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Basics & Transformations: Notes

Basics of Geometry:

Point: •
Draw Q
•Q

Plane:
Draw plane RST

3 or more collinear points

Segment:
Draw $\overline{RS}$

*For length of a segment: RS = 6

Ray:
Draw $\overrightarrow{GH}$ and $\overrightarrow{TS}$

Line:
Draw $\overleftrightarrow{XY}$

Opposite Rays:
Draw $\overrightarrow{BC}$ and $\overrightarrow{BA}$

Line $\overleftrightarrow{CA}$
$\angle CBA = 180°$

Collinear:
Draw E so that it is collinear on $\overleftrightarrow{AB}$. Draw F so it is non-collinear with $\overleftrightarrow{AB}$.

Coplanar:
Draw plane ABC then draw E so it is coplanar and F so it is non-coplanar.

$\cong$ (is congruent to)
~ (same shape)
= (same size)

$\rightarrow \overline{AB} \cong \overline{CD}$

*Tick marks indicate congruency

Intersections: collide, cross

Intersection A

Parallel: Lines $\rightarrow \parallel$ never intersect

Perpendicular: intersect at 90° at

Midpoint: Middle

M = Midpoint

Segment Bisector

sectors = equal parts

Angle Bisector

$\angle AMC \cong \angle CMB$

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Types of Polygons:

Polygons: a figure with 3 or more sides and angles

Convex Polygon: the polygon used in geometry

Concave Polygon: shape that has sides that cave in

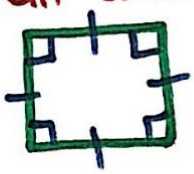
Equilateral Polygon: all sides are congruent

*represented by tick marks (-)

Equiangular Polygon: all angles are congruent

* represented by angle marks (>)

Regular Polygon: all sides and angles are congruent



Classifying Polygons By # of sides:

Name:	# of Sides:
triangle	3
quadrilateral	4
pentagon	5
hexagon	6
heptagon|septagon	7
octagon	8
nonagon	9
decagon	10
undecagon	11
dodecagon	12
"n" gon	n

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Triangles:

Triangle: 3 sided polygon

Interior angles: inside the polygon

Exterior angles: outside the polygon

Classify by sides:

no sides are ≅ (congruent) (same size/shape)

Scalene

2 sides are ≅

Isosceles

all sides are ≅

Equilateral

Classify by angles:

all 3 angles are less than 90°

Acute

one angle is 90°

Right

one angle is greater than 90°

Obtuse

Hypotenuse: the side opposite the right angle in a right triangle

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Angles:

Angle: 2 opposite rays with the same beginning point

Vertex: the point in the middle

Angle Notation:  = ∠CAB or ∠A

Acute angle: less than 90°

Right angle: 90°

Obtuse angle: more than 90°

Straight angle: 180°

Addition Angle Postulate:

m∠PRS (measure of angle PRS)

81 + 42 = 123 *add both angles

m∠PRS = 123°

m∠WXZ

90 - 26 = 64 *7 means 90°

m∠WXZ = 64°

Angle Bisector & congruent Angles:

*Bisector always cuts angle in half, making 2 congruent angles

XZ bisects ∠WXY →

m∠YXZ = 32°

m∠YXW = 64°

∠LKN is bisected by $\overline{KM}$

2x = x + 13

2x - x = x - x + 13

x = 13

2x = 26, so m∠LKN = 52°

complementary Angles: 2 angles that equal 90° (a and b from ex)

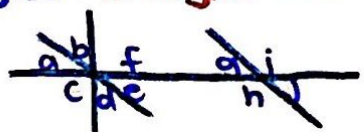
supplementary Angles: 2 angles that equal 180° (g and i)

Adjacent Angles: 2 angles that share a side (h and j)

Linear pair: 2 adjacent angles that equal 180° (g and i)

Vertical Angles: 2 angles that are ≅ and form a V (i and h)

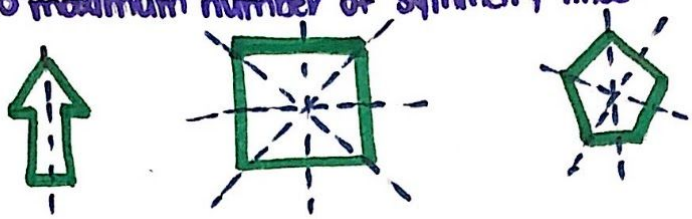
ex:



Symmetry:

Reflectional (Line) Symmetry: occurs when there is at least 1 line that splits an object into 2 parts that are mirror images

* The lines are called lines of symmetry.
* NO maximum number of symmetry lines.



Rotational (Point) Symmetry: occurs when an object can be turned 180° or less around a center point and land on itself

this square has 90° rotational symmetry

this shape has NO rotational symmetry

* a shape can have both types of symmetry

Review Vocab:

line symmetry: line can divide shape into mirror images

rotational symmetry: shape looks the same when rotated a certain angle (less than 360°)

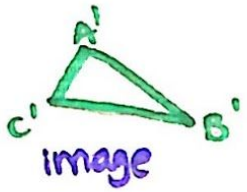
Order of rotational symmetry: the number of positions a shape can be rotated, without changing the way it looks

Point symmetry: shape looks the same upside down (rotated 180°)

Transformations:

Transformation: an operation that moves a geometric figure, the preimage, in some way to produce a new figure which is called the image

preimage



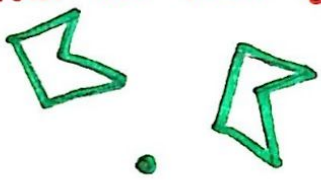
image

*the image is labeled the same letters with an accent

Isometry: image and preimage are congruent

Translation: image is the same as preimage, but in different locations

Rotation: image rotates a certain number of degrees from the preimage



Reflection: image reflects preimage (can be over a point, axis on a graph)

Dilation: image and preimage are similar (look kind of the same, different size)