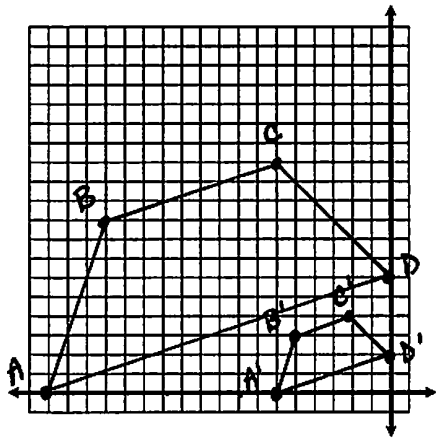
$P'(\underline{5}, \underline{-10})$
$Q'(\underline{10}, \underline{-5})$
$R'(\underline{15}, \underline{-10})$
$S'(\underline{10}, \underline{-15})$

3. Triangle WXY with vertices $W(-8, 16)$, $X(8, 12)$, and $Y(-4, 8)$: $k = 1/4$



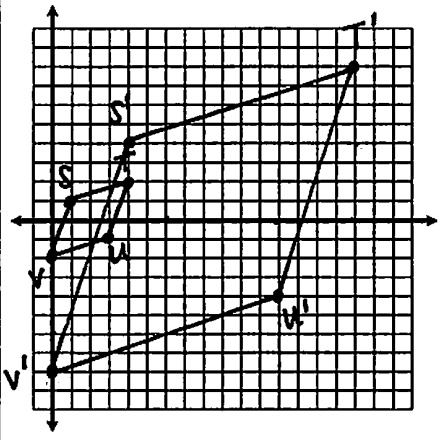
$W'(\underline{-2}, \underline{4})$
$X'(\underline{2}, \underline{3})$
$Y'(\underline{-1}, \underline{2})$

4. Trapezoid $ABCD$ with vertices $A(-18, 0)$, $B(-15, 9)$, $C(-6, 12)$, and $D(0, 6)$: $k = 1/3$



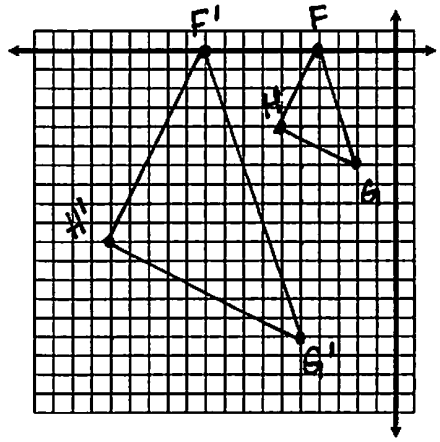
$A'(\underline{-6}, \underline{0})$
$B'(\underline{-5}, \underline{3})$
$C'(\underline{-2}, \underline{4})$
$D'(\underline{0}, \underline{2})$

5. Rhombus $STUV$ with vertices $S(1, 1)$, $T(4, 2)$, $U(3, -1)$, and $V(0, -2)$: $k = 4$



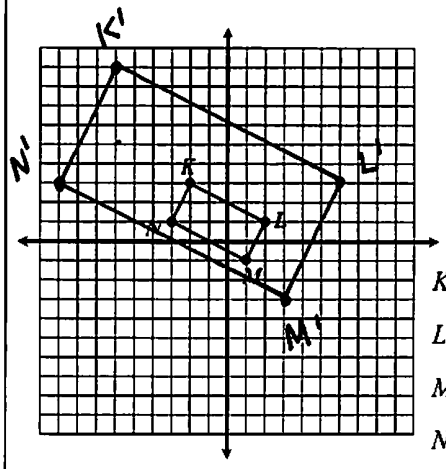
$S'(\underline{4}, \underline{4})$
$T'(\underline{16}, \underline{8})$
$U'(\underline{12}, \underline{-4})$
$V'(\underline{0}, \underline{-8})$

6. Triangle FGH with vertices $F(-4, 0)$, $G(-2, -6)$, and $H(-6, -4)$: $k = 5/2$



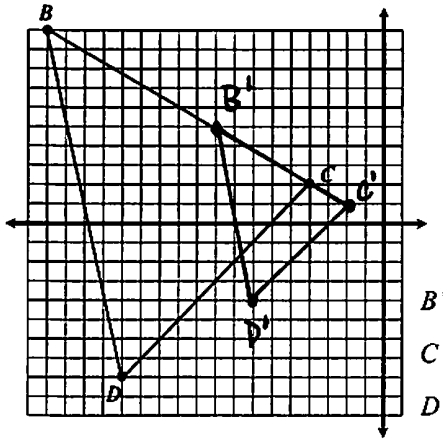
$F'(\underline{-10}, \underline{0})$
$G'(\underline{-5}, \underline{-15})$
$H'(\underline{-15}, \underline{-10})$

7. Graph the image of the rectangle below using a scale factor of $k = 3$.



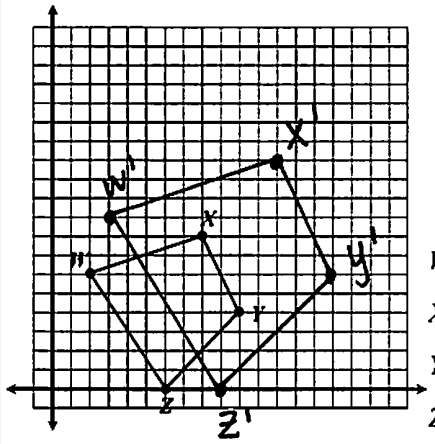
$K'(-6, 9)$
$L'(6, 3)$
$M'(3, -3)$
$N'(-9, 3)$

8. Graph the image of the triangle below using a scale factor of $k = 1/2$.



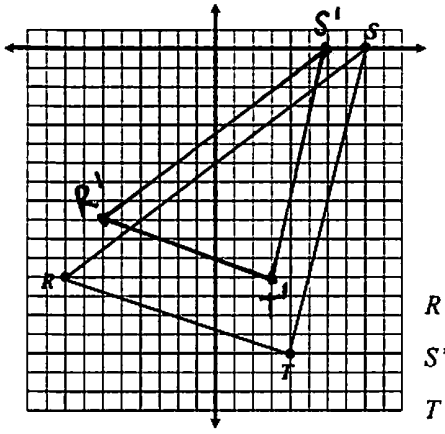
$B'(-9, 5)$
$C'(-2, 1)$
$D'(-7, -4)$

9. Graph the image of the quadrilateral below using a scale factor of $k = 3/2$.



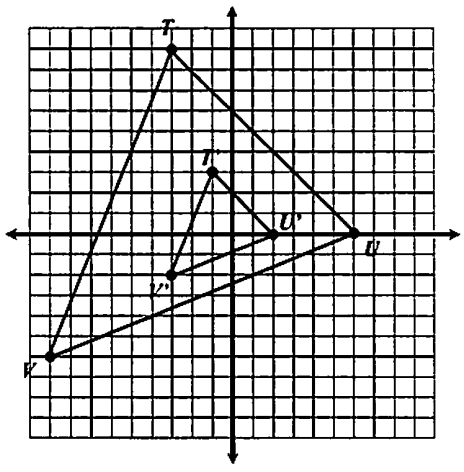
$W'(3, 9)$
$X'(12, 12)$
$Y'(15, 6)$
$Z'(9, 0)$

10. Graph the image of the triangle below using a scale factor of $k = 3/4$.



$R'(-6, -9)$
$S'(6, 0)$
$T'(3, -12)$

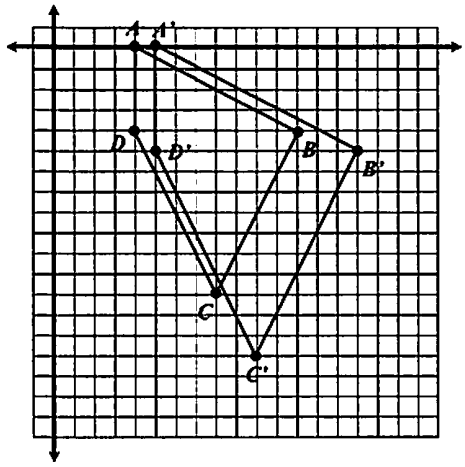
11. Identify the scale factor used to graph the image below.



$U(6,0)$
$U'(2,0)$

$k = 1/3$

12. Identify the scale factor used to graph the image below.



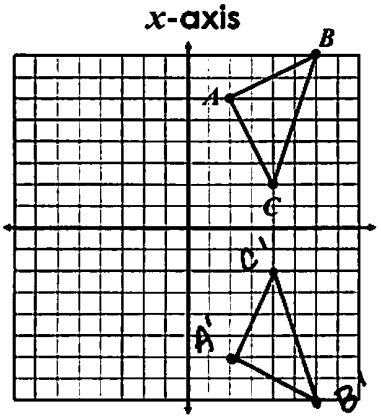
$D(4, -4)$
$D'(5, -5)$

$k = 5/4$

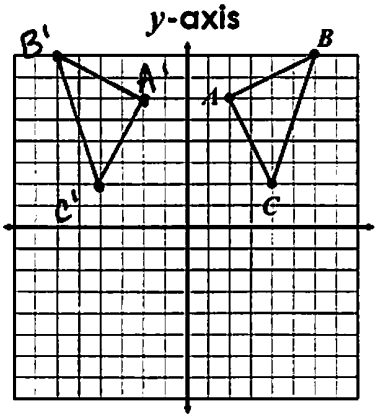
Transformations

REFLECTION (Flip)

x-axis

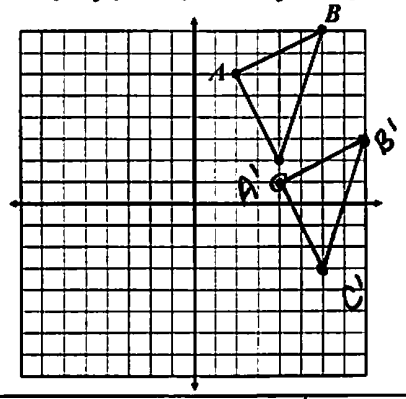


y-axis

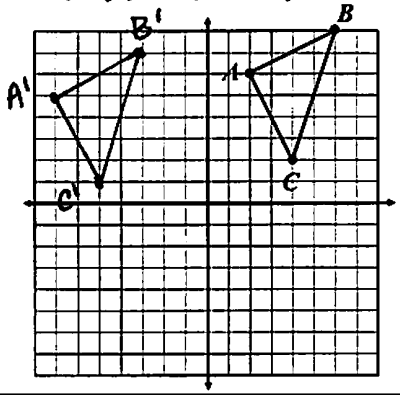


TRANSLATION (Slide)

$(x, y) \rightarrow (x + 2, y - 5)$

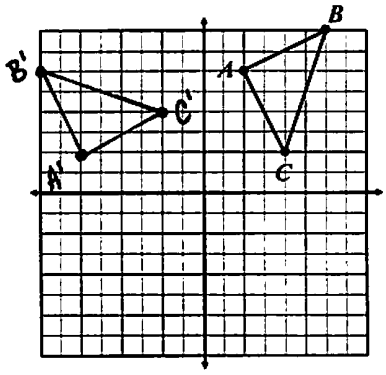


$(x, y) \rightarrow (x - 9, y - 1)$

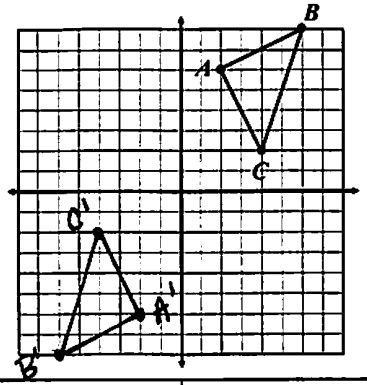


ROTATION (Turn)

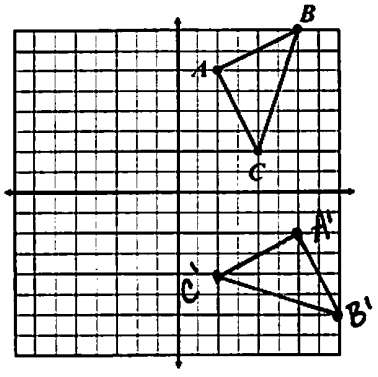
90° counterclockwise



180°

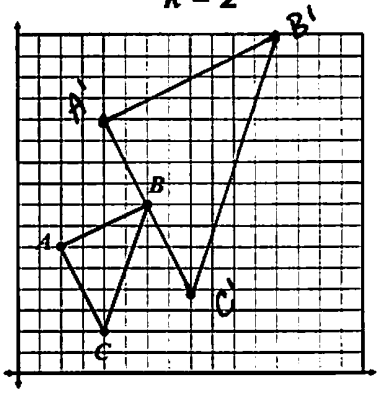


270° counterclockwise

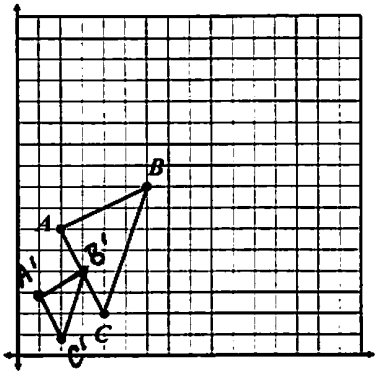


DILATION (Bigger | Smaller)

$k = 2$



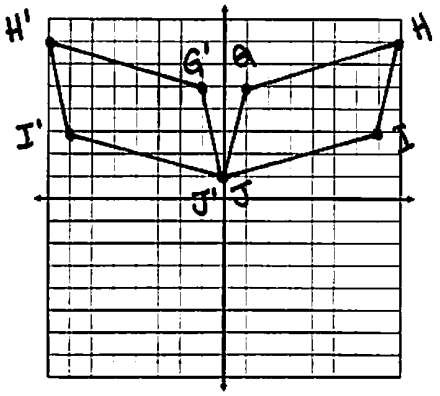
$k = 1/2$



TRANFORMATIONS REVIEW

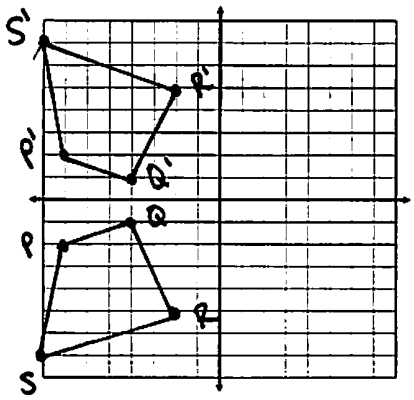
REFLECTIONS

1. Parallelogram $GHIJ$ with vertices $G(1, 5)$, $H(8, 7)$, $I(7, 3)$, and $J(0, 1)$; reflection in the y-axis.



G' (-1 , 5)
H' (-8 , 7)
I' (-7 , 3)
J' (0 , 1)

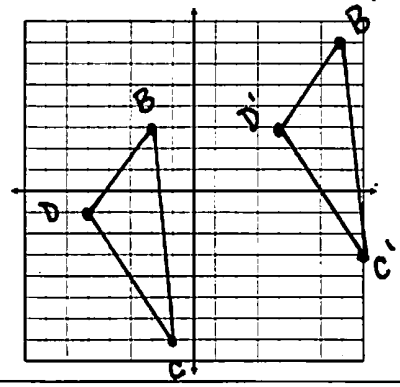
2. Trapezoid $PQRS$ with vertices $P(-7, 2)$, $Q(-4, -1)$, $R(-2, -5)$, and $S(-8, -7)$; reflection in the x-axis.



P' (-7 , 2)
Q' (-4 , 1)
R' (-2 , 5)
S' (-8 , 7)

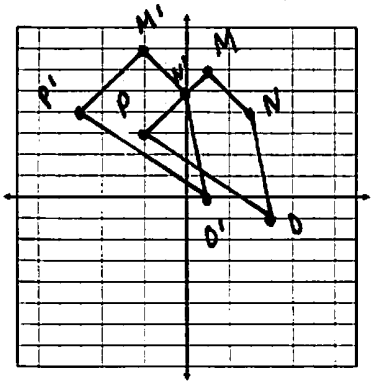
TRANSLATIONS

3. Triangle BCD with vertices $B(-2, 3)$, $C(-1, -7)$, and $D(-5, -1)$; translated along the rule $(x, y) \rightarrow (x + 9, y + 4)$



B' (7 , 7)
C' (8 , -3)
D' (4 , 3)

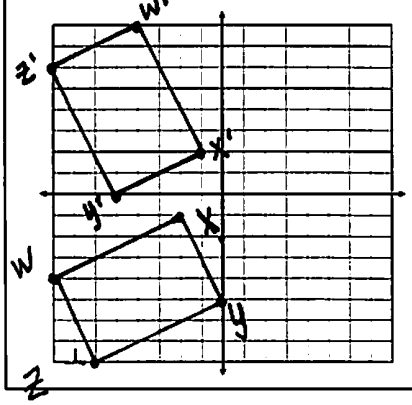
4. Quadrilateral $MNOP$ with vertices $M(1, 6)$, $N(3, 4)$, $O(4, -1)$, and $P(-2, 3)$; translated along the rule $(x, y) \rightarrow (x - 3, y + 1)$



M' (-2 , 7)
N' (0 , 5)
O' (1 , 0)
P' (-5 , 4)

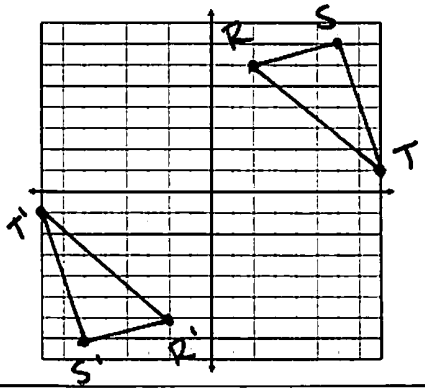
ROTATIONS

5. Rectangle $WXYZ$ with vertices $W(-8, -4)$, $X(-2, -1)$, $Y(0, -5)$, and $Z(-6, -8)$; 270° counterclockwise rotation about the origin



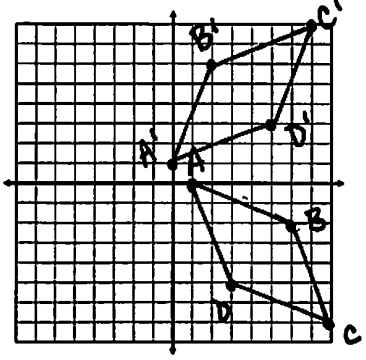
W' (-4 , 8)
X' (-1 , 2)
Y' (-5 , 0)
Z' (-8 , 6)

6. Triangle RST with vertices $R(2, 6)$, $S(6, 7)$, and $T(8, 1)$; 180° rotation about the origin



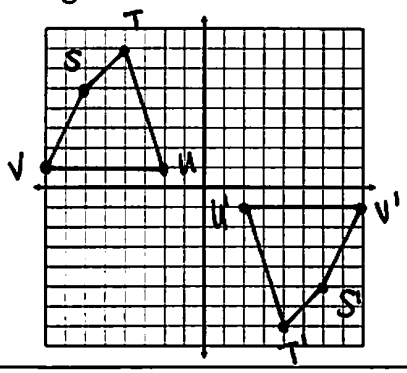
R' (-2 , -6)
S' (-6 , -7)
T' (-8 , -1)

7. Rhombus $ABCD$ with vertices $A(1, 0)$, $B(6, -2)$, $C(8, -7)$, and $D(3, -5)$; 90° counterclockwise rotation about the origin



A' (0 , 1)
B' (2 , 6)
C' (7 , 8)
D' (5 , 3)

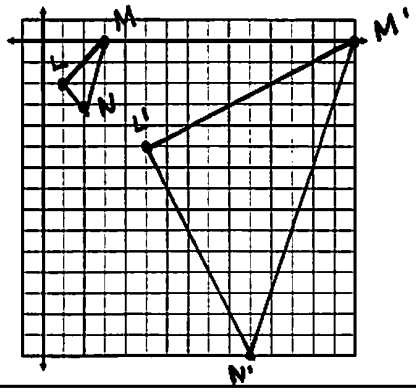
8. Quadrilateral $STUV$ with vertices $S(-6, 5)$, $T(-4, 7)$, $U(-2, 1)$, and $V(-8, 1)$; 180° rotation about the origin



S' (6 , -5)
T' (4 , -7)
U' (2 , -1)
V' (8 , -1)

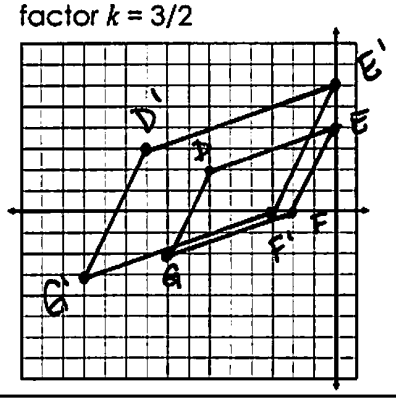
DILATIONS

9. Triangle LMN with vertices $L(1, -2)$, $M(3, 0)$, and $N(2, -3)$; dilation with scale factor $k = 5$



L' (5 , -10)
M' (15 , 0)
N' (10 , -15)

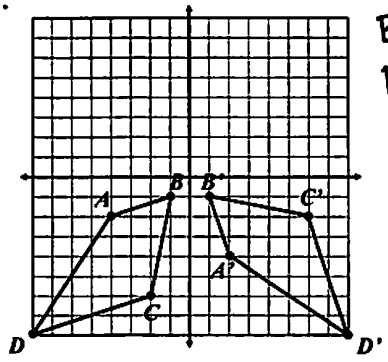
10. Parallelogram $DEFG$ with vertices $D(-6, 2)$, $E(0, 4)$, $F(-2, 0)$, and $G(-8, -2)$; dilation with scale factor $k = 3/2$



D' (-9 , 3)
E' (0 , 6)
F' (-3 , 0)
G' (-12 , -3)

NAME THAT TRANSFORMATION! (Write the rule, too!)

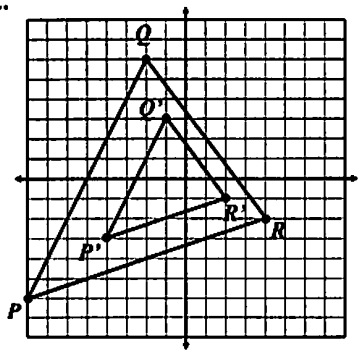
11.



B(-1,-1)
B'(1,-1)

Rotation
90° ccw
about the
origin

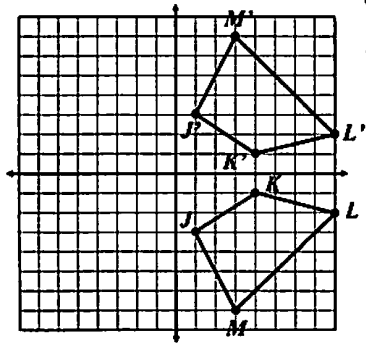
12.



R(4,-2)
R'(2,-1)

Dilation
$k = 1/2$

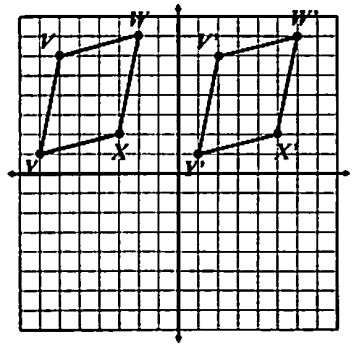
13.



J(1,-3)
J'(1,3)

Reflection
in the
x-axis

14.

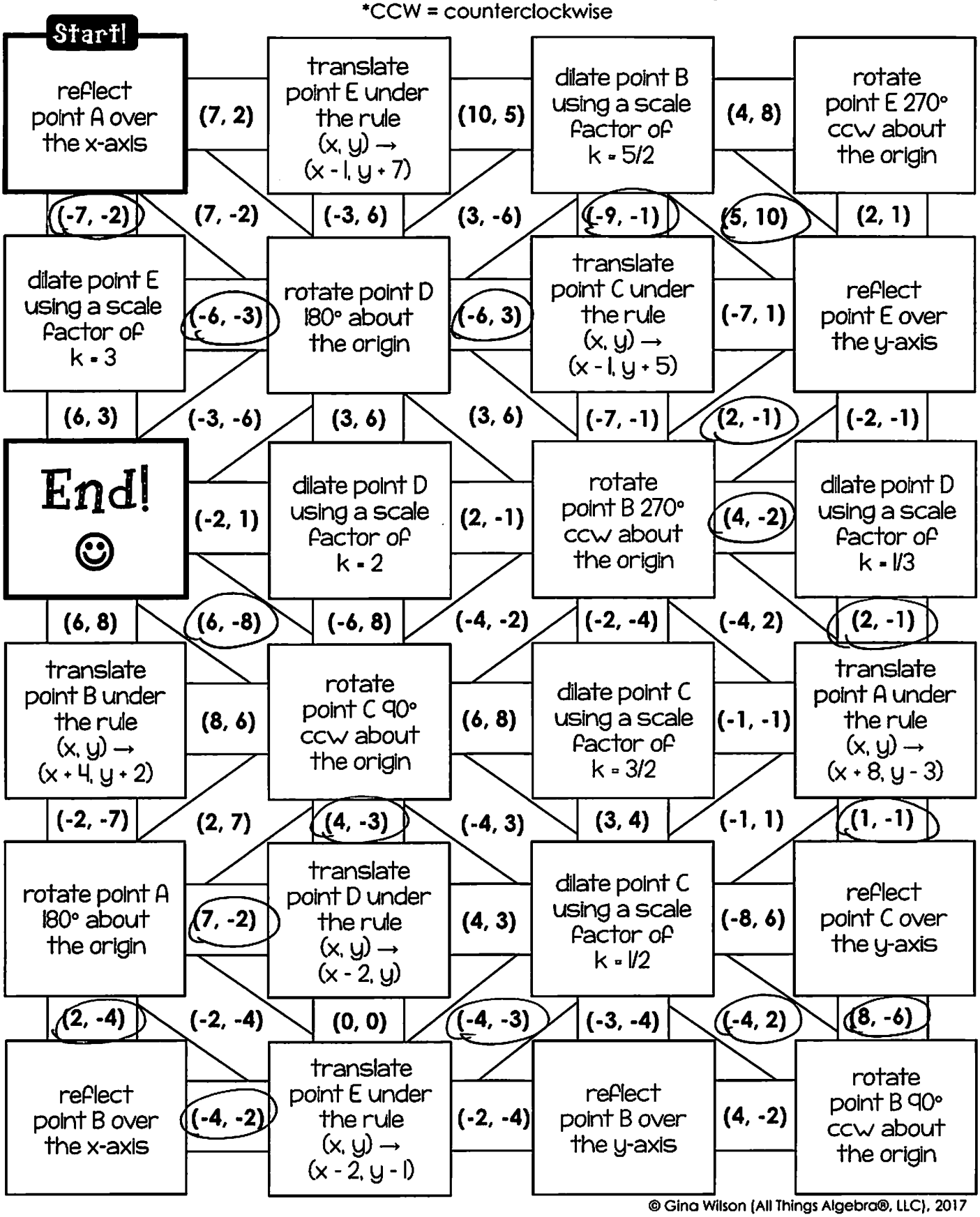


V(-6,6)
V(2,6)

Translation
$(x,y) \rightarrow (x+8,y)$

Transformations Maze!

Directions: Use the points $A(-7, 2)$, $B(2, 4)$, $C(-8, -6)$, $D(6, -3)$, and $E(-2, -1)$ to complete the maze. Use your solutions to navigate through the maze.
*CCW = counterclockwise



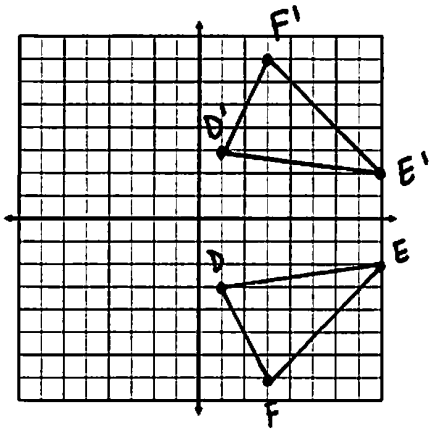
Name: _____ **Unit 7:** Geometry

Date: _____ **Per:** _____ **Homework 14:** Transformations Review

**** This is a 2-page document! ****

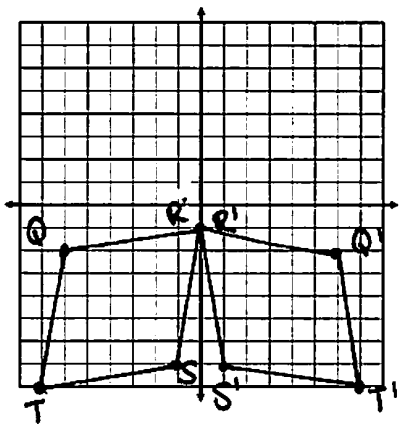
Directions: Graph and label each figure and its image under the given transformation. Then, give the new coordinates. Assume all rotations are about the origin.

1. Triangle DEF with vertices $D(1, -3)$, $E(8, -2)$, and $F(3, -7)$; reflection in the x-axis.



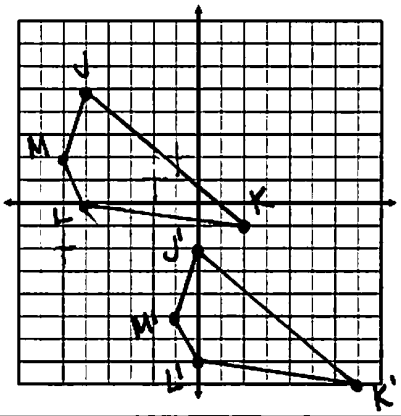
D'(1 , 3)
E'(8 , 2)
F'(3 , 7)

2. Rhombus $QRST$ with vertices $Q(-6, -2)$, $R(0, -1)$, $S(-1, -7)$, and $T(-7, -8)$; reflection in the y-axis.



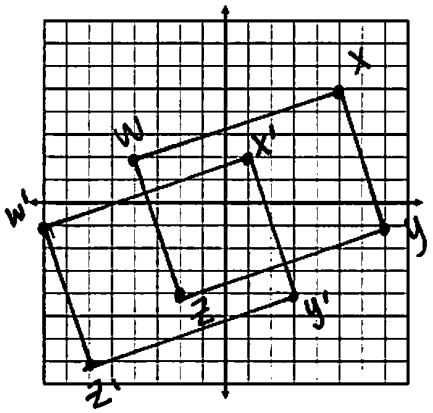
Q'(6 , -2)
R'(0 , -1)
S'(1 , -7)
T'(7 , -8)

3. Quadrilateral $JKLM$ with vertices $J(-5, 5)$, $K(2, -1)$, $L(-5, 0)$, and $M(-6, 2)$; translated along the rule $(x, y) \rightarrow (x + 5, y - 7)$



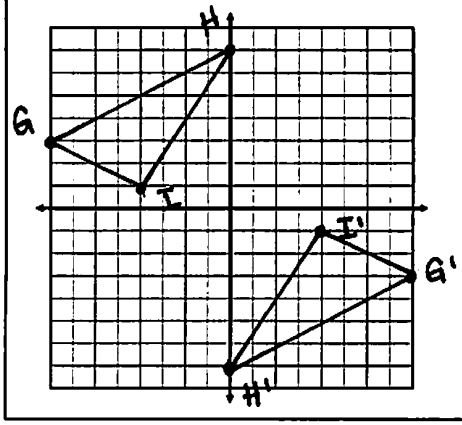
J'(0 , -2)
K'(7 , -8)
L'(0 , -7)
M'(-1 , -5)

4. Rectangle $WXYZ$ with vertices $W(-4, 2)$, $X(5, 5)$, $Y(7, -1)$, and $Z(-2, -4)$; translated along the rule $(x, y) \rightarrow (x - 4, y - 3)$



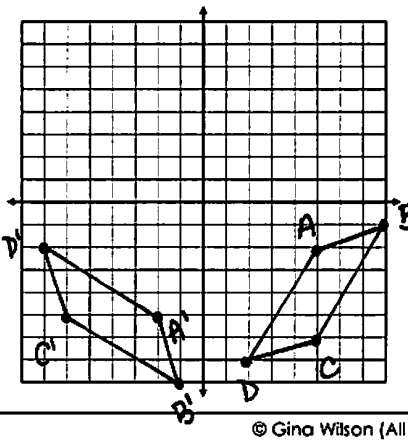
W'(-8 , -1)
X'(1 , 2)
Y'(3 , -4)
Z'(-6 , -7)

5. Triangle GHI with vertices $G(-8, 3)$, $H(0, 7)$, and $I(-4, 1)$; 180° rotation



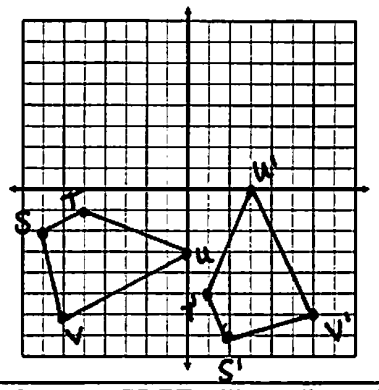
G'(8 , -3)
H'(0 , -7)
I'(4 , -1)

6. Parallelogram $ABCD$ with vertices $A(5, -2)$, $B(8, -1)$, $C(5, -6)$, and $D(2, -7)$; 270° counterclockwise rotation



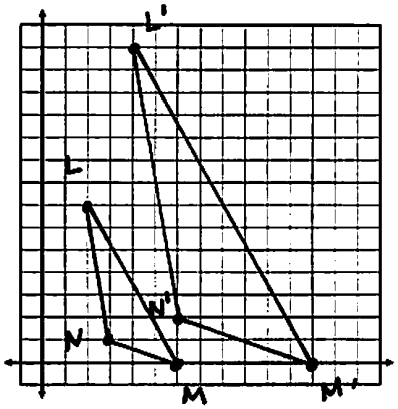
A'(-2 , -5)
B'(-1 , -8)
C'(-6 , -5)
D'(-7 , -2)

7. Trapezoid $STUV$ with vertices $S(-7, -2)$, $T(-5, -1)$, $U(0, -3)$, and $V(-6, -6)$; 90° counterclockwise rotation



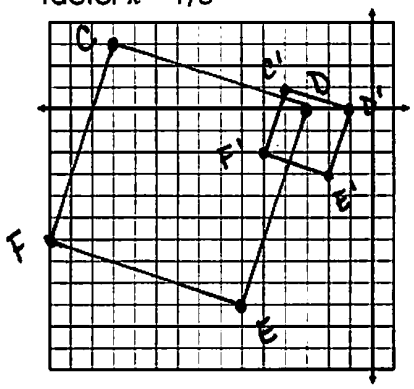
$S'(\underline{2}, \underline{-7})$
$T'(\underline{1}, \underline{-5})$
$U'(\underline{3}, \underline{0})$
$V'(\underline{6}, \underline{-6})$

8. Triangle LMN with vertices $L(2, 7)$, $M(6, 0)$, and $N(3, 1)$; dilation with scale factor $k = 2$



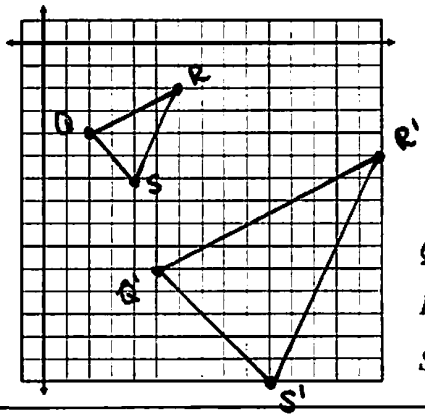
$L'(\underline{4}, \underline{14})$
$M'(\underline{12}, \underline{0})$
$N'(\underline{6}, \underline{2})$

9. Square $CDEF$ with vertices $C(-12, 3)$, $D(-3, 0)$, $E(-6, -9)$, and $F(-15, -6)$; dilation with scale factor $k = 1/3$



$C'(\underline{-4}, \underline{1})$
$D'(\underline{-1}, \underline{0})$
$E'(\underline{-2}, \underline{-3})$
$F'(\underline{-5}, \underline{-2})$

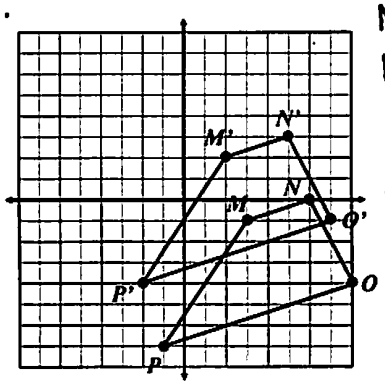
10. Triangle QRS with vertices $Q(2, -4)$, $R(6, -2)$, and $S(4, -6)$; dilation with scale factor $k = 5/2$



$Q'(\underline{5}, \underline{-10})$
$R'(\underline{15}, \underline{-5})$
$S'(\underline{10}, \underline{-15})$

Directions: Determine the type of transformation and write a rule.

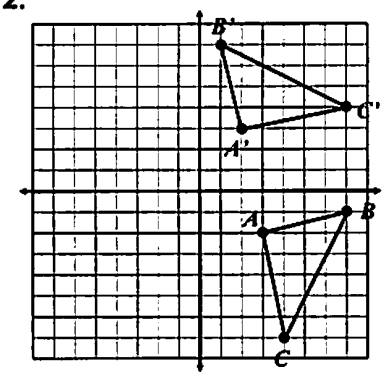
11.



M(3,-1)
M'(2,2)

Translation
(x,y) → (x-1, y+3)

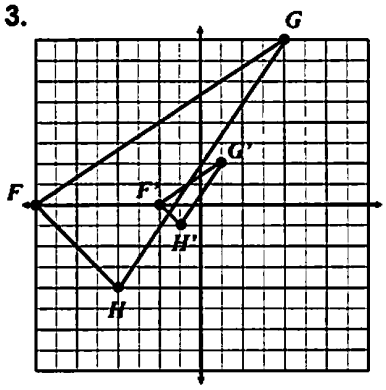
12.



A(3,-2)
A'(2,3)

Rotation 90° ccw about the origin

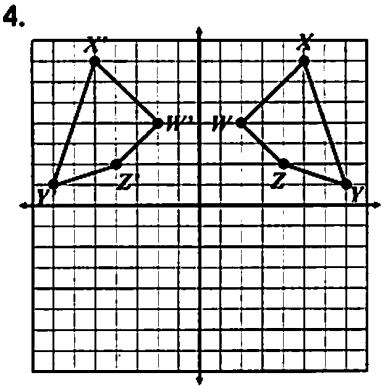
13.



H(4,-4)
H'(1,-1)

Dilation
K = 1/4

14.



W(2,4)
W'(-2,4)

Reflection in y-axis

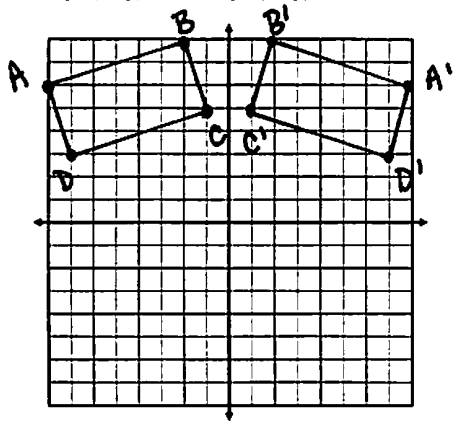
Name: _____ **Pre-Algebra**

Date: _____ **Per:** _____ **Unit 7:** Geometry

Quiz 7-4: Transformations

Graph and label each figure and its image under the given transformation. Then, give the new coordinates. Assume all rotations are about the origin.

1. Rectangle $ABCD$ with vertices $A(-8, 6)$, $B(-2, 8)$, $C(-1, 5)$, and $D(-7, 3)$; reflected in the y-axis.



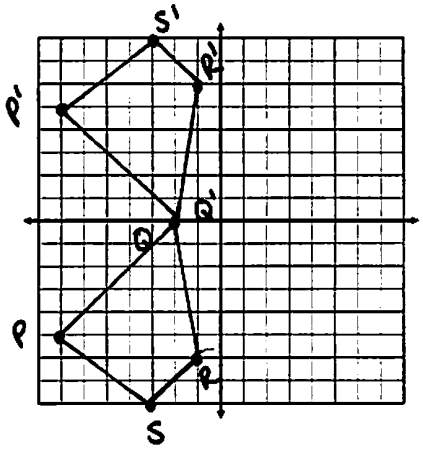
A' (8 , 6)

B' (2 , 8)

C' (1 , 5)

D' (7 , 3)

2. Trapezoid $PQRS$ with vertices $P(-7, -5)$, $Q(-2, 0)$, $R(-1, -6)$, and $S(-3, -8)$; reflected in the x-axis.



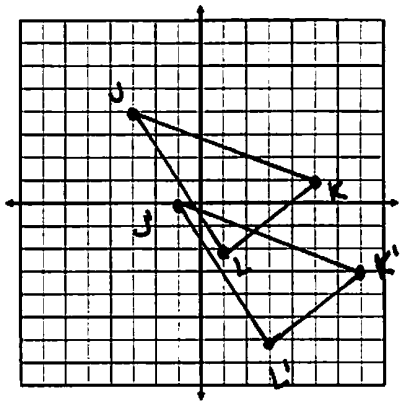
P' (-7 , 5)

Q' (-2 , 0)

R' (-1 , 6)

S' (-3 , 8)

3. Triangle JKL with vertices $J(-3, 4)$, $K(5, 1)$, and $L(1, -2)$; translated along the rule $(x, y) \rightarrow (x + 2, y - 4)$

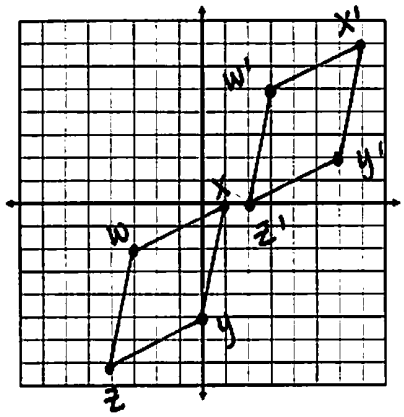


J' (-1 , 0)

K' (7 , -3)

L' (3 , -6)

4. Parallelogram $WXYZ$ with vertices $W(-3, -2)$, $X(1, 0)$, $Y(0, -5)$, and $Z(-4, -7)$; translated along the rule $(x, y) \rightarrow (x + 6, y + 7)$



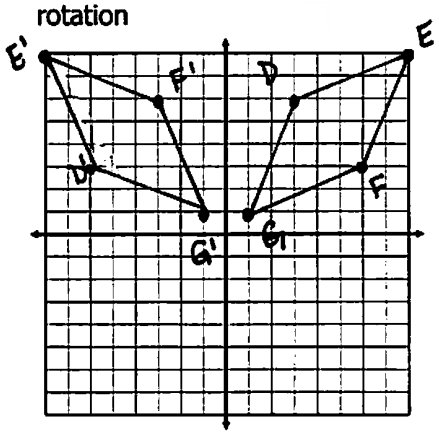
W' (3 , 5)

X' (7 , 7)

Y' (6 , 2)

Z' (2 , 0)

5. Rhombus $DEFG$ with vertices $D(3, 6)$, $E(8, 8)$, $F(6, 3)$, and $G(1, 1)$; 90° counterclockwise rotation



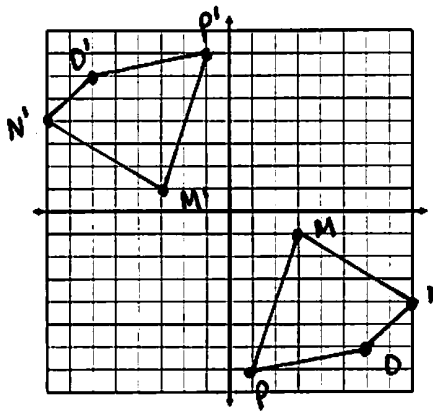
D' (-6 , 3)

E' (-8 , 8)

F' (-3 , 6)

G' (-1 , 1)

6. Quadrilateral $MNOP$ with vertices $M(3, -1)$, $N(8, -4)$, $O(6, -6)$, and $P(1, -7)$; 180° rotation



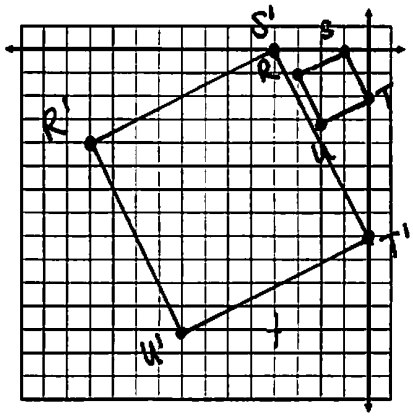
M' (-3 , 1)

N' (-8 , 4)

O' (-6 , 6)

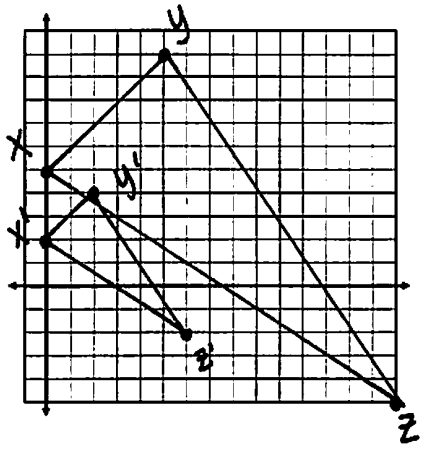
P' (-1 , 7)

7. Square $RSTU$ with vertices $R(-3, -1)$, $S(-1, 0)$, $T(0, -2)$, and $U(-2, -3)$; dilation with scale factor $k = 4$



R' (-12, -4)
S' (-4, 0)
T' (0, -8)
U' (-8, -12)

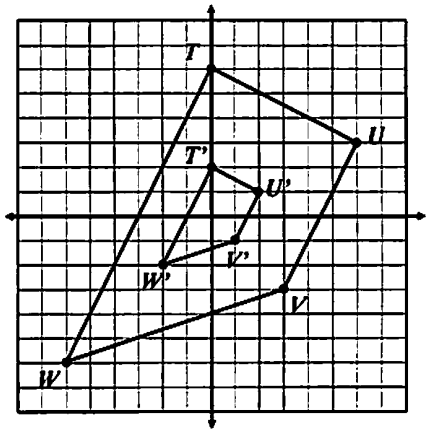
8. Triangle XYZ with vertices $X(0, 5)$, $Y(5, 10)$, and $Z(15, -5)$; dilation with scale factor $k = 2/5$



X' (0, 2)
Y' (2, 4)
Z' (6, -2)

Determine the type of transformation shown on the graph, then write a rule.

9.

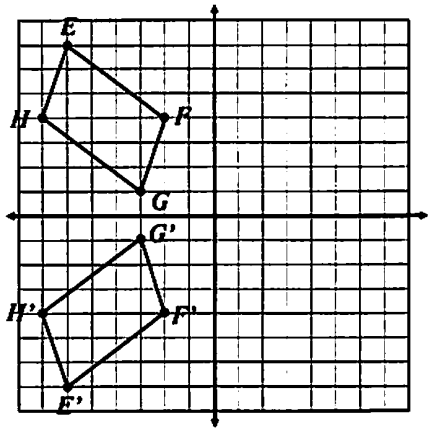


- ☐ Reflection
- ☐ Translation
- ☐ Rotation
- ☑ Dilation

T(0,6)
T'(0,2)

Rule: $k = 1/3$

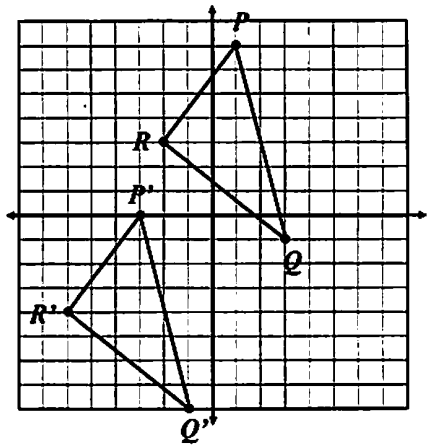
10.



- ☑ Reflection
- ☐ Translation
- ☐ Rotation
- ☐ Dilation

Rule: x-axis

11.

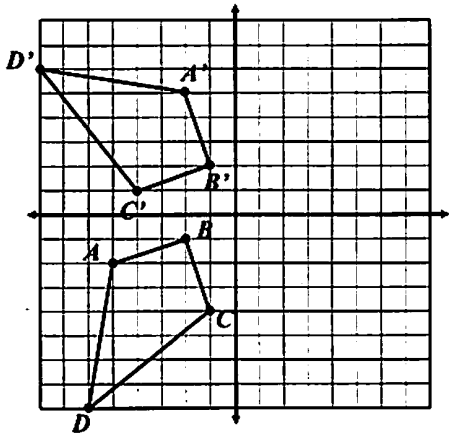


- ☐ Reflection
- ☑ Translation
- ☐ Rotation
- ☐ Dilation

P(1,7)
P'(-3,0)

Rule: $(x, y) \rightarrow (x-4, y-7)$

12.



- ☐ Reflection
- ☐ Translation
- ☑ Rotation
- ☐ Dilation

B(-2,-1)
B'(-1,2)

Rule: 270° ccw about the origin

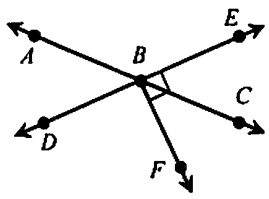
Unit 7 Test Study Guide
(Geometry)

Name: _____

Date: _____ Per: _____

Topic 1: Basic Angle Relationships

1. Using the diagram below, classify the angle pair as vertical angles, adjacent angles, complementary angles, or supplementary angles. Use all names that apply.



a) $\angle ABE$ and $\angle EBC$

Adjacent + Supplementary

b) $\angle ABD$ and $\angle EBC$

Vertical

c) $\angle EBC$ and $\angle CBF$

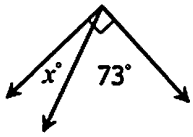
Adjacent + Complementary

d) $\angle ABD$ and $\angle DBF$

Adjacent

Find each measure.

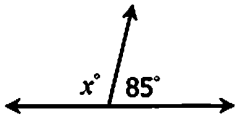
2.



$90 - 73$

$= 17°$

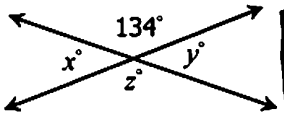
3.



$180 - 85$

$= 95°$

4.



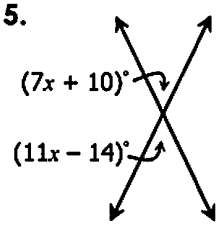
$x = 46°$

$y = 46°$

$z = 134°$

Find the value of x.

5. (vertical)



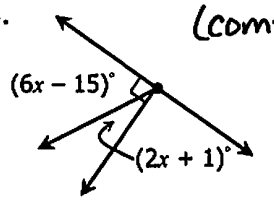
$7x + 10 = 11x - 14$

$10 = 4x - 14$

$24 = 4x$

$x = 6$

6. (complementary)



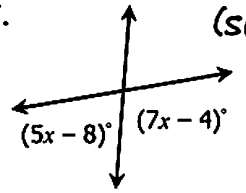
$6x - 15 + 2x + 1 = 90$

$8x - 14 = 90$

$8x = 104$

$x = 13$

7. (supplementary)



$5x - 8 + 7x - 4 = 180$

$12x - 12 = 180$

$12x = 192$

$x = 16$

8. If $\angle X$ and $\angle Y$ are supplementary angles and $m\angle Y = 61°$, find $m\angle X$.

$180 - 61 = 119°$

9. If $\angle A$ and $\angle B$ are complementary angles and $m\angle A = 22°$, find $m\angle B$.

$90 - 22 = 68°$

10. $\angle 1$ and $\angle 2$ are vertical angles. If $m\angle 1 = (7x + 20)°$ and $m\angle 2 = (9x - 14)°$, find $m\angle 1$.

$7x + 20 = 9x - 14$

$20 = 2x - 14$

$34 = 2x$

$x = 17$

$m\angle 1 = 7(17) + 20 = 139°$

11. $\angle J$ and $\angle K$ are supplementary angles. If $m\angle J = (13x - 10)°$ and $m\angle K = (8x + 1)°$, find $m\angle K$.

$13x - 10 + 8x + 1 = 180$

$21x - 9 = 180$

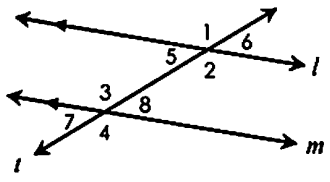
$21x = 189$

$x = 9$

$m\angle K = 8(9) + 1 = 73°$

Topic 2: Parallel Lines Cut by a Transversal

12. Using the diagram below, classify the angle pair as alternate interior angles, alternate exterior angles, corresponding angles, consecutive interior angles, or "no relationship."



a) ∠6 and ∠7 — Alternate Exterior

b) ∠3 and ∠5 — Consecutive Interior

c) ∠2 and ∠4 — Corresponding

d) ∠1 and ∠8 — No Relationship

e) ∠2 and ∠3 — Alternate Interior

f) ∠5 and ∠7 — Corresponding

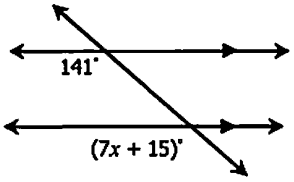
13. In the diagram above, if $m\angle 8 = 48°$, find each angle measure.

$m\angle 1 =$ 132° $m\angle 3 =$ 132° $m\angle 5 =$ 48° $m\angle 7 =$ 48°

$m\angle 2 =$ 132° $m\angle 4 =$ 132° $m\angle 6 =$ 48°

Find the value of x.

14.



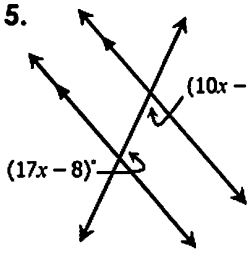
(Corresponding)

$141 = 7x + 15$

$126 = 7x$

$x = 18$

15.



(consecutive interior)

$17x - 8 + 10x - 1 = 180$

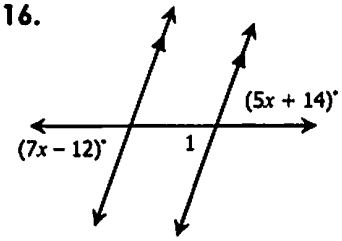
$27x - 9 = 180$

$27x = 189$

$x = 7$

Find $m\angle 1$.

16.



$7x - 12 = 5x + 14$

$2x - 12 = 14$

$2x = 26$

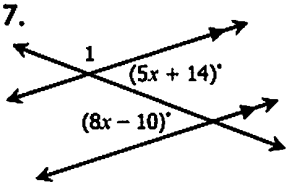
$x = 13$

$5(13) + 14$

$= 65 + 14$

$= 79°$

17.



$5x + 14 = 8x - 10$

$14 = 3x - 10$

$24 = 3x$

$x = 8$

$5(8) + 14$

$= 40 + 14$

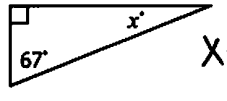
$= 54°$

$180 - 54° =$ 126°

Topic 3: Triangles & The Pythagorean Theorem

Find each missing angle measure, then classify the triangle by its angles and its side.

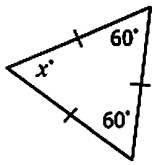
18.



$x = 23°$

Right, Scalene

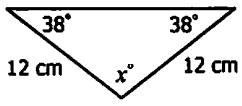
19.



$x = 60°$

Acute, Equilateral

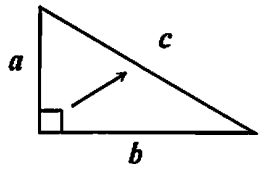
20.



$x = 104°$

Obtuse, Isosceles

Pythagorean Theorem:

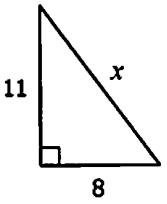


$a^2+b^2=c^2$

where a and b are the legs and c, the longest side, is the hypotenuse

Find the missing side length. Round to the nearest tenth if necessary.

21.



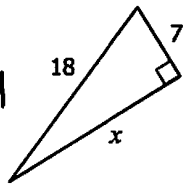
$11^2+8^2=x^2$

$121+64=x^2$

$\sqrt{185}=\sqrt{x^2}$

$x=13.6$

22.



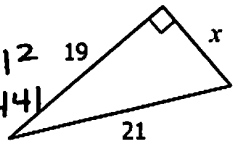
$x^2+7^2=18^2$

$x^2+49=324$

$\sqrt{x^2}=\sqrt{275}$

$x=16.6$

23.



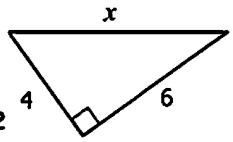
$x^2+19^2=21^2$

$x^2+361=441$

$\sqrt{x^2}=\sqrt{80}$

$x=8.9$

24.



$4^2+6^2=x^2$

$16+36=x^2$

$\sqrt{52}=\sqrt{x^2}$

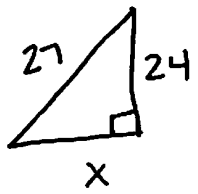
$x=7.2$

25. Determine whether the side lengths could form a right triangle. Check all that apply.

- ☑ 6, 8, 10 — $36+64=100$, $100=100$
- ☐ 4, 7, 8 — $16+49=64$, $65\neq64$
- ☐ 9, 12, 18 — $81+144=324$, $225\neq324$
- ☑ 7, 24, 25 — $49+576=625$, $625=625$
- ☐ 14, 16, 30 — $196+256=900$, $452\neq900$

Solve each word problem using a picture to assist you. Round to the nearest tenth if necessary.

26. A 27-foot long wire is attached from a stake in the ground to the top of a 24-foot flagpole. Find the distance from the stake in the ground to the flagpole.



$x^2+24^2=27^2$

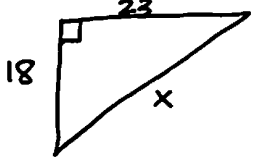
$x^2+576=729$

$\sqrt{x^2}=\sqrt{153}$

$x=12.4$

12.4 ft

27. Morgan just got her permit and is practicing driving in a parking lot with her Dad. She drives 18 meters north then 23 meters west. How far is she from her starting point?



$18^2+23^2=x^2$

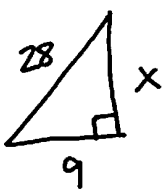
$324+529=x^2$

$\sqrt{853}=\sqrt{x^2}$

$x=29.2$

29.2 m

28. A painter leans a 28-foot ladder against a house so that the base of the ladder is 9 feet from the house. How high up the house does the ladder reach?



$x^2+9^2=28^2$

$x^2+81=784$

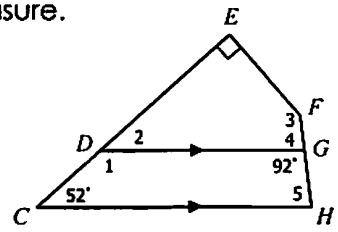
$\sqrt{x^2}=\sqrt{703}$

$x=26.5$

26.5 ft

Topic 4: Quadrilaterals

29. Find each missing angle measure.



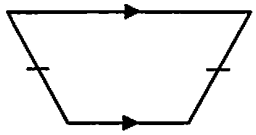
$m\angle 1 =$ 128° $m\angle 4 =$ 88°

$m\angle 2 =$ 52° $m\angle 5 =$ 88°

$m\angle 3 =$ 130°

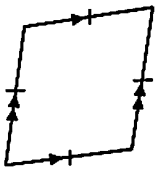
Classify each figure using all names that apply.

30.



- ☑ Quadrilateral
- ☑ Trapezoid
- ☑ Isosceles Trapezoid
- ☐ Parallelogram
- ☐ Rectangle
- ☐ Rhombus
- ☐ Square

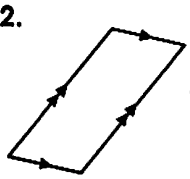
31.



- ☑ Quadrilateral
- ☐ Trapezoid
- ☐ Isosceles Trapezoid
- ☑ Parallelogram
- ☐ Rectangle
- ☑ Rhombus
- ☐ Square

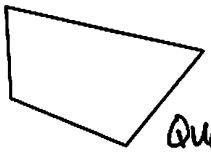
Classify each figure using the name that best describes it.

32.



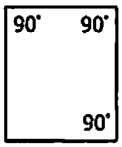
Parallelogram

33.



Quadrilateral

34.



Rectangle

Determine if the statement is true or false.

35. A parallelogram is sometimes a square.

True

36. A trapezoid is never a quadrilateral.

False

37. A square is always rhombus.

True

38. A quadilateral is always a parallelogram.

False

Topic 5: Polygons

Formula for the sum of the measures of the interior angles of polygon:

$S = (n-2) \cdot 180$

$n =$ # of sides

39. Find the sum of the measures of the interior angles.

a) decagon

$S = (10-2) \cdot 180$

$= 1440°$

b) 19-gon

$S = (19-2) \cdot 180$

$= 3060°$

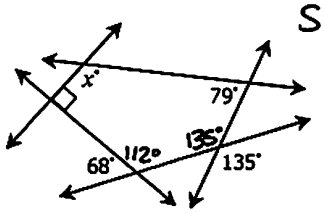
c) 26-gon

$S = (26-2) \cdot 180$

$= 4320°$

40. Find the measure of the missing angle.

$S = (5-2) \cdot 180 = 540°$



$X = 124°$

41. A octagon has interior angles that measure 134°, 125°, 98°, 141°, 159°, 116°, and 148°. Find the measure of the remaining angle.

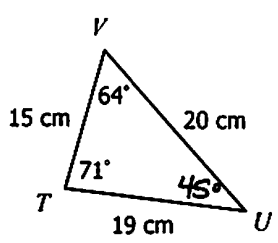
$S = (8-2) \cdot 180 = 1080°$

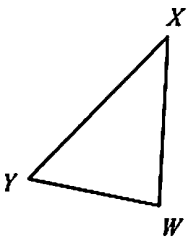
$X = 159°$

42. If quadrilateral $ABCD \cong$ quadrilateral $EFGH$, identify the congruent parts.

$\angle A \cong \angle E$	$\overline{EF} \cong \overline{AB}$
$\angle B \cong \angle F$	$\overline{FG} \cong \overline{BC}$
$\angle C \cong \angle G$	$\overline{GH} \cong \overline{CD}$
$\angle D \cong \angle H$	$\overline{EH} \cong \overline{AD}$

43. If $\Delta TUV \cong \Delta WXY$, find each measure.



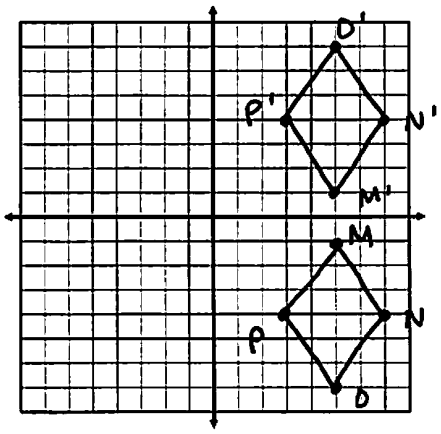


$m\angle W =$ 71°	$WX =$ 19 cm
$m\angle X =$ 45°	$WY =$ 15 cm
$m\angle Y =$ 64°	$XY =$ 20 cm

Topic 6: Transformations

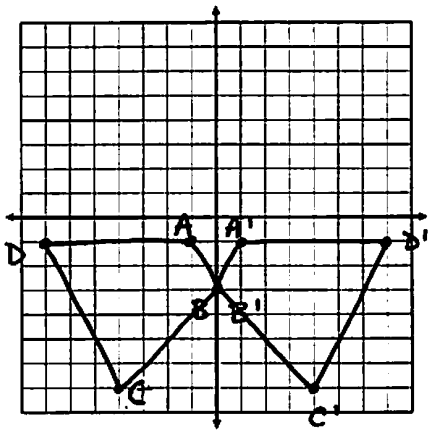
Graph and label each figure and its image under the given transformation. Then, give the new coordinates. Assume all rotations are about the origin.

44. Rhombus $MNOP$ with vertices $M(5, -1)$, $N(7, -4)$, $O(5, -7)$, and $P(3, -4)$; reflection in the x-axis.



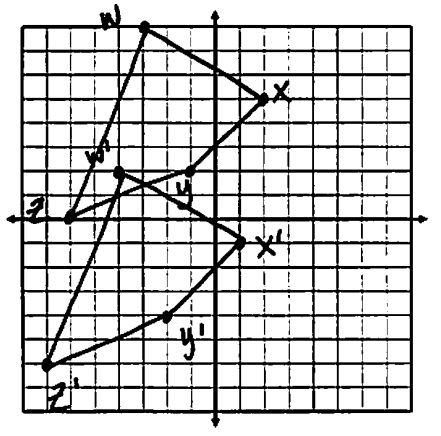
M' (5 , 1)
N' (7 , 4)
O' (5 , 7)
P' (3 , 4)

45. Trapezoid $ABCD$ with vertices $A(-1, -1)$, $B(0, -3)$, $C(-4, -7)$, and $D(-7, -1)$; reflection in the y-axis.



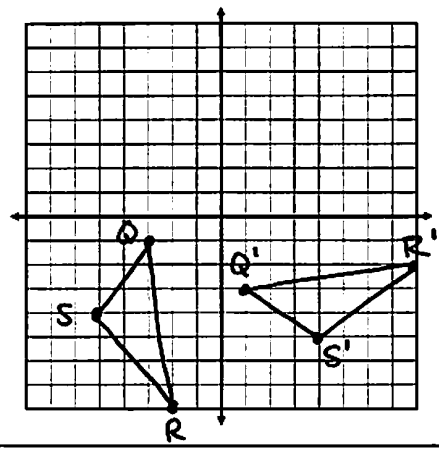
A' (1 , -1)
B' (0 , -3)
C' (4 , -7)
D' (7 , -1)

46. Quadrilateral $WXYZ$ with vertices $W(-3, 8)$, $X(2, 5)$, $Y(-1, 2)$, and $Z(-6, 0)$; translated along the rule $(x, y) \rightarrow (x - 1, y - 6)$



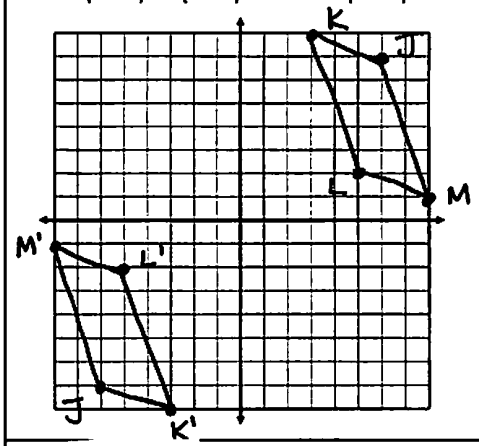
W' (-4 , 2)
X' (1 , -1)
Y' (-2 , -4)
Z' (-7 , -6)

47. Triangle QRS with vertices $Q(-3, -1)$, $R(-2, -8)$, and $S(-5, -4)$; 90° counterclockwise rotation



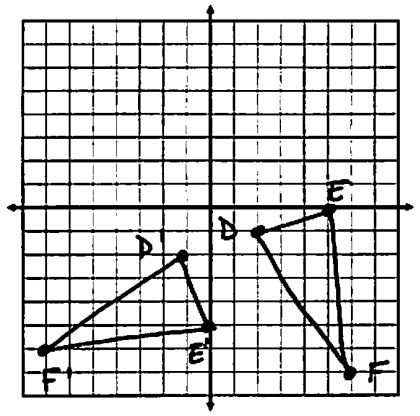
Q' (1 , -3)
R' (8 , -2)
S' (4 , -5)

48. Parallelogram $JKLM$ with vertices $J(6, 7)$, $K(3, 8)$, $L(5, 2)$, and $M(8, 1)$; 180° rotation



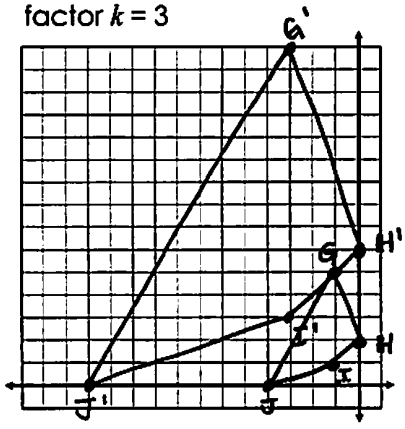
J' (-6, -7)
K' (-3, -8)
L' (-5, -2)
M' (-8, -1)

49. Triangle DEF with vertices $D(2, -1)$, $E(5, 0)$, and $F(6, -7)$; 270° counterclockwise rotation



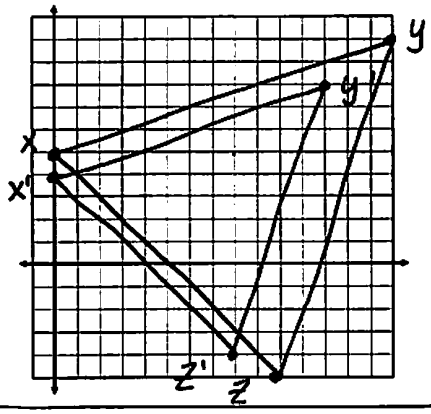
D' (-1, -2)
E' (0, -5)
F' (-7, -6)

50. Quadrilateral $GHIJ$ with vertices $G(-1, 5)$, $H(0, 2)$, $I(-1, 1)$, and $J(-4, 0)$; dilation with scale factor $k = 3$



G' (-3, 15)
H' (0, 6)
I' (-3, 3)
J' (-12, 0)

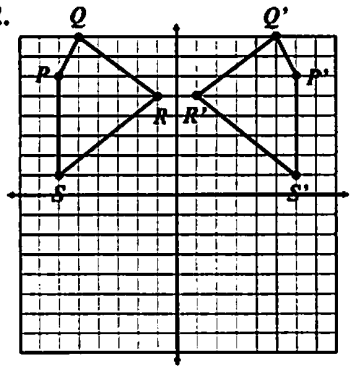
51. Triangle XYZ with vertices $X(0, 5)$, $Y(15, 10)$, and $Z(10, -5)$; dilation with scale factor $k = 4/5$



X' (0, 4)
Y' (12, 8)
Z' (8, -4)

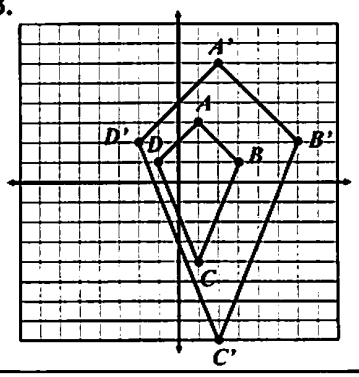
Determine the type of transformation and write a rule.

52.



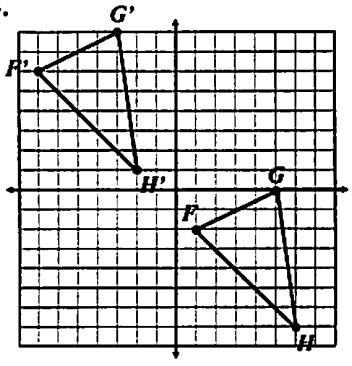
Reflection in y-axis

53.



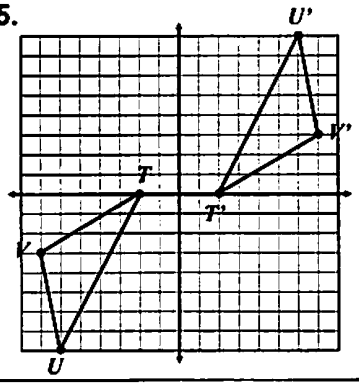
Dilation
$k = 2$

54.



Translation
$(x, y) \rightarrow$
$(x-8, y+8)$

55.



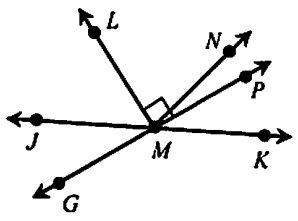
Reflection 180° ccw about the origin

Name: _____

Date: _____ Per: _____

Unit 7 Test
Geometry

Using the diagram below for questions 1-5.



Classify each angle pair using all names that apply.

1. $\angle LMN$ and $\angle NMP$

- ☐ Vertical Angles
- ☑ Adjacent Angles
- ☑ Complementary Angles
- ☐ Supplementary Angles

2. $\angle JMG$ and $\angle PMK$

- ☑ Vertical Angles
- ☐ Adjacent Angles
- ☐ Complementary Angles
- ☐ Supplementary Angles

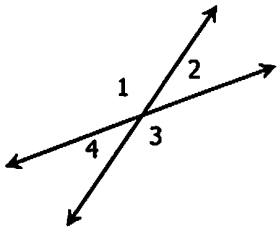
If $m\angle JMG = 39^\circ$ and $m\angle LMN = 72^\circ$, find each angle measure.

3. $m\angle GMK =$ 141°

4. $m\angle PMK =$ 39°

5. $m\angle NMP =$ 18°

6. Given the diagram below, which statement is true?



A. $\angle 1$ and $\angle 2$ are vertical angles and supplementary.

B. $\angle 2$ and $\angle 3$ are complementary angles and congruent.

C. $\angle 1$ and $\angle 3$ are vertical angles and congruent.

D. $\angle 2$ and $\angle 4$ are supplementary angles and congruent.

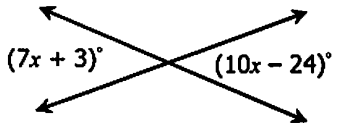
C

7. If $\angle A$ and $\angle B$ are supplementary angles and $m\angle B = 54^\circ$, find $m\angle A$.

$180 - 54 = 126^\circ$

$m\angle A = 126^\circ$

8. Solve for x.



$7x + 3 = 10x - 24$

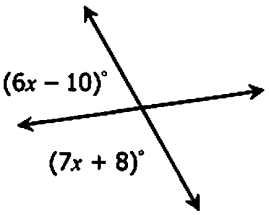
$3 = 3x - 24$

$27 = 3x$

$x = 9$

$x = 9$

9. Solve for x.



$6x - 10 + 7x + 8 = 180$

$13x - 2 = 180$

$13x = 182$

$x = 14$

$x = 14$

10. If $m\angle P = (12x + 7)^\circ$, $m\angle Q = (6x - 7)^\circ$, and $\angle P$ and $\angle Q$ are complementary angles, find $m\angle Q$.

$12x + 7 + 6x - 7 = 90$

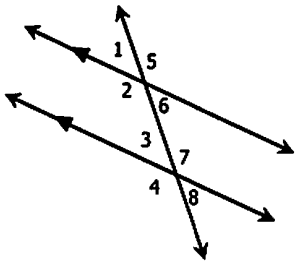
$18x = 90$

$x = 5$

$m\angle Q: 6(5) - 7 = 23^\circ$

$m\angle Q = 23^\circ$

Using the diagram below for questions 11-15.



Fill in the blanks.

11. $\angle 5$ and $\boxed{\angle 7}$ are corresponding angles.

12. $\boxed{\angle 1}$ and $\angle 8$ are alternate exterior angles

13. $\angle 3$ and $\boxed{\angle 6}$ are alternate interior angles.

14. $\boxed{\angle 6}$ and $\angle 7$ are consecutive interior angles.

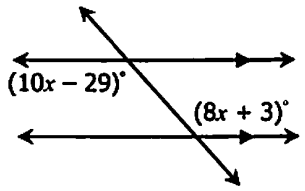
15. If $m\angle 4 = 122^\circ$, find each angle measure.

$m\angle 1 = \underline{58^\circ}$ $m\angle 3 = \underline{58^\circ}$ $m\angle 6 = \underline{58^\circ}$ $m\angle 8 = \underline{58^\circ}$

$m\angle 2 = \underline{122^\circ}$ $m\angle 5 = \underline{122^\circ}$ $m\angle 7 = \underline{122^\circ}$

16. Find the value of x.

(Alternate Interior)



$10x - 29 = 8x + 3$

$2x - 29 = 3$

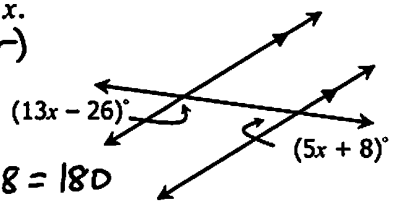
$2x = 32$

$x = 16$

$\boxed{x = 16}$

17. Find the value of x.

(Cons. interior)



$13x - 26 + 5x + 8 = 180$

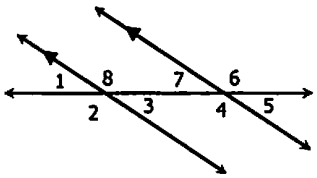
$18x - 18 = 180$

$18x = 198$

$x = 11$

$\boxed{x = 11}$

18. If $m\angle 3 = (9x + 14)^\circ$ and $m\angle 5 = (14x - 1)^\circ$, find $m\angle 8$.



$9x + 14 = 14x - 1$

$14 = 5x - 1$

$15 = 5x$

$x = 3$

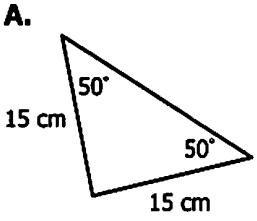
$m\angle 3: 9(3) + 14 = 41^\circ$

$m\angle 8: 180 - 41 = 139^\circ$

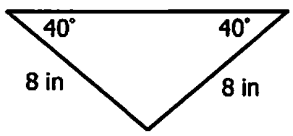
$\boxed{m\angle 8 = 139^\circ}$

19. Which diagram shows an obtuse scalene triangle?

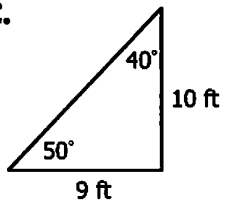
A.



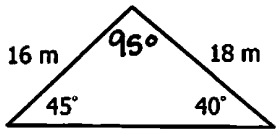
B.



C.

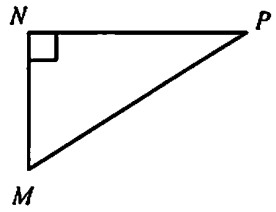


D.



$\boxed{D}$

20. Given ΔMNP, identify the hypotenuse.



A. $\overline{MP}$
B. $\overline{NP}$
C. $\angle MNP$
D. $\angle NMP$

A

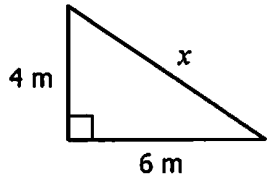
21. Which side lengths could form a right triangle? Check all that apply.

☐ 1, 1, 2	☑ 8, 15, 17
☑ 18, 24, 30	☐ 5, 9, 10
☐ 12, 13, 14	☐ 20, 25, 30

For questions 22 and 23, find the value of x. Round to the nearest tenth if necessary.

22.

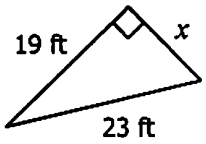
$4^2 + 6^2 = x^2$
$16 + 36 = x^2$
$\sqrt{52} = \sqrt{x^2}$
$x = 7.2$



$x = 7.2$

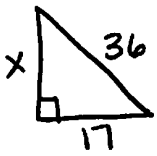
23.

$x^2 + 19^2 = 23^2$
$x^2 + 361 = 529$
$\sqrt{x^2} = \sqrt{168}$
$x = 13$



$x = 13$

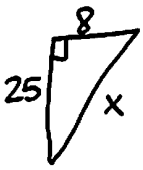
24. A 36-foot long rope is tied from the top of a pole to a stake in the ground. If the stake is 17 feet from the base of the pole, find the height of the pole. Round to the nearest tenth if necessary.



$x^2 + 17^2 = 36^2$
$x^2 + 289 = 1296$
$\sqrt{x^2} = \sqrt{1007}$
$x = 31.7$

31.7 ft

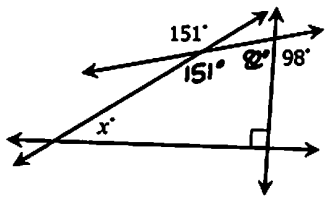
25. Starting from the line of scrimmage on the football field, Trey ran 25 yards directly down the field, then turned to his right and ran 8 more yards. How far is he from where he started on the line of scrimmage? Round to the nearest tenth if necessary.



$8^2 + 25^2 = x^2$
$64 + 625 = x^2$
$\sqrt{689} = \sqrt{x^2}$
$x = 26.2$

26.2 yd

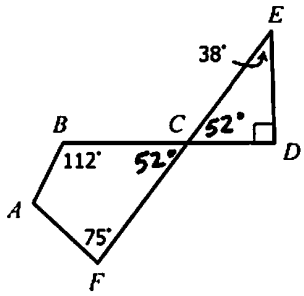
26. Find x.



A. 21°
B. 41°
C. 32°
D. 37°

D

27. Find $m\angle A$.



A. 118°
B. 121°
C. 128°
D. 135°

B

28. Fill in the blank:

"A rectangle is not always a _____."

A. Square
B. Parallelogram
C. Rhombus
D. Quadrilateral

A

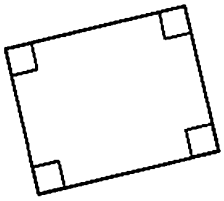
29. Fill in the blank:

"A parallelogram is always a _____."

A. Square
B. Quadrilateral
C. Rectangle
D. Rhombus

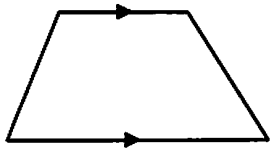
B

30. Classify the shape below using all names that apply.



- ☑ Quadrilateral
- ☐ Trapezoid
- ☐ Isosceles Trapezoid
- ☑ Parallelogram
- ☑ Rectangle
- ☐ Rhombus
- ☐ Square

31. Classify the shape below using all names that apply.



- ☑ Quadrilateral
- ☑ Trapezoid
- ☐ Isosceles Trapezoid
- ☐ Parallelogram
- ☐ Rectangle
- ☐ Rhombus
- ☐ Square

32. Eliza drew a four-sided figure with opposite sides parallel and congruent. Which best describes the shape that Eliza drew?

A. Quadrilateral
B. Parallelogram
C. Rhombus
D. Square

B

33. Fill in the blank:

"A rhombus with four right angles can be best described as a _____."

A. Quadrilateral
B. Parallelogram
C. Rectangle
D. Square

D

34. Find the sum of the measures of the interior angles of a nonagon.

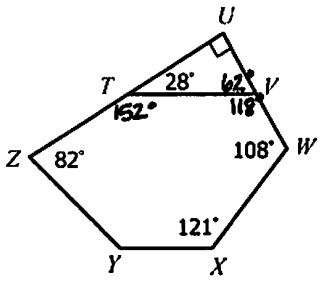
$S = (9-2) \cdot 180$

A. 900°
B. 1,080°
C. 1,260°
D. 3,060°

C

35. Find $m\angle Y$.

$S = (6-2)\,180$
$= 720$

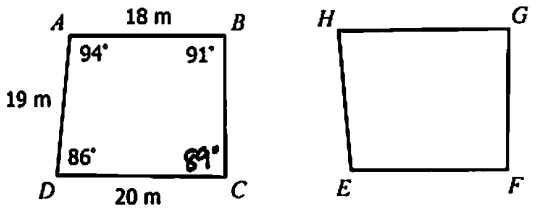


A. 131°
B. 135°
C. 139°
D. 142°

C

For questions 36-38, use the diagram below to find each measure.

figure $ABCD \cong$ figure $EFGH$



36. Find $m\angle E$.

$m\angle E = 94°$

37. Find $m\angle G$.

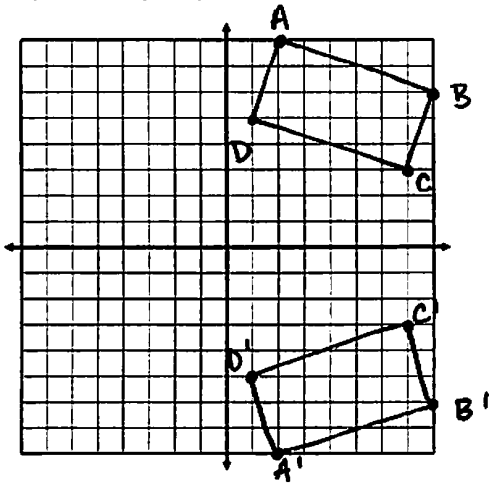
$m\angle G = 89°$

38. Find GH.

$GH = 20m$

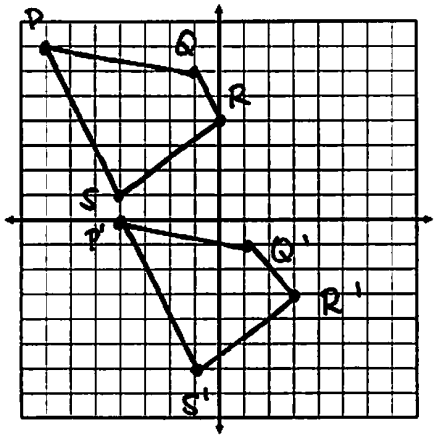
For questions 39-42, graph and label each figure and its image under the given transformation. Then, give the new coordinates. Assume all rotations are about the origin.

39. Rectangle $ABCD$ with vertices $A(2, 8)$, $B(8, 6)$, $C(7, 3)$, and $D(1, 5)$; reflection in the x-axis.



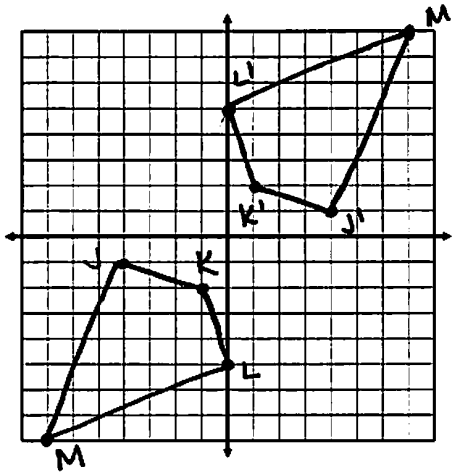
A': (2, -8)	B': (8, -6)
C': (7, -3)	D': (1, -5)

40. Trapezoid $PQRS$ with vertices $P(-7, 7)$, $Q(-1, 6)$, $R(0, 4)$, and $S(-4, 1)$; translated along the rule $(x, y) \rightarrow (x + 3, y - 7)$



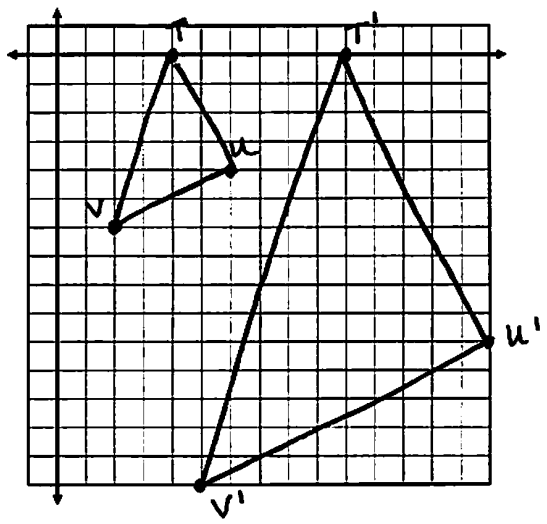
P': (-4, 0)	Q': (2, -1)
R': (3, -3)	S': (-1, -6)

41. Quadrilateral $JKLM$ with vertices $J(-4, -1)$, $K(-1, -2)$, $L(0, -5)$, and $M(-7, -8)$; 180° rotation



J': (4, 1)	K': (1, 2)
L': (0, 5)	M': (7, 8)

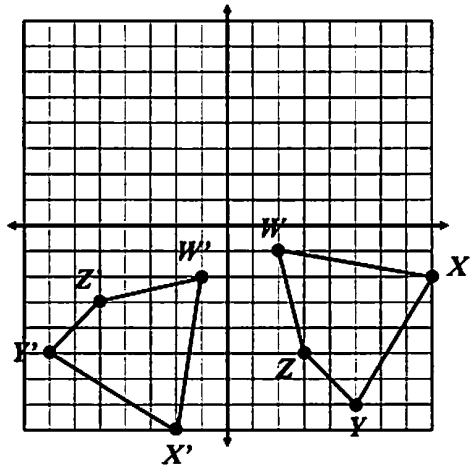
42. Triangle TUV with vertices $T(4, 0)$, $U(6, -4)$, and $V(2, -6)$; dilation with scale factor $k = 5/2$



T': (10, 0)	U': (15, -10)	V': (5, -15)

For questions 43-44, identify the type of transformation and rule.

43.



A. Reflection; x-axis

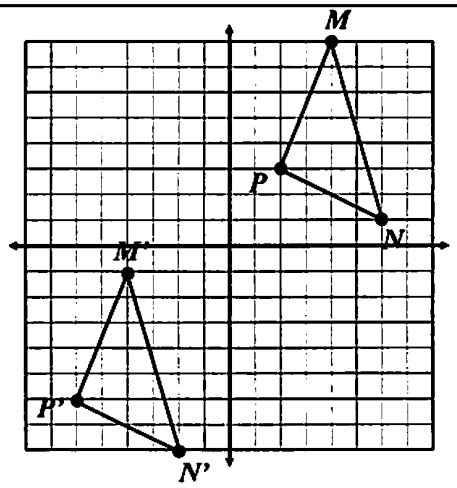
B. Reflection; y-axis

C. Rotation; 90° counterclockwise

D. Rotation; 270° counterclockwise

D

44.



A. Translation; $(x, y) \rightarrow (x - 8, y - 9)$

B. Translation; $(x, y) \rightarrow (x - 9, y - 8)$

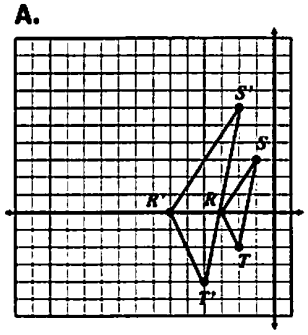
C. Rotation; 180° counterclockwise

D. Reflection; y-axis

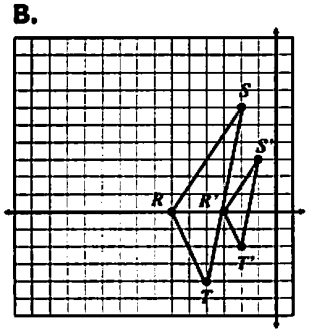
A

45. Which graph shows a dilation with scale factor of 1/3?

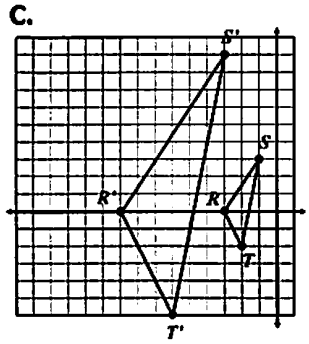
A.



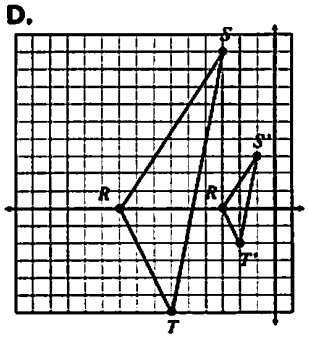
B.



C.

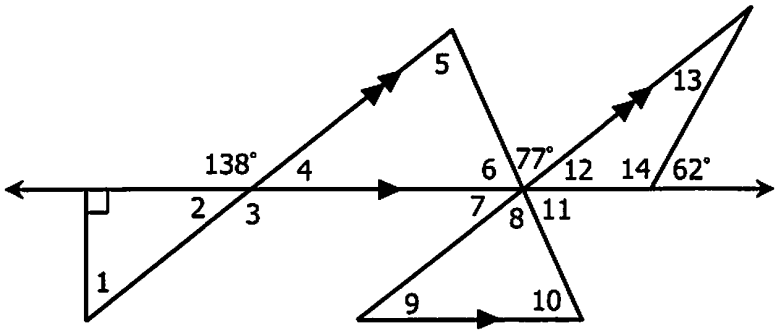


D.



D

BONUS: Find each angle measure.



$m\angle 1 =$ 48°	$m\angle 8 =$ 77°
$m\angle 2 =$ 42°	$m\angle 9 =$ 42°
$m\angle 3 =$ 138°	$m\angle 10 =$ 61°
$m\angle 4 =$ 42°	$m\angle 11 =$ 61°
$m\angle 5 =$ 77°	$m\angle 12 =$ 42°
$m\angle 6 =$ 61°	$m\angle 13 =$ 20°
$m\angle 7 =$ 42°	$m\angle 14 =$ 118°

CREDITS

I use clipart and fonts in my products by:

Art with Jenny K

Many thanks to these talented artists!