Grade 7 General

EOT2 Coverage 2023-2024

Part 1

Multiple Choice Questions

● ● ● ● ● ● ● ● ● ● ● ● ● ●

(15 questions, 4 marks each, Paper-Based)

Use different methods to subtract linear expressions.

13. Open Response The table shows the scores of two teams in a trivia challenge at the end of the first half. How many more points did the Huskies score than the Bobcats?

Team	Points Scored
Bobcats	$2x - 7$
Huskies	$5x - 3$

$= (5x - 3) - (2x - 7)$

$= (5x - 3) + - (2x - 7)$

$= (5x - 3) + (-2x + 7)$

$= (5x + -2x) + (-3 + 7)$

$= (5 + -2)x + (-3 + 7)$

$= 3x + 4$

Use different methods to subtract linear expressions.

14. The table shows the sales of plain and Asiago cheese bagels at a bakery for h hours. After 6 hours, how much more will the bakery have made in sales of Asiago cheese bagels than the sales of plain bagels ?

Bagel Sales		
Bagel	Cost ($)	Number Sold After h hours
Asiago Cheese	1.50	$12h + 7$
Plain	1.50	$7h - 4$

= (12h + 7) - (7h - 4)
= (12h + 7) + - (7h - 4)
= (12h + 7) + (-7h + 4)
= (12h + -7h) + (7 + 4)
= (12 + -7)h + (7 + 4)
= 5 h + 11
= 5 (6) + 11
= 30 + 11
= 41
41 × $1.50 = $61.50
In 6 hours, they sold 41 more Asiago bagels.
They made $61.50 more in Asiago bagel sales.

Use different methods to subtract linear expressions.

15. Derek owns a snack shop where he sells tins of buttered and caramel popcorn. The table shows the number of each type of popcorn sold over w weeks. After 12 weeks, how much more will he have made in sales of buttered popcorn than the sales of caramel popcorn ?

Popcorn Sales		
Popcorn	Cost ($)	Number Sold Over w Weeks
Buttered	11	$8w + 9$
Caramel	11	$6w - 1$

= (8w + 9) - (6w - 1)
= (8w + 9) + - (6w - 1)
= (8w + 9) + (-6w + 1)
= (8w + -6w) + (9 + 1)
= (8 + -6)w + (9 + 1)
= 2 w + 10
= 2 (12) + 10
= 24 + 10
= 34
34 × $11 = $374
In 12 weeks, he sold 34 more buttered popcorn.
He made $11 × 34 = $374 more in buttered popcorn.

Use inverse operations to solve two-step equations of the form p(x + q) = r.

---

16. Write a real-world problem that could be represented by the equation $6(x + 3.5) = 57$. Then solve the equation.

$$\frac{6(x+3.5)}{6} = \frac{57}{6}$$

X + 3.5 = 9.5

− 3.5   − 3.5

X = 6

17. **MP** **Find the Error** A student is solving $-2(x - 5) = 12$. Find the student's mistake and correct it.

$$-2(x - 5) = 12$$

$$-2x - 5 = 12$$

$$-2x - 5 + 5 = 12 + 5$$

$$-2x = 17$$

$$x = -8.5$$

$$\frac{-2(x-5)}{-2} = \frac{12}{-2}$$

X − 5 = − 6

+ 5   +5

X = 1

Use inverse operations to solve two-step equations of the form p(x + q) = r.

18. **MP** **Justify Conclusions** Suppose for some value of x the solution to the equation $2.5(y - x) = 0$ is $y = 6$. What must be true about x? Justify your conclusion.

X = 6

19. **MP** **Persevere with Problems** Solve each equation.

a. $2.5(x + 4) + x = 38$

2.5x + 10 + x = 38
3.5x + 10 = 38
   - 10   -10
3.5 x = 28

$$\frac{3.5\,x}{3.5} = \frac{28}{3.5} = 8$$

b. $6.1(x - 2) + x = 51.7$

6.1x – 12.2 + x = 51.7
7.1x – 12.2 = 51.7
      +12   +12
7.1 x = 63.9

$$\frac{7.1x}{7.1} = \frac{63.9}{7.1} = 9$$

Write one-step addition and subtraction inequalities from real-world situations and use inverse operations to solve the inequalities.

1. Gabe went to the amusement park with $40 to spend. His ticket cost $26.50. Determine how much Gabe can spend on souvenirs and snacks. Then interpret the solution. (Example 1)

X + 26.50 ≤ 40
X ≤ 13.50 $
The most Gabe can spend on souvenirs and snacks is 13.50$

2. Drew practices piano at least 45 minutes per day. He has already practiced 18.5 minutes today. Determine how much longer he will have to practice. Then interpret the solution. (Example 1)

X + 18.5 ≥ 45
X ≥ 26.5 min
Drew has to practice at least 26.5 more minutes today

3. A dolphin is swimming at a depth of −50 feet and then ascends a certain number of feet to a depth above −35 feet. Determine the number of feet the dolphin ascended. Then interpret the solution. (Example 1)

-50 + X > -35
X > 15
The depth ascended more than 15 feet

4. Elena's account balance with her parents is −$5.50. She adds a certain amount of money to her balance by mowing the lawn. Elena now has an account balance less than $20. Determine a possible amount she earned mowing the lawn. Then interpret the solution. (Example 1)

-5.50 + X < 20
X < 25.50
Elena earned less than 25.50$ mowing the loan

Write one-step addition and subtraction inequalities from real-world situations and use inverse operations to solve the inequalities.

5. Linda has two cats. The difference in weight of her Maine Coon and Siberian is at least 6 pounds. Linda's Siberian has a weight of $8\frac{3}{4}$ pounds. Determine the possible weight of the Maine Coon. Then interpret the solution. (Example 2)

$X - 8\frac{3}{4} \geq 6 + 8\frac{3}{4}$

$X \geq 14\frac{3}{4}$

The weight of the maine coon is at least $14\frac{3}{4}$ pounds

6. The Hendersons have a sedan and a minivan. The difference in mileage of the two vehicles is greater than 4,500 miles. The minivan has 12,755.25 miles. Determine the possible number of miles on the sedan. Then interpret the solution. (Example 2)
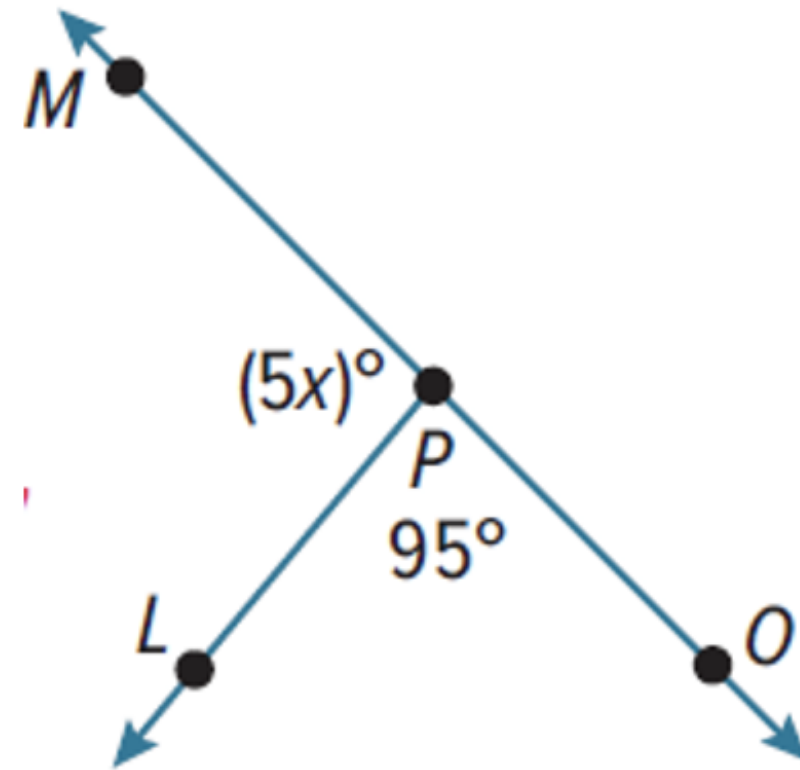
$X - 12,755.25 > 4500$

$X > 17,255.25$

The number of miles on the sedan is more than 17,255.25

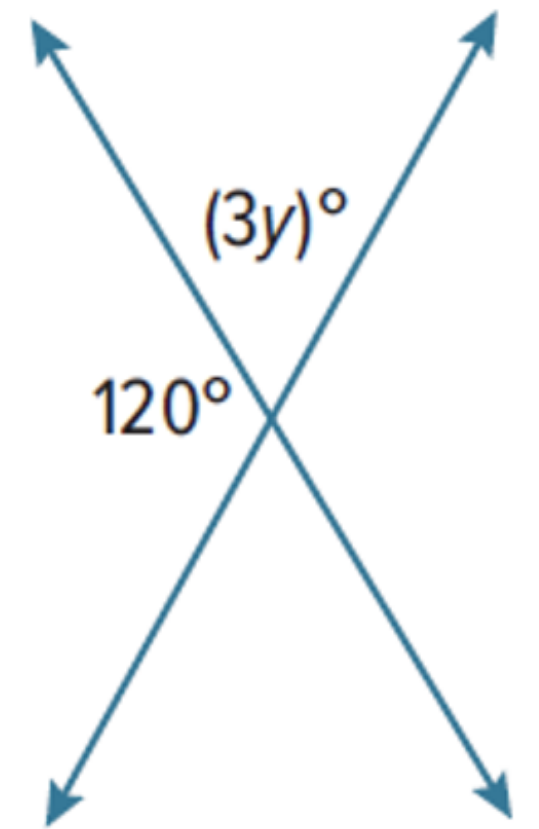| 4 | Identify vertical and adjacent angles and use them to write and solve equations to find unknown angle measures | (7-10) | 401, 402 |

Identify vertical and adjacent angles and use them to write and solve equations to find unknown angle measures.

7. Write and solve an equation to find the value of x. (Example 5)

$5x + 95 = 180$
   $-95 \quad -95$
$5x = 85$
$X = 17$

M

$(5x)°$

P

$95°$

L

O

8. **Open Response** Write and solve an equation to find the value of y.

$3y + 120 = 180$
   $-120 \quad -120$
$3y = 60$
$X = 20$

$(3y)°$

$120°$

| 4 | Identify vertical and adjacent angles and use them to write and solve equations to find unknown angle measures | (7-10) | 401, 402 |

Identify vertical and adjacent angles and use them to write and solve equations to find unknown angle measures.
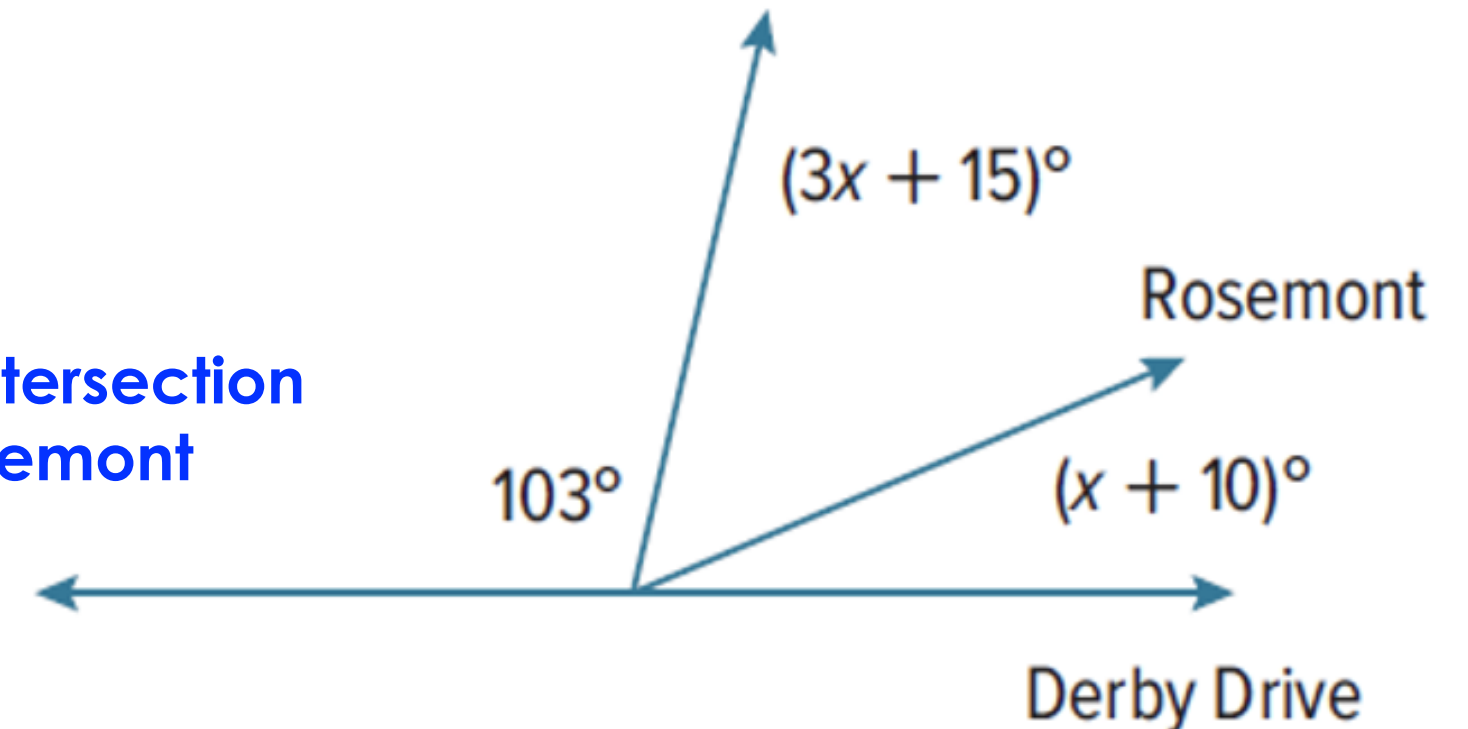
9. Levi was designing a kite. He needs to determine the measure of $\angle A$ before cutting the fabric. What is the measure of angle A?

$(6x + 4) + (4x + 26) + 110 = 180$ Measure of angle A
$10x + 140 = 180$ $4x + 26$
    -140 -140 $4x4 + 26$
$10x = 40$ $16 + 26$
X = 4   A= 42

$(6x + 4)°$ A $110°$

$(4x + 26)°$
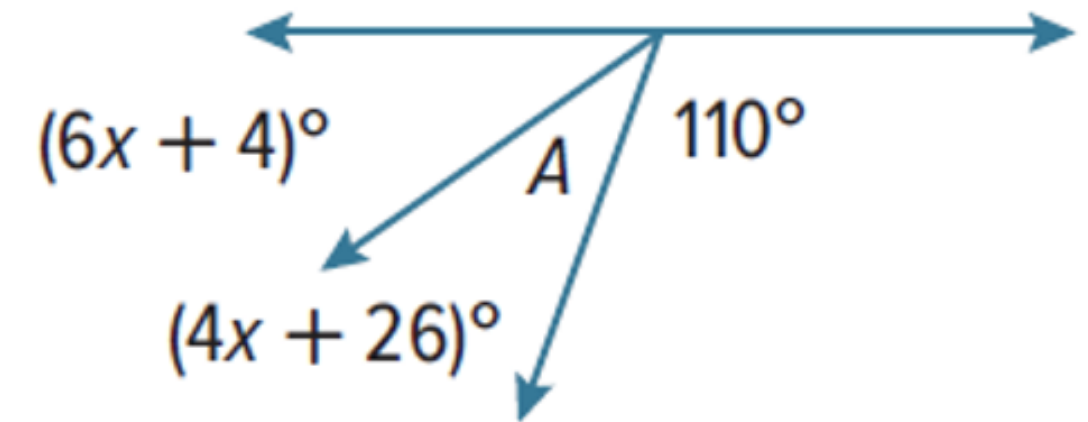
10. Jess was drawing a map of her neighborhood. What is the measure of the angle of the intersection between Derby Drive and Rosemont?

$(3x + 15) + (x + 10) + 103 = 180$ Measure of the angle of the intersection
$4x + 128 = 180$ between Derby Drive and Rosemont
    -128 -128 $(X + 10)$
$4x = 52$ $13 + 10$
X = 13   = 23

$(3x + 15)°$

Rosemont

$103°$ $(x + 10)°$

Derby Drive

Combine operations to simplify linear expressions.

Simplify each expression. For Exercises 1–4 and 9–12, write your answer in factored form. (Examples 1–3)

1. $3(x + 4) + 5x$

$= 3(x) + 3(4) + 5x$
$= 3x + 12 + 5x$
$= 3x + 5x + 12$
$= 8x + 12$
$= 4(2x + 3)$

2. $-4(x + 1) + 6x$

$= -4(x) + -4(1) + 6x$
$= -4x + -4 + 6x$
$= -4x + 6x + -4$
$= 2x - 4$
$= 2(x - 2)$

3. $-5(2x - 6) + 25x$

$= -5(2x) + -5(-6) + 25x$
$= -10x + 30 + 25x$
$= -10x + 25x + 30$
$= 15x + 30$
$= 15(x + 2)$

Combine operations to simplify linear expressions.

4. $2(-8x - 3) + 18x$

$= 2(-8x) + 2(-3) + 18x$
$= -16x + -6 + 18x$
$= -16x + 18x + -6$
$= \mathbf{2x + -6}$
$= \mathbf{2(x-3)}$

5. $\frac{1}{6}x + \frac{3}{4}\left(\frac{1}{2}x - 4\right)$

$= \frac{1}{6}(x) + \frac{3}{4}\left(\frac{1}{2}x\right) + \frac{3}{4}(-4)$

$= \frac{1}{6}x + \frac{3}{8}x + -3$

$= \frac{8}{48}x + \frac{18}{48}x + -3$

$= \frac{26}{48}x + -3$

$= \mathbf{\frac{13}{24}x - 3}$

6. $\frac{2}{3}\left(6x - \frac{1}{6}\right) + 3x$

$= \frac{2}{3}(6x) - \frac{2}{3}\left(\frac{1}{6}\right) + 3x$
$= 4x - \frac{2}{18} + 3x$
$= 4x - \frac{1}{9} + 3x$
$= 4x + 3x - \frac{1}{9}$
$= \mathbf{7x - \frac{1}{9}}$

Combine operations to simplify linear expressions.

7. $\frac{5}{8}x + \frac{1}{2}\left(\frac{1}{4}x + 10\right)$

$= \frac{5}{8}x + \frac{1}{2}\left(\frac{1}{4}x\right) + \frac{1}{2}(10)$

$= \frac{5}{8}x + \frac{1}{8}x + 5$

$= \frac{6}{8}x + 5$

$= \boxed{\frac{3}{4}x + 5}$

8. $\frac{2}{5}\left(10x + \frac{3}{4}\right) - 2x$

$= \frac{2}{5}(10x) + \frac{2}{5}\left(\frac{3}{4}\right) - 2x$

$= 4x + \frac{6}{20} - 2x$

$= 4x + \frac{3}{10} - 2x$

$= 4x - 2x + \frac{3}{10}$

$= \boxed{2x + \frac{3}{10}}$

9. $\frac{3}{4}(24x + 28) - (4x - 1)$

$= \frac{3}{4}(24x + 28) + (-4x + 1)$

$= \frac{3}{4}(24x) + \frac{3}{4}(28) + -4x + 1$

$= 18x + 21 + -4x + 1$

$= 18x + -4x + 21 + 1$

$= \boxed{14x + 22}$

$= \boxed{2(7x + 11)}$

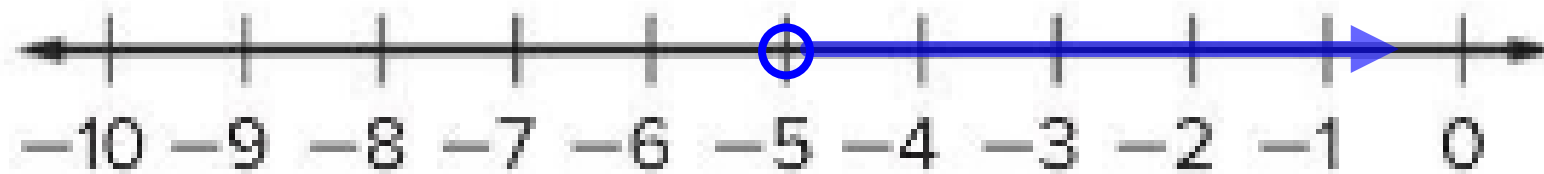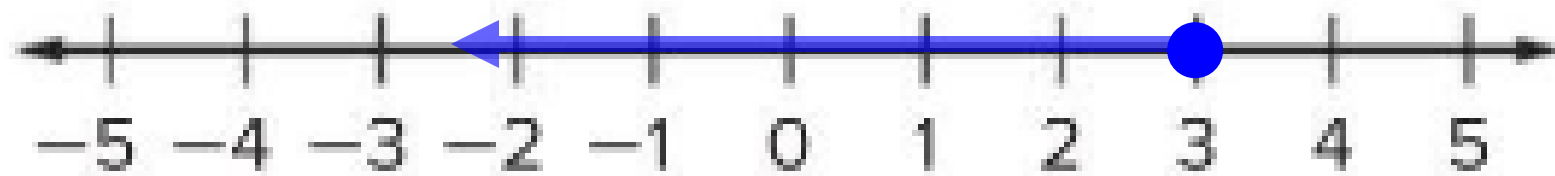| 6 | Use inverse operations to solve two-step equations of the form px + q = r, | (1-9) | 297 |
| | Write two-step inequalities from real-world situations and use inverse operations to solve inequalities | (1,6) | 383 |

Use inverse operations to solve two-step equations of the form px + q = r,
Write two-step inequalities from real-world situations and use inverse operations to solve inequalitie.

Solve each equation. Check your solution. (Examples 1–4)

1. $5x + 2 = 17$

$5x = 15$
$X = 3$

2. $19 = 4x + 3$

$16 = 4x$
$X = 4$

3. $-18 = 6 + 6x$

$-24 = 6x$
$X = -4$

4. $-3x - 9 = -15$

$-3x = -24$
$X = 8$

5. $-6x - 7 = 17$

$-6x = 24$
$X = -4$

6. $-5 = 3x - 14$

$9 = 3x$
$X = 3$

7. $3.8 = 2x - 11.2$

$15 = 2x$
$X = 7.5$

8. $5x - 3.3 = 7.2$

$5x = 10.5$
$X = 2.1$

9. $1.3x + 1.5 = 5.4$

$1.3x = 3.9$
$X = 3$

| 6 | Use inverse operations to solve two-step equations of the form px + q = r, | (1-9) | 297 |
| | Write two-step inequalities from real-world situations and use inverse operations to solve inequalities | (1,6) | 383 |

Use inverse operations to solve two-step equations of the form px + q = r,
Write two-step inequalities from real-world situations and use inverse operations to solve inequalitie.

Solve each inequality. Graph the solution set on a number line. (Examples 1–3)

1. $-3x - 3 > 12$

$+ 3 \qquad + 3$

$-3x > 15$

$X > -5$

2. $-4 \leq 4x + 8$

$-8 \qquad -8$
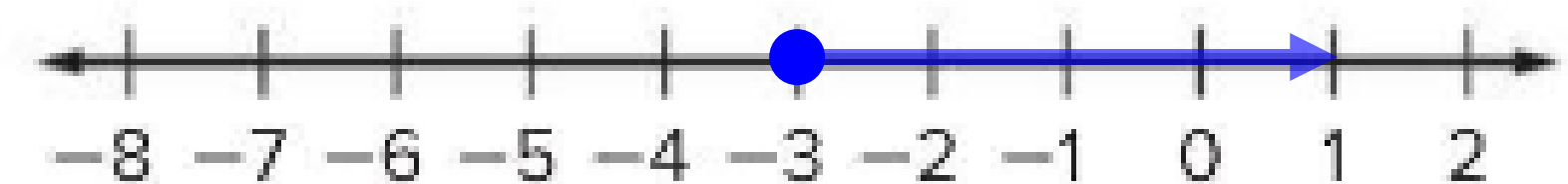
$-12 \leq 4x$

$-3 \leq x$

$X \geq -3$

6	Use inverse operations to solve two-step equations of the form px + q = r,	(1-9)	297
	Write two-step inequalities from real-world situations and use inverse operations to solve inequalities	(1,6)	383

Use inverse operations to solve two-step equations of the form px + q = r,
Write two-step inequalities from real-world situations and use inverse operations to solve inequalitie.

3. $6.5x - 11.3 \leq 8.2$

$+ 11.3 \qquad + 11.3$

$6.5\,x \leq 19.5$

$x \leq 3$

4. $-2.45x + 3.2 < -6.6$

$-3.2 \qquad - 3.2$
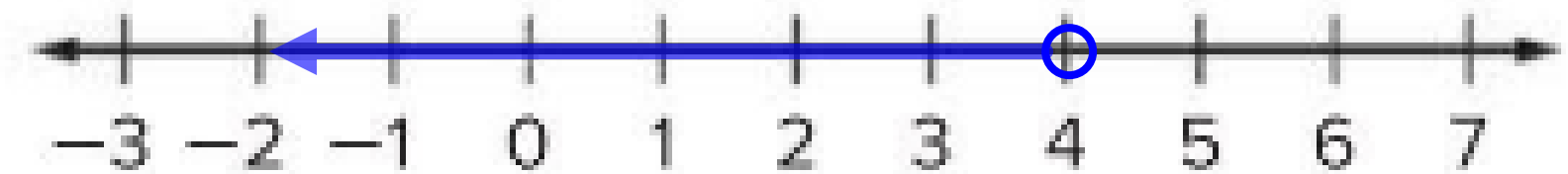
$-2.45\,x < -9.8$

$X < 4$

| 6 | Use inverse operations to solve two-step equations of the form px + q = r, | (1-9) | 297 |
| | Write two-step inequalities from real-world situations and use inverse operations to solve inequalities | (1,6) | 383 |

Use inverse operations to solve two-step equations of the form px + q = r,
Write two-step inequalities from real-world situations and use inverse operations to solve inequalitie.

5. $\dfrac{1}{2}x - \dfrac{1}{4} < \dfrac{5}{8}$
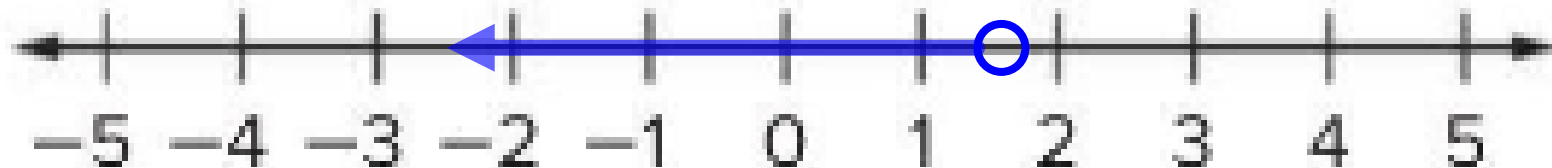
$+\dfrac{1}{4} \quad +\dfrac{1}{4}$

$\dfrac{1}{2}x < \dfrac{7}{8}$

$X < 1\dfrac{3}{4}$

6. $\dfrac{x}{10} + \dfrac{1}{4} \geq \dfrac{1}{5}$

$-\dfrac{1}{4} \quad -\dfrac{1}{4}$
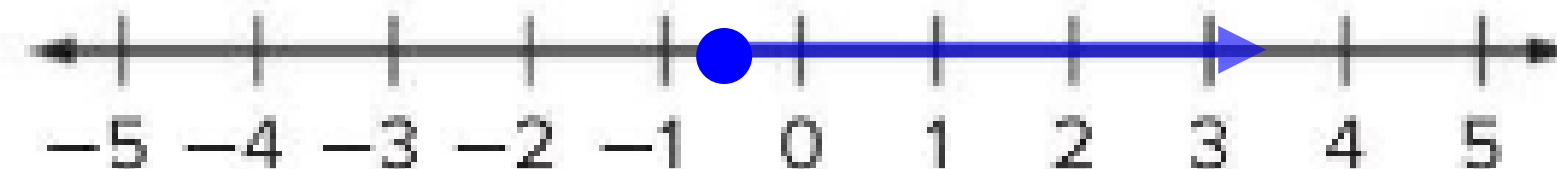
$\dfrac{x}{10} \geq -\dfrac{1}{20}$

$X \geq -\dfrac{1}{2}$

Simplify algebraic expressions by identifying and combining like terms.

Simplify each expression. (Examples 2 and 3)

3. $-y + 9z - 16y - 25z + 4$

$= -y + 9z + (-16y) + (-25z) + 4$
$= -y + (-16y) + 9z + (-25z) + 4$
$= (-1 + -16)y + (9 + -25)z + 4$
$= -17y + -16z + 4$

4. $8z + x - 5 - 9z + 2$

$= 8z + x + (-5) + (-9z) + 2$
$= 8z + (-9z) + x + (-5) + 2$
$= (8 + -9)z + x + (-5 + 2)$
$= -z + x - 3$

5. $5c - 3d - 12c + d - 6$

$= 5c + (-3d) + (-12c) + d - 6$
$= 5c + (-12c) + (-3d) + d - 6$
$= (5 + -12)c + (-3 + 1)d - 6$
$= -7c + -2d - 6$

6. $-\dfrac{3}{4}x - \dfrac{1}{3} + \dfrac{7}{8}x - \dfrac{1}{2}$

$= -\dfrac{3}{4}x + \left(-\dfrac{1}{3}\right) + \dfrac{7}{8}x + \left(-\dfrac{1}{2}\right)$
$= -\dfrac{3}{4}x + \dfrac{7}{8}x + \left(-\dfrac{1}{3}\right) + \left(-\dfrac{1}{2}\right)$
$= \left(-\dfrac{3}{4} + \dfrac{7}{8}\right)x + \left(-\dfrac{1}{3} - \dfrac{1}{2}\right)$
$= \dfrac{1}{8}x - \dfrac{5}{6}$

7. $\dfrac{1}{4} + \dfrac{9}{10}y - \dfrac{3}{5}y + \dfrac{7}{8}$

$= \dfrac{1}{4} + \dfrac{9}{10}y + \left(-\dfrac{3}{5}y\right) + \dfrac{7}{8}$
$= \dfrac{9}{10}y + \left(-\dfrac{3}{5}y\right) + \dfrac{1}{4} + \dfrac{7}{8}$
$= \left(\dfrac{9}{10} + -\dfrac{3}{5}\right)y + \left(\dfrac{1}{4} + \dfrac{7}{8}\right)$
$= \dfrac{3}{10}y + 1\dfrac{1}{8}$

8. $-\dfrac{1}{2}a + \dfrac{2}{5} + \dfrac{5}{6}a - \dfrac{1}{10}$

$= -\dfrac{1}{2}a + \dfrac{2}{5} + \dfrac{5}{6}a + \left(-\dfrac{1}{10}\right)$
$= -\dfrac{1}{2}a + \dfrac{5}{6}a + \dfrac{2}{5} + \left(-\dfrac{1}{10}\right)$
$= \left(-\dfrac{1}{2} + \dfrac{5}{6}\right)a + \left(\dfrac{2}{5} + -\dfrac{1}{10}\right)$
$= \dfrac{1}{3}a + \dfrac{3}{10}$

Use different methods to add linear expressions.

Add. (Examples 1 and 2)

1. $(8x + 9) + (-6x - 2)$

$= (8x + 9) + (-6x + -2)$
$= (8x + -6x) + (9 + -2)$
$= (8 + -6)x + (9 + -2)$
$= 2x + 7$

2. $(5x + 4) + (-8x - 2)$

$= (5x + 4) + (-8x + -2)$
$= (5x + -8x) + (4 + -2)$
$= (5 + -8)x + (4 + -2)$
$= -3x + 2$

3. $(-7x + 1) + (4x - 5)$

$= (-7x + 1) + (4x + -5)$
$= (-7x + 4x) + (1 + -5)$
$= (-7 + 4)x + (1 + -5)$
$= -3x - 4$

4. $(-3x - 9) + (4x + 8)$

$= (-3x + -9) + (4x + 8)$
$= (-3x + 4x) + (-9 + 8)$
$= (-3 + 4)x + (-9 + 8)$
$= x - 1$

5. $(-5x + 4) + (-9x - 3)$

$= (-5x + 4) + (-9x + -3)$
$= (-5x + -9x) + (4 + -3)$
$= (-5 + -9)x + (4 + -3)$
$= -14x + 1$

6. $(-2x + 10) + (-8x - 1)$

$= (-2x + 10) + (-8x + -1)$
$= (-2x + -8x) + (10 + -1)$
$= (-2 + -8)x + (10 + -1)$
$= -10x + 9$

Use different methods to add linear expressions.

7. $\left(\frac{1}{4}x - 3\right) + \left(\frac{3}{16}x + 5\right)$

$= \frac{1}{4}x + (-3) + \frac{3}{16}x + 5$

$= \frac{1}{4}x + \frac{3}{16}x + (-3) + 5$

$= \left(\frac{1}{4} + \frac{3}{16}\right)x + (-3 + 5)$

$= \left(\frac{4}{16} + \frac{3}{16}\right)x + (2)$

$= \frac{7}{16}x + 2$

8. $\left(\frac{1}{2}x - 3\right) + \left(\frac{1}{6}x + 1\right)$

$= \frac{1}{2}x + (-3) + \frac{1}{6}x + 1$

$= \frac{1}{2}x + \frac{1}{6}x + (-3) + 1$

$= \left(\frac{1}{2} + \frac{1}{6}\right)x + (-3 + 1)$

$= \left(\frac{3}{6} + \frac{1}{6}\right)x + (-2)$

$= \frac{2}{3}x - 2$

9. $\left(4x + \frac{3}{4}\right) + \left(-3x - \frac{5}{12}\right)$

$= 4x + \frac{3}{4} + -3x + -\frac{5}{12}$

$= 4x + -3x + \frac{3}{4} + -\frac{5}{12}$

$= (4 + -3)x + \left(\frac{3}{4} + -\frac{5}{12}\right)$

$= x + \left(\frac{9}{12} + -\frac{5}{12}\right)$

$= x + \frac{1}{3}$

Use different methods to add linear expressions.

10. $\left(-9x - \frac{4}{5}\right) + \left(2x + \frac{2}{3}\right)$

$= -9x + \left(-\frac{4}{5}\right) + \left(2x + \frac{2}{3}\right)$

$= -9x + 2x + \left(-\frac{4}{5}\right) + \frac{2}{3}$

$= (-9 + 2)x + \left(-\frac{4}{5} + \frac{2}{3}\right)$

$= -7x + \left(-\frac{12}{15} + \frac{10}{15}\right)$

$= -7x - \frac{2}{15}$

11. $\left(\frac{1}{3}x - 3\right) + \left(-\frac{3}{4}x - 5\right)$

$= \frac{1}{3}x + (-3) + \left(-\frac{3}{4}x + -5\right)$

$= \frac{1}{3}x + -\frac{3}{4}x + (-3) + -5$

$= \left(\frac{1}{3} + -\frac{3}{4}\right)x + (-3 + -5)$

$= \left(\frac{4}{12} + -\frac{9}{12}\right)x + (-3 + -5)$

$= -\frac{5}{12}x - 8$

12. $\left(-5x - \frac{2}{3}\right) + \left(-4x - \frac{1}{9}\right)$

$= -5x + \left(-\frac{2}{3}\right) + -4x + \left(-\frac{1}{9}\right)$

$= -5x + -4x + \left(-\frac{2}{3}\right) + \left(-\frac{1}{9}\right)$

$= (-5 + -4)x + \left(-\frac{2}{3} + -\frac{1}{9}\right)$

$= -9x + \left(-\frac{6}{9} + -\frac{1}{9}\right)$

$= -9x - \frac{7}{9}$

Use GCFs to factor linear expressions.

Factor each expression. If the expression cannot be factored, write *cannot be factored*.
(Examples 3–5)

7. $5x + 35$

$5x = 5 \cdot x$
$35 = 5 \cdot 7$
Common Factors: 5
Greatest Common Factor: 5
$5x + 35 = 5(x) + 5(7)$
$= 5(x + 7)$

8. $8x - 14$

$8x = 2 \cdot 2 \cdot 2 \cdot x$
$14 = 2 \cdot 7$
Common Factors: 2
Greatest Common Factor: 2
$8x - 14 = 2(4x) - 2(7)$
$= 2(4x - 7)$

9. $3x + 11y$

$3x = 3 \cdot x$
$11y = 11 \cdot y$
There are no Common Factors.
$3x + 11y$ can not be factored.

Use GCFs to factor linear expressions.

10. $32x - 15$

$32x = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot x$
$15 = 3 \cdot 5$
There are no Common Factors.
$32x - 15$ can not be factored.

11. $72x - 18xy$

$72x = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot x$
$18xy = 2 \cdot 3 \cdot 3 \cdot x \cdot y$
Common Factors: $2 \cdot 3 \cdot 3 \cdot x$
Greatest Common Factor: $18x$
$72x - 18xy = 18x(4) - 18x(y)$
$= 18x(4 - y)$

12. $45xy - 81y$

$45xy = 3 \cdot 3 \cdot 5 \cdot x \cdot y$
$81y = 3 \cdot 3 \cdot 3 \cdot 3 \cdot y$
Common Factors: $3 \cdot 3 \cdot y$
Greatest Common Factor: $9y$
$45xy - 81y = 9y(5x) - 9y(9)$
$= 9y(5x - 9)$

Use GCFs to factor linear expressions.

13. $25x + 14y$

$25\,x = 5 \cdot 5 \cdot x$
$14\,y = 2 \cdot 7 \cdot y$
There are no Common Factors.
$25x + 14y$ can not be factored.

14. $\dfrac{1}{3}x - \dfrac{1}{3}$

$\dfrac{1}{3}x = \dfrac{1}{3} \cdot x$
$\dfrac{1}{3} = \dfrac{1}{3}$
Common Factors: $\dfrac{1}{3}$
Greatest Common Factor: $\dfrac{1}{3}$
$\dfrac{1}{3}x - \dfrac{1}{3} = \dfrac{1}{3}(x) - \dfrac{1}{3}(1)$
$\qquad = \dfrac{1}{3}(x - 1)$

15. $\dfrac{1}{2}x + \dfrac{1}{2}$

$\dfrac{1}{2}x = \dfrac{1}{2} \cdot x$
$\dfrac{1}{2} = \dfrac{1}{2}$
Common Factors: $\dfrac{1}{2}$
Greatest Common Factor: $\dfrac{1}{2}$
$\dfrac{1}{2}x + \dfrac{1}{2} = \dfrac{1}{2}(x) + \dfrac{1}{2}(1)$
$\qquad = \dfrac{1}{2}(x + 1)$

Simplify algebraic expressions by identifying and combining like terms.

Use the Distributive Property to expand each expression. (Examples 4–6)

9. $2(-3x + 5)$

$= 2(-3x) + 2(5)$
$= -6x + 10$

10. $6(-4x + 3y)$

$= 6(-4x) + 6(3y)$
$= -24x + 18y$

11. $(3y - 2z)5$

$= 5(3y) - 5(2z)$
$= 15y - 10z$

12. $(-2x - 7)4$

$= 4(-2x) - 4(7)$
$= -8x - 28$

13. $-7(x - 2)$

$= -7(x) - -7(2)$
$= -7x + 14$

14. $-3(8x - 4)$

$= -3(8x) - 3(-4)$
$= -24x + 12$

Write one-step equations involving integers and rational numbers and use inverse operations to solve the equations.

Solve each equation. Check your solution. (Examples 1–7)

1. $6 + y = -8$

2. $-12 = 4 + c$

$c = 16$

3. $p - 11 = -5$

$P = 6$

4. $12 = z - 8$

$z = 20$

$6 + y = -8$ **Write the equation.**
$-6 \quad = -6$ **Subtract 6 from each side.**
$y = -14$ **Simplify.**

Check:

$6 + y = -8$ **Write the equation.**
$6 + -14 \overset{?}{=} -8$ **Replace y with - 14.**
$-8 = -8 \checkmark$
This sentence is true.

The solution is -14.

Write one-step equations involving integers and rational numbers and use inverse operations to solve the equations.

13. $c - 5.3 = -6.4$

14. $-\dfrac{1}{3} = -\dfrac{5}{6} + w$

15. $n + 7.1 = 8.6$

c – 5.3 = - 6.4   **Write the equation.**
 + 5.3 = + 5.3   **Add 5.3 to each side.**
   c = – 1.1   **Simplify.**

$W = \dfrac{1}{2}$

$n = 1.5$

Check:

   c – 5.3 = – 6.4   **Write the equation.**
-1.1 – 5.3 $\overset{?}{=}$ – 6.4   **Replace c with -1.1**
– 6.4 = – 6.4 ✓
This sentence is true.

The solution is – 1.1

Write one-step equations involving integers and rational numbers and use inverse operations to solve the equations.

7. $\dfrac{d}{-9} = -6$

8. $15 = \dfrac{z}{-8}$

z = -120

9. $2\dfrac{4}{5}x = -1\dfrac{1}{4}$

x = -120

$\dfrac{d}{-9} = -6$ **Write the equation.**

$\dfrac{d}{-9}(-9) = -6(-9)$ **Multiply each side by - 9.**

d = 54   **Simplify.**

Check:

$\dfrac{d}{-9} = -6$ **Write the original equation.**

$\dfrac{54}{-9} \overset{?}{=} -6$ **Replace d with 54.**

- 6 = - 6 ✓

This is a true sentence.

The solution is 54.

Write one-step equations involving integers and rational numbers and use inverse operations to solve the equations.

10. $-6 = \frac{3}{5}y$

11. $-6 = 0.2b$

12. $-0.8n = 2.8$

$-6 = \frac{3}{5}y$ **Write the equation.**

$-6\left(\frac{5}{3}\right) = \frac{3}{5}y\left(\frac{5}{3}\right)$ **Multiply each side by $\frac{3}{5}$.**

$-10 = y$ **Simplify.**

Check:

$-6 = \frac{3}{5}y$ **Write the original equation.**

$-6 \stackrel{?}{=} \frac{3}{5}(-10)$ **Replace y with - 10.**

$-6 = -6$ ✓

This is a true sentence.
The solution is - 10.

b = −30

n = − 3.5

Write two-step equations of the form px + q = r and use inverse operations to solve the equations.

---

1. Easton went to a concert with some of his friends. The tickets cost $29.50 each, and they spent a total of $15 on parking. The total amount spent was $133. Determine how many people went to the concert. (Example 1)

Let p represent the number of people.

29.50 p + 15 = 133

$\quad\quad$ - 15 -15

29.50 p $\quad$ = 118

$\quad\quad$ p $\quad$ = $\frac{118}{29.5}$

$\quad\quad$ p $\quad$ = 4 people

2. Ishi bought a $6.95 canvas and 8 tubes of paint. She spent a total of $24.95 on the canvas and paints. Determine the cost of each tube of paint. (Example 1)

6.95 + 8x = 24.9

$\quad$ - 6.95 $\quad\quad$ -6.95

8x $\quad\quad$ = 17.95

$\quad\quad$ x $\quad$ = $\frac{17.95}{8}$

$\quad\quad$ x $\quad$ = 4.24 $

3. A taxi service charges $1.50 plus $0.60 per mile for a trip to the airport. The total charge is $13.50. Determine how many miles it is to the airport. (Example 1)

1.50 + 0.60 x = 13.50

- 1.50 $\quad\quad$ -1.50

0.60 x = 12

$\quad\quad$ x $\quad$ = $\frac{12}{0.60}$

$\quad\quad$ x $\quad$ = 20 miles

4. At the market, Meyer buys a bunch of bananas for $0.65 per pound and a frozen pizza for $4.99. The total for his purchase was $6.94, without tax. Determine how many pounds of bananas Meyer bought. (Example 1)

0.65x + 4.99= 6.94

$\quad$ - 4.99   -4.99

0.65 x = 1.95

$\quad\quad$ x $\quad$ = $\frac{1.95}{0.65}$

$\quad\quad$ x $\quad$ = 3 pounds

Write two-step equations of the form px + q = r and use inverse operations to solve the equations.

5. A hot air balloon is at an altitude of $100\frac{1}{5}$ yards. The balloon's altitude decreases by $10\frac{4}{5}$ yards every minute. Determine the number of minutes it will take the balloon to reach an altitude of 57 yards. (Example 2)

$$100\frac{1}{5} - 10\frac{4}{5}x = 57$$

$$x = \frac{216}{54} \qquad x = 4 \text{ min}$$

6. The current temperature is 48°F. It is expected to drop 1.5°F each hour. Determine in how many hours the temperature will be 36°F. (Example 2)

$$48 - 1.5x = 36$$
$$-48 \qquad -48$$
$$-1.5x = -12$$
$$x = \frac{-12}{-1.5} \qquad x = 8 \text{ hours}$$

7. Mariko and her friend spent $24.50 on lunch. Their lunches cost the same amount, and they used a $4 off coupon. Determine the cost of each lunch. (Example 2)

$$2x - 4 = 24.50$$
$$+4 \qquad +4$$
$$2x = 28.50$$
$$x = 14.25 \text{ \$}$$

8. **Open Response** The table shows the amount of water Joel had in his bathtub to wash his dog and his desired water level. If the water drains at a rate of 14 gallons per minute, how many minutes will it take the tub to drain to his desired level?

Starting Water Level	42 gallons
Desired Water Level	28 gallons

$$42 - 14x = 28$$
$$-42 \qquad -42$$
$$14x = -14 \qquad x = 1 \text{ min}$$

Write two-step equations of the form p(x + q) = r and use inverse operations to solve the equations.

1. Ayana is making 6 scarves that each require $1\frac{1}{4}$ yards of purple fabric and a certain amount of blue fabric. She will use 10 yards in all. Determine how many yards of blue fabric are needed for each scarf. (Example 1)

$6(1\frac{1}{4} + x) = 10$

$\frac{5}{4} + X = \frac{10}{6}$

$X = \frac{5}{12}$

2. Sara is making 3 batches of chocolate chip cookies and 3 batches of oatmeal cookies. Each batch of chocolate chip cookies uses $2\frac{1}{4}$ cups of flour. She will use $12\frac{3}{4}$ cups of flour for all six batches. Determine how many cups of flour are needed for each batch of oatmeal cookies. (Example 1)

$3(2\frac{1}{4} + x) = 12\frac{3}{4}$

$\frac{9}{4} + X = \frac{51}{4}$

X =2 cups

3. Pete is making 8 identical fruit baskets as gifts. Each basket contains some apples and 12 oranges. Pete uses a total of 168 pieces of fruit to make the baskets. Determine the number of apples that are in each basket. (Example 1)

$8(x + 12) = 168$

$X + 12 = 21$

X =9 apples

4. A teacher is making 7 identical supply boxes for each table in her classroom. Each box contains some pencils and 11 pens. The teacher uses a total of 182 pencils and pens. Determine the number of pencils that are in each box. (Example 1)

$7(p + 11) = 182$

$p + 11 = 26$

p =15 pencils

Write two-step equations of the form p(x + q) = r and use inverse operations to solve the equations.

---

5. Javier bought 3 bags of balloons for a party. He used 8 balloons from each bag. Determine how many balloons were originally in each bag if there were 21 balloons left over. (Example 2)

$3(x - 8) = 21$
X − 8 = 7
X =15 balloons

6. Vera and her three sisters received the same amount of money to go to the school festival. Each girl spent $12. Afterward, the girls had $24 altogether. Determine the amount of money each girl received. (Example 2)

$4(x - 12) = 24$
X − 12 = 6
X =18 $

7. Zak buys 6 gallons of fruit punch. He has coupons for $0.55 off the regular price of each gallon of fruit punch. After using the coupons, the total cost of the fruit punch is $8.70. Determine the regular price of a gallon of fruit punch. (Example 2)

$6(x - 0.55) = 8.7$
X − 0.55 = 1.45
X =2 $

8. Open Response Mrs. James buys 5 hat and glove sets for charity. She has coupons for $1.50 off the regular price of each set. After using the coupons, the total cost is $48.75. Determine the regular price of a hat and glove set.

Item	Cost ($)
Hat and glove set	p
Scarf	9.99

$5(p - 1.50) = 48.75$
p − 1.50 = 9.75
p = 11.25 $

Use inverse operations to solve one-step addition and subtraction inequalities.

1. $x + 5 < 7$ **X < 2**
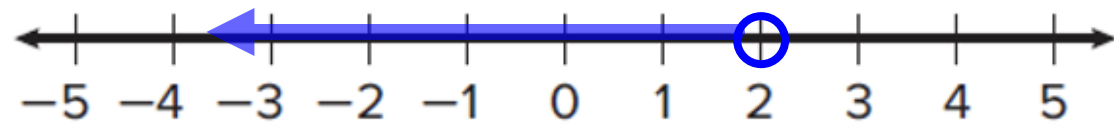
2. $1 > x + 6$ **-5 < x   or   x >-5**
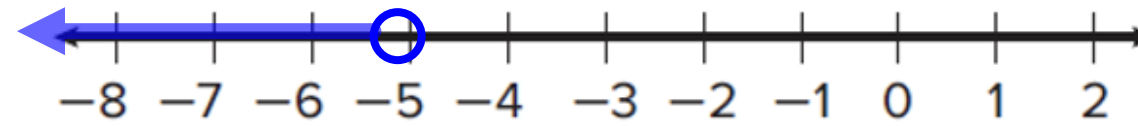
3. $x + 8 \geq 14$ **X ≥ 6**
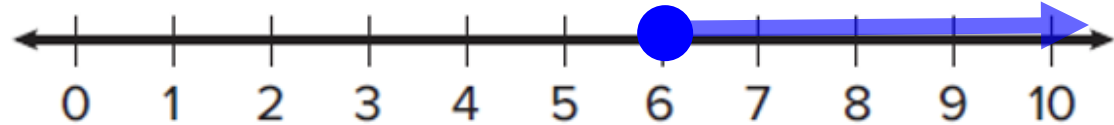
4. $5 \leq x + 12$ **-7 ≥ x   or   x ≥ -7**
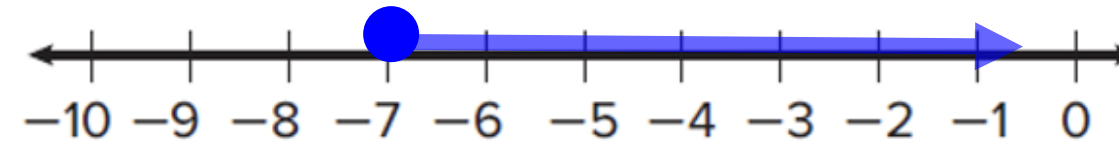
5. $x + 5.4 < -1.6$ **X < −7**
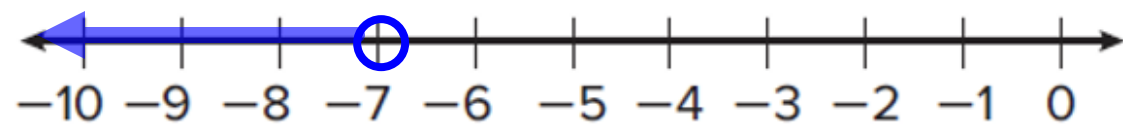
6. $x + 7.5 > -2.5$ **X > −10**
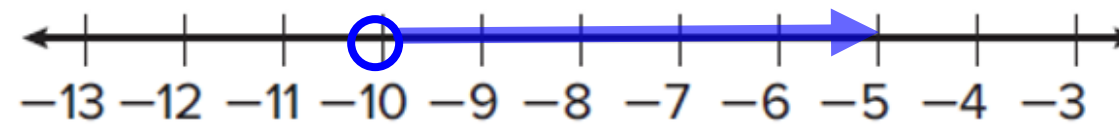
Use inverse operations to solve one-step addition and subtraction inequalities.

7. $3 \geq \dfrac{1}{3} + x$ **2.6 ≥ X   or   X ≥ 2.6**

$$\overset{\text{\quad\quad\quad\quad\quad\quad\quad\quad}}{\underset{-3\;-2\;-1\;\;\;0\;\;\;1\;\;\;2\;\;\;3\;\;\;4\;\;\;5\;\;\;6\;\;\;7}{\longleftarrow\!\!\!+\!+\!+\!+\!+\!\bullet\!\!\longrightarrow}}$$

8. $4 \geq x + \dfrac{3}{4}$ **X ≥ 3.25**

$$\underset{-5\;-4\;-3\;-2\;-1\;\;0\;\;1\;\;2\;\;3\;\;4\;\;5}{\longleftarrow\!\!\longleftarrow\!\bullet\!+\!+\!\longrightarrow}$$

9. $X - 3 \leq -8$ **X ≥ − 5**

$$\underset{-8\;-7\;-6\;-5\;-4\;-3\;-2\;-1\;\;0\;\;1\;\;2}{\longleftarrow\!\bullet\!+\!+\!+\!+\!+\!+\!\longrightarrow}$$

10. $4 \leq x - 7$ **11 ≥ X   or   X ≥ 11**

$$\underset{3\;\;4\;\;5\;\;6\;\;7\;\;8\;\;9\;\;10\;\;11\;\;12\;\;13}{\longleftarrow\!+\!+\!+\!+\!+\!+\!+\!\bullet\!\!\longrightarrow}$$
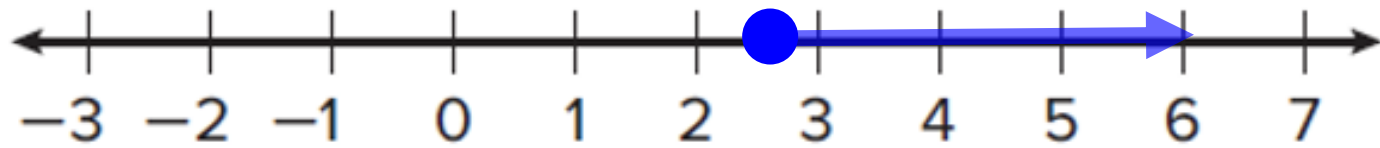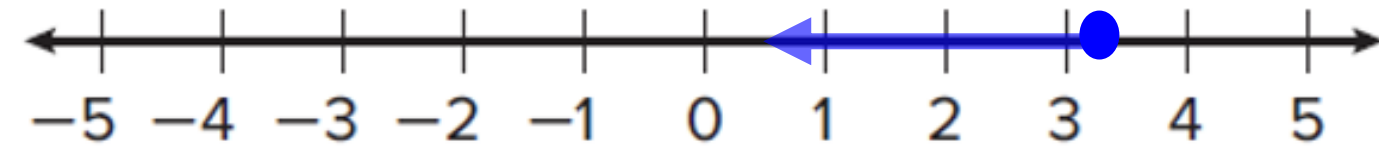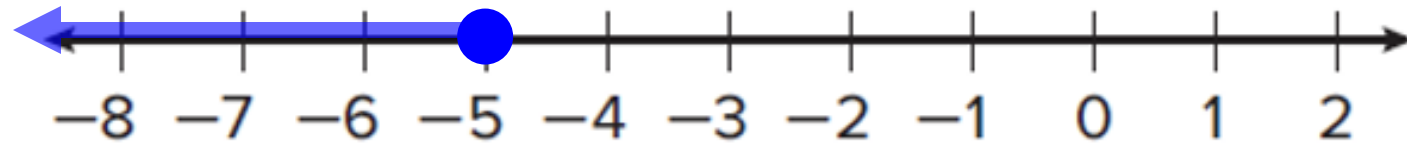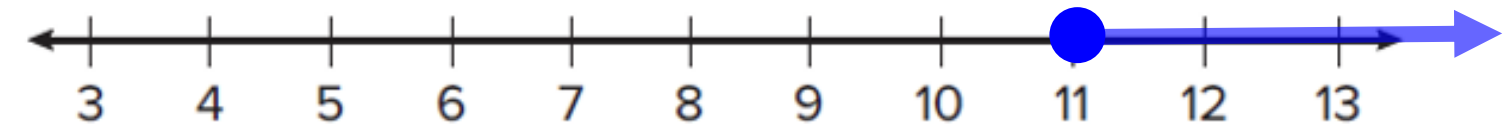
Part 2

Free Response Questions

(4 questions, 5-10 marks each, Paper-Based)

Use inverse operations to solve one-step multiplication and division inequalities with positive coefficients.

Solve each inequality. Graph the solution set on a number line. (Examples 1 and 2)

1. $3x > 12$ **X > 4**
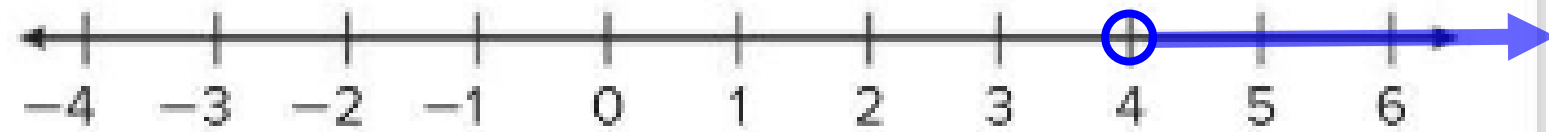
2. $60 \geq 12x$ **5 ≥ x   or x ≥ 5**
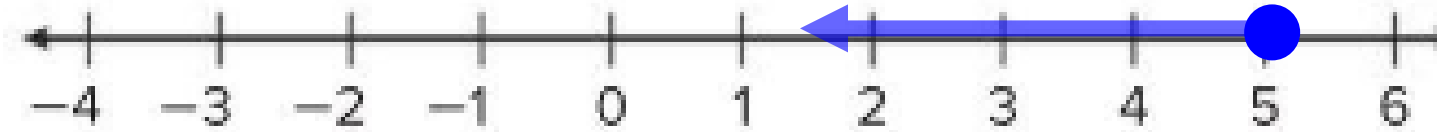
3. $-14 \geq 7x$ **-2 ≥ x   or   x ≤ - 2**
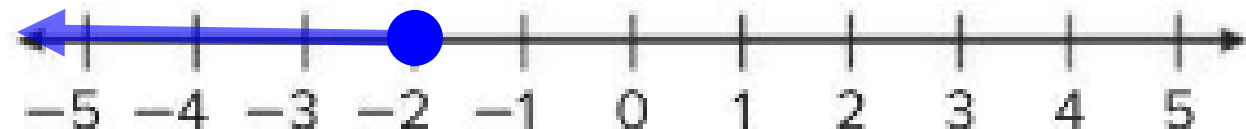
4. $2 \leq 0.25x$ **8 ≥ x   or   x ≥ 8**
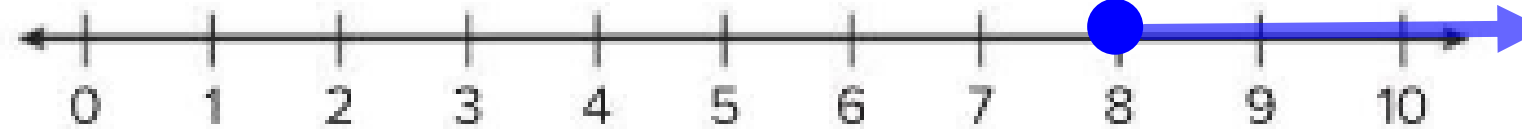
Use inverse operations to solve one-step multiplication and division inequalities with positive coefficients.

5. $1.1x < -4.4$ **X < −4**
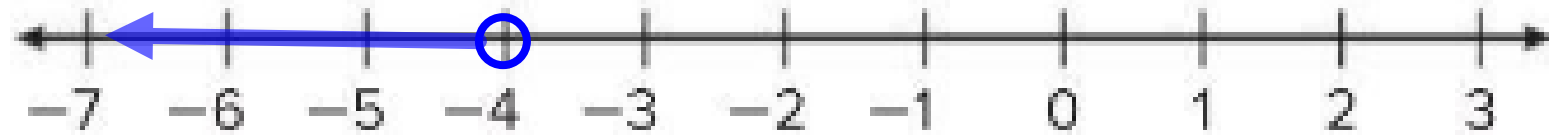
6. $\frac{x}{6} \geq 2$ **X ≥ 12**
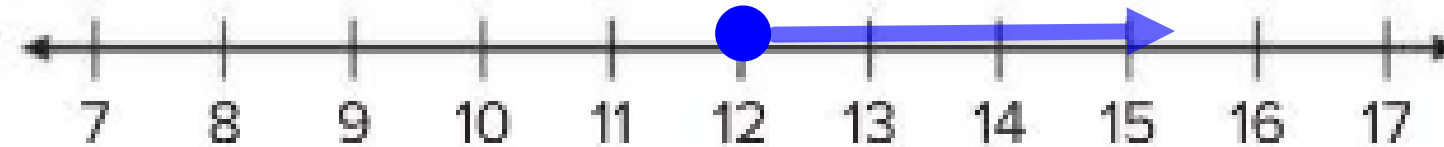
7. $\frac{x}{2} > -4$ **X > −8**
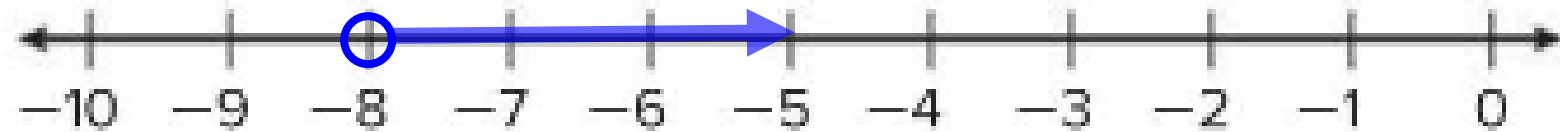
8. $\frac{x}{3} < 5$ **X < 15**
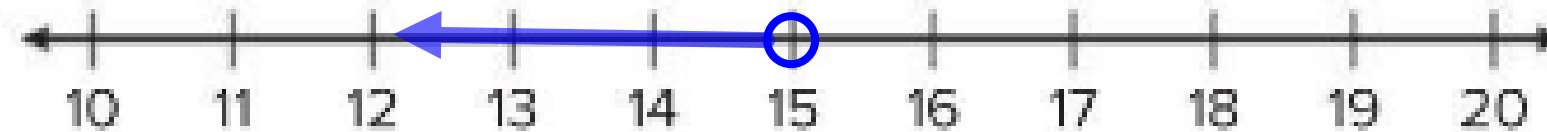
Use inverse operations to solve one-step multiplication and division inequalities with negative coefficients.

---

1. $-6x > 66$ **X < −11**
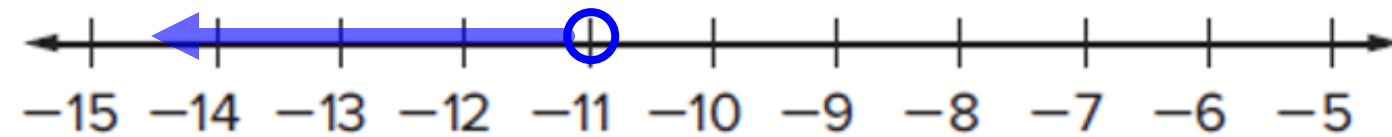
2. $-12 \leq -3x$ **4 ≥ X   or   X ≤ 4**
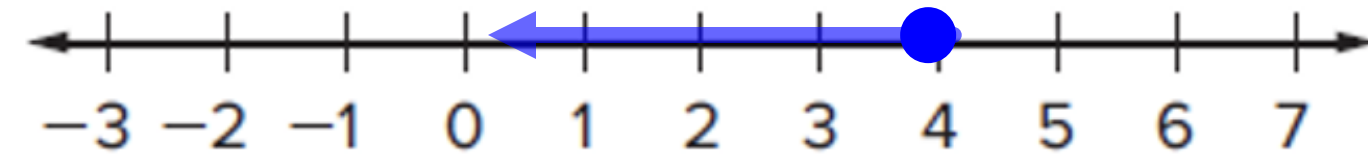
3. $-4x \geq -36$ **X ≤ 9**
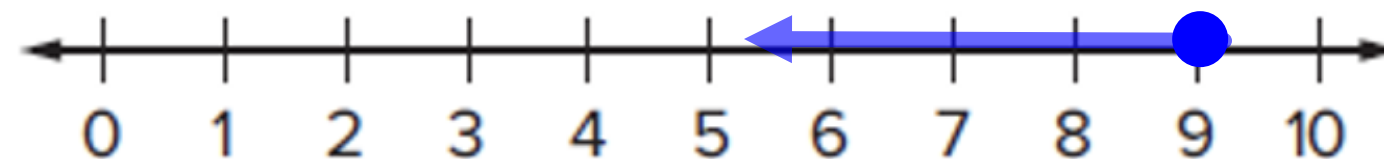
4. $3 > -0.4x$ **-7.5 < X   or   X > -7.5**
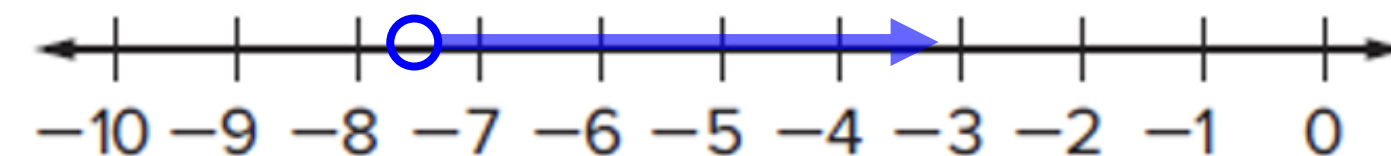
Use inverse operations to solve one-step multiplication and division inequalities with negative coefficients.

5. $-2.2x \leq -6.6$ **X ≥ 3**
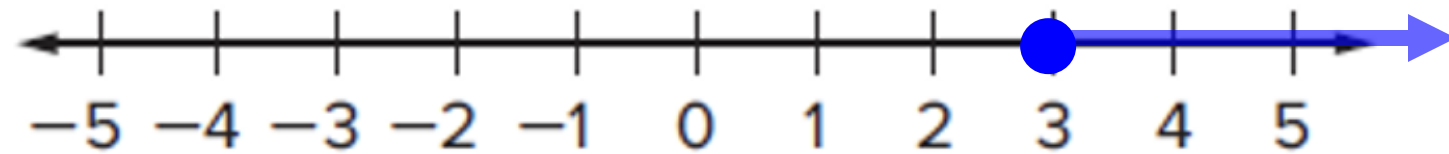
6. $\dfrac{x}{-8} > 2$ **X < −16**
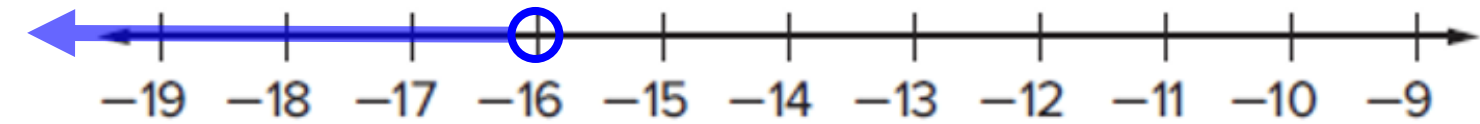
7. $\dfrac{x}{-5} \geq -3$ **X ≥ 15**
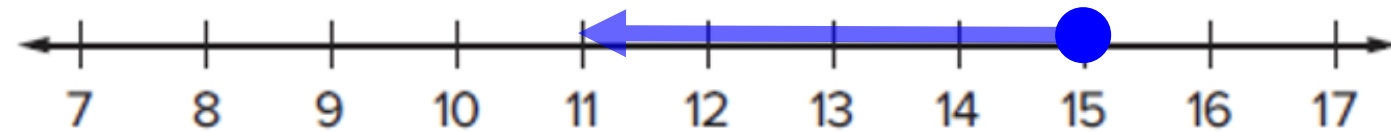
8. $\dfrac{x}{-2} < -6$ **X > 12**
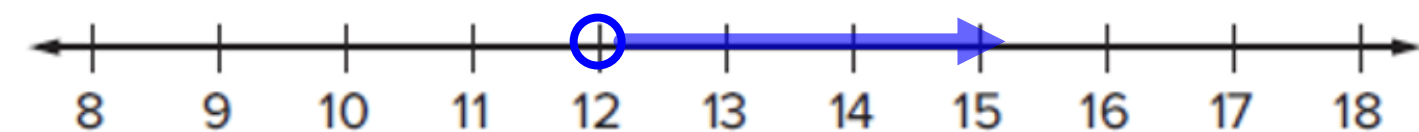
| 18 | Write one-step multiplication and division inequalities from real-world situations and use inverse operations to solve the inequalities | (1-7) | 371 |

Write one-step multiplication and division inequalities from real-world situations and use inverse operations to solve the inequalities.

1. Hermes earns $6 an hour for babysitting. He wants to earn at least $168 for a new video game system. Determine the number of hours he must babysit to earn enough money for the video game system. Then interpret the solution. (Example 1)

$6x \geq 168$

$X \geq 28$

Hermes needs to babysit 28 or more hours

2. Becky wants to buy some fish for her aquarium. She has $20 to spend and the fish cost $2.50 each. Determine how many fish Becky can afford. Then interpret the solution. (Example 1)

$2.50x \leq 20$

$X \leq 8$

Becky can afford 8 fish at most with no money left over

3. Sadie wants to make several batches of rolls. She has 13 tablespoons of yeast left in the jar and each batch of rolls takes $3\frac{1}{4}$ tablespoons. Determine the number of batches of rolls Sadie can make. Then interpret the solution. (Example 1)

$3\frac{1}{4}x \leq 13$

$X \leq 4$

Sadie can make at most 4 batches

4. Trini needs more than 51 cubic feet of soil to fill her raised garden. Each bag of soil contains 1.5 cubic feet. Determine how many bags of soil Trini needs. Then interpret the solution. (Example 1)

$1.5x > 51$

$X > 34$

Trin needs more than 34 bags of soil.

Write one-step multiplication and division inequalities from real-world situations and use inverse operations to solve the inequalities.

5. A teacher is making tutus for the school play. She wants to make at least 24 tutus and needs 1.25 yards of tulle for each tutu. Determine the amount of tulle she needs to buy. Then interpret the solution. (Example 2)

$$\frac{x}{1.25} \geq 24$$

$$X \geq 30$$

Teacher needs at least 30 yards of tulle.

6. Paul is making picture frames. He wants to make at least 8 picture frames and needs 24.5 inches of materials for each frame. Determine how much of the materials Paul should buy. Then interpret the solution. (Example 2)

$$\frac{x}{24.5} \geq 8$$

$$X \geq 196$$

Paul should buy 196 or more than 196 inches

7. Chase is making bookmarks. He wants to make no more than 12 bookmarks and needs 4.25 inches of fabric for each bookmark. Determine the amount of fabric he needs to buy. Then interpret the solution. (Example 2)

$$\frac{x}{4.25} \leq 12$$

$$X \leq 51$$

Chase should buy at most 51 inches of fabric

8. Open Response Mae wants to make more than 6 gift baskets for the school raffle. Each gift basket costs $15.50. Determine the amount of money she will spend to make the gift baskets. Then interpret the solution.

$$\frac{x}{15.50} > 6$$

$$X > 93$$

Mae will spend mor than $ 93

1. Name the angle in four ways. (Example 1)

∟ **3**
∟ **F**
∟ **HFG**
∟ **GFH**
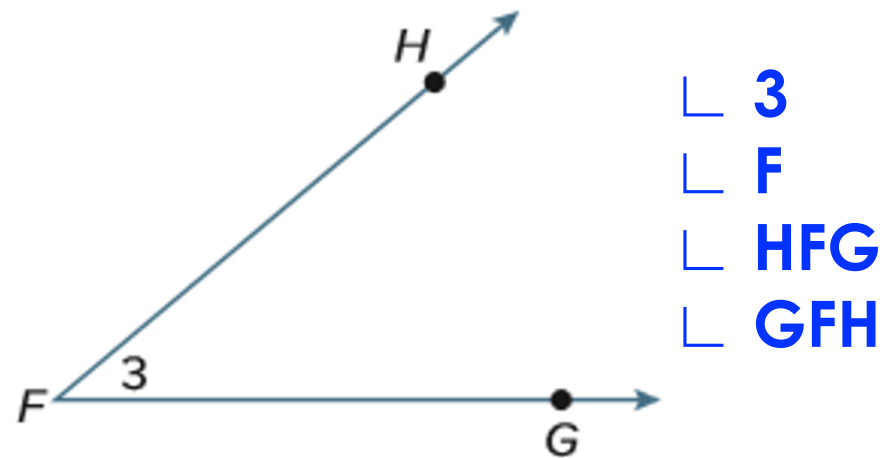
2. Name the angle in four ways. (Example 1)

∟ **1**
∟ **B**
∟ **ABC**
∟ **CBA**
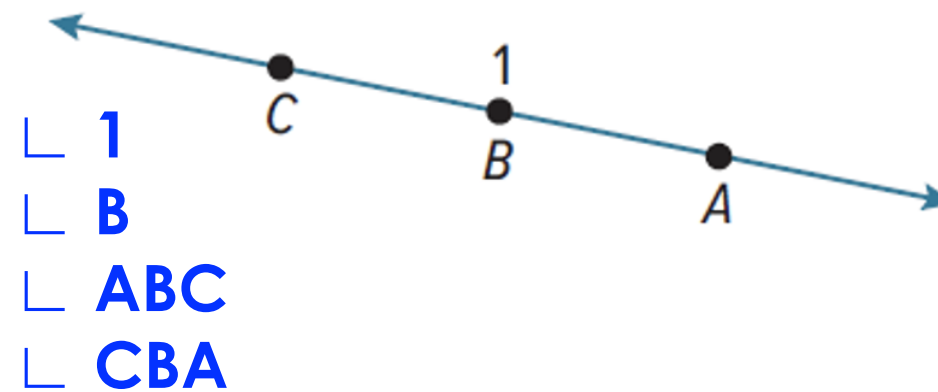
3. Refer to the diagram below. Identify three pairs of vertical angles. Name all the angles that are adjacent to ∠10. (Examples 2 and 4)

∟ **10 and** ∟**9**
∟ **10 and** ∟**11**
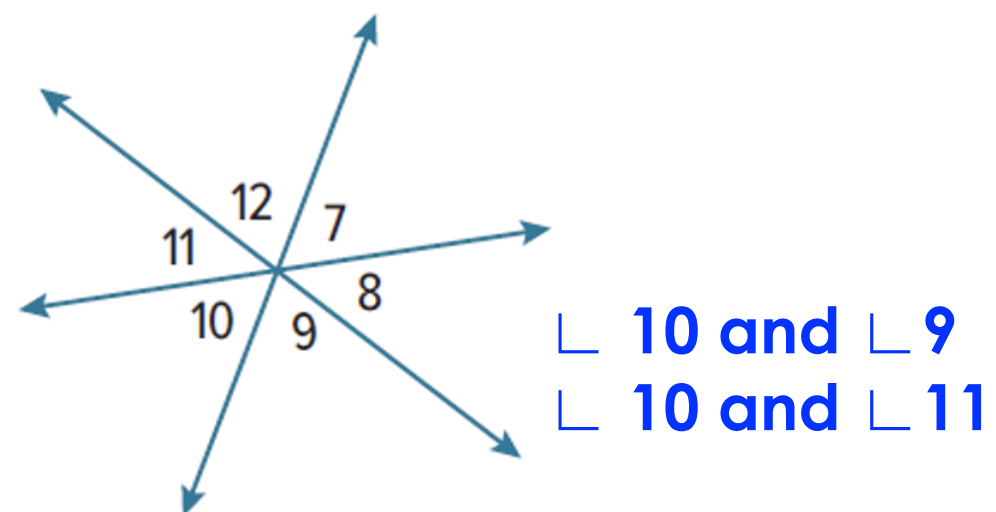
4. Identify three pairs of vertical angles. Name all the angles that are adjacent to ∠3. (Examples 2 and 4)

∟ **3 and** ∟**2**
∟ **3 and** ∟ **4**
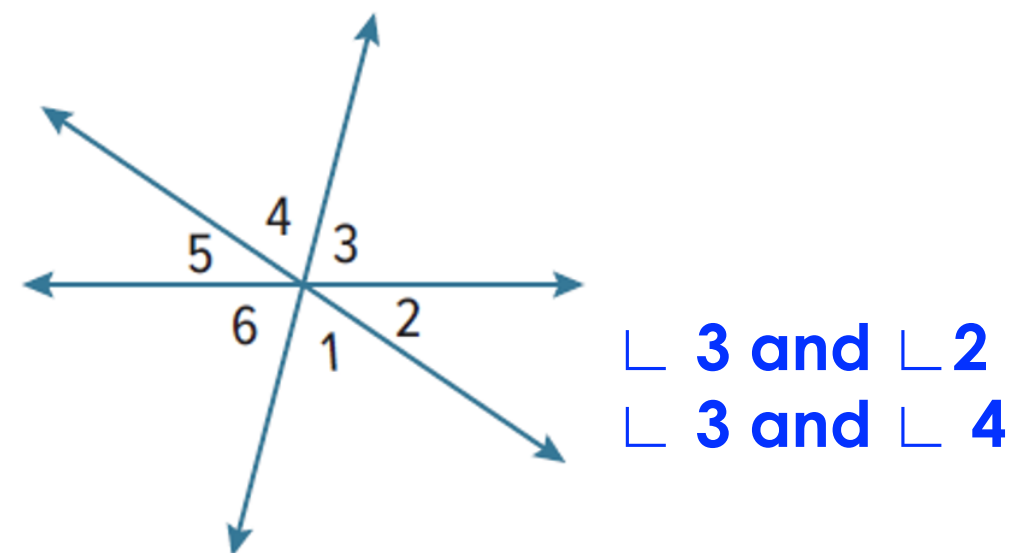
5. Write and solve an equation to find the value of x. (Example 3)

Vertical angles are equal

2x + 5 = 115
   -5   -5
2x = 110
X = 55

115°

$(2x + 5)°$
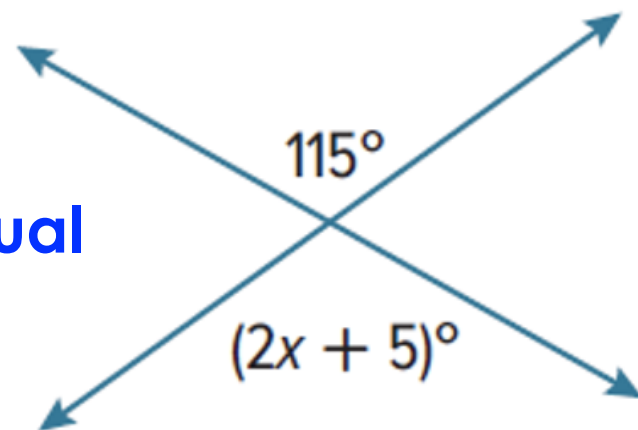
6. Write and solve an equation to find the value of x. (Example 3)

Vertical angles are equal

2x = 120

X = 60
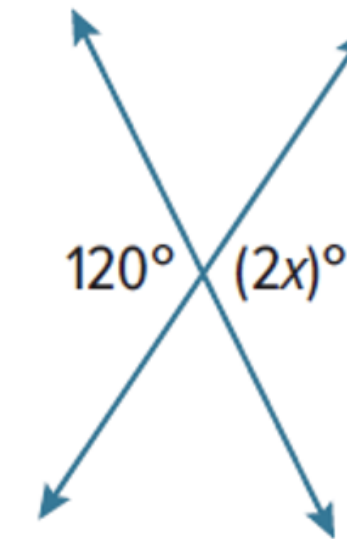
120° $(2x)°$

7. Write and solve an equation to find the value of x. (Example 5)

5x + 95 = 180
   -95   -95
5x = 85
X = 17

M

$(5x)°$
P
95°
L   O
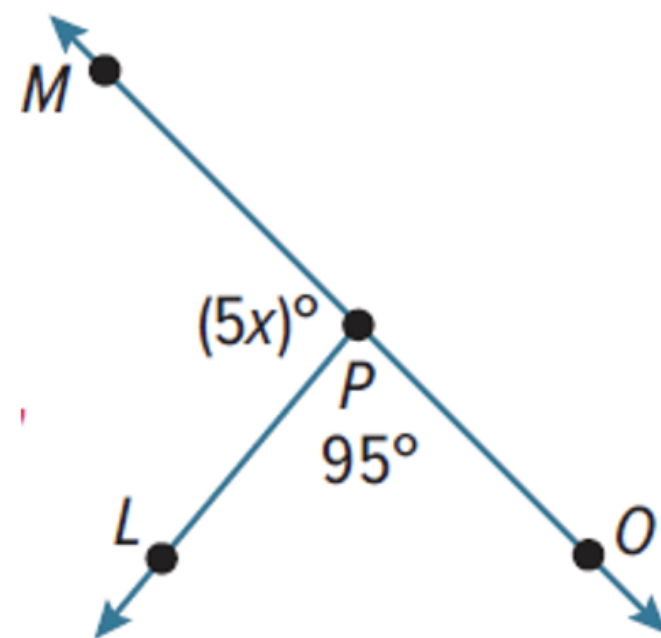
8. Open Response Write and solve an equation to find the value of y.

3y + 120 = 180
    -120   -120
3y = 60
X = 20

$(3y)°$
120°
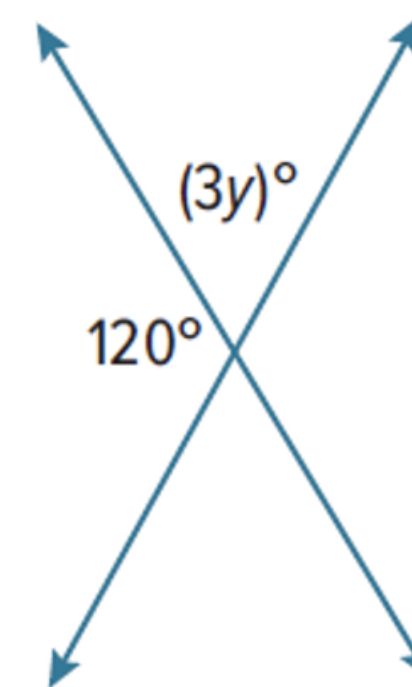
Identify complementary and supplementary angles and use them to write and solve equations to find unknown angle measures.

Give the measure of the angle that is **complementary** to the given angle. (Example 1)

1.

45°

2.

20°

3.

54°
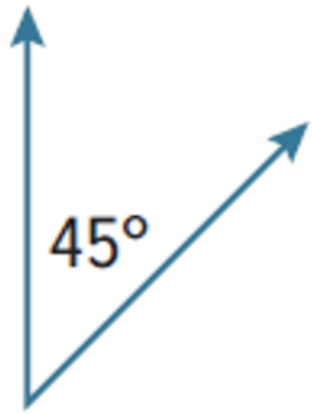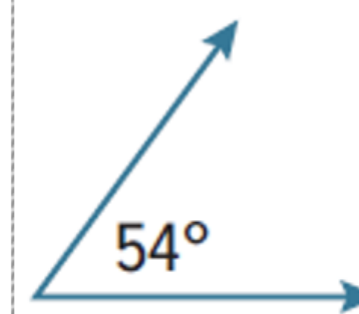
| $90° - 45° = 45°$ | $90° - 20° = 70°$ | $90° - 54° = 36°$ |

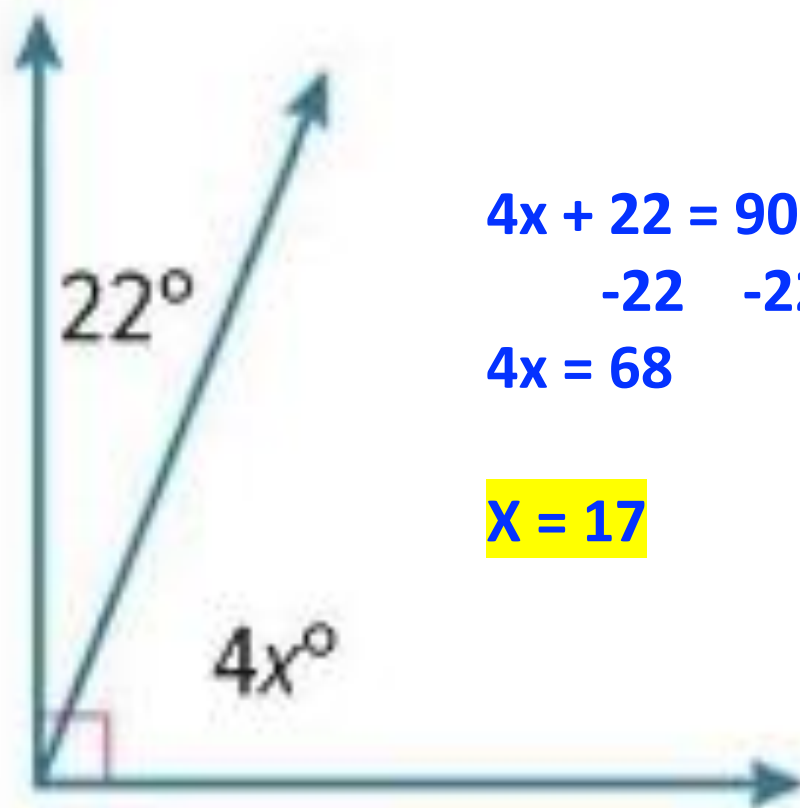Give the measure of the angle that is **supplementary** to the given angle. (Example 1)

4.

128°

5.

160°

6.

50°
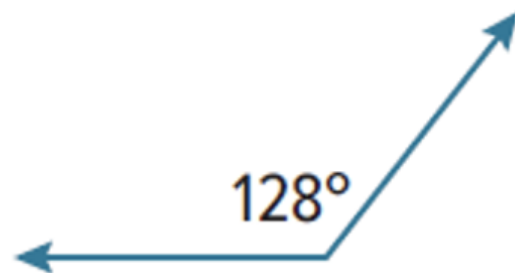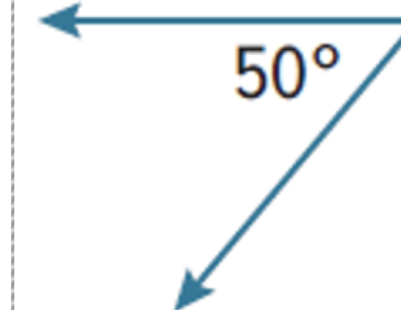
| $180° - 128° = 52°$ | $180° - 160° = 20°$ | $180° - 150° = 130°$ |

Identify complementary and supplementary angles and use them to write and solve equations to find unknown angle measures.

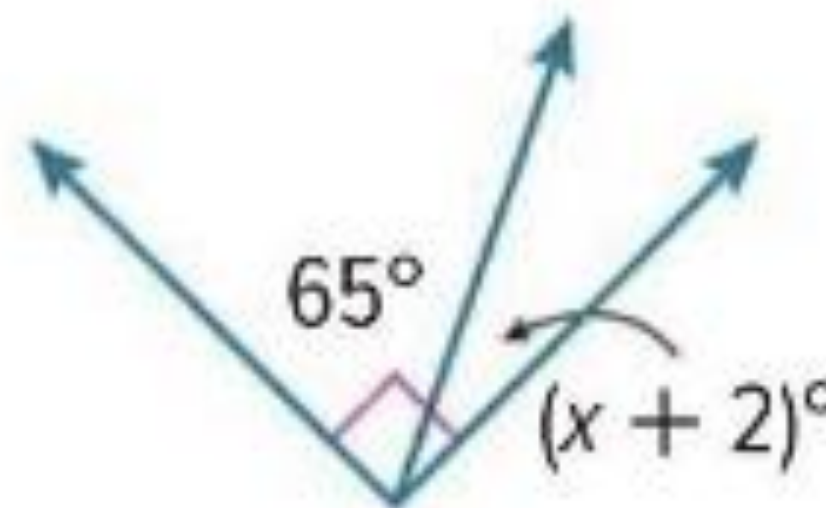## Write and solve an equation to find the value of *x* in each figure. (Examples 2 and 4)

7.

22°

4*x*°

$4x + 22 = 90$
$ -22 \quad -22$
$4x = 68$

X = 17

8.

65°

$(x + 2)°$

$X + 2 + 65 = 90$
$X + 67 = 90$
$ -67 \quad -67$

X = 23

9.

$(x - 7)°$

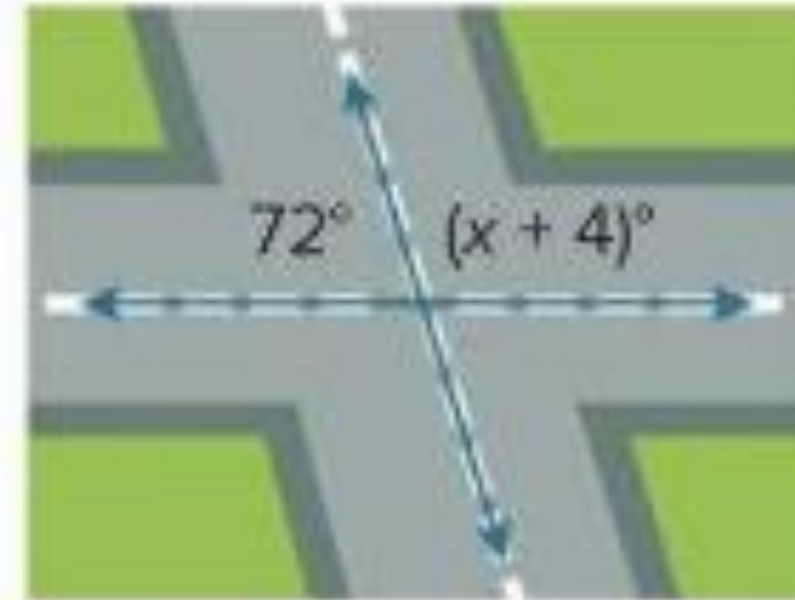43°
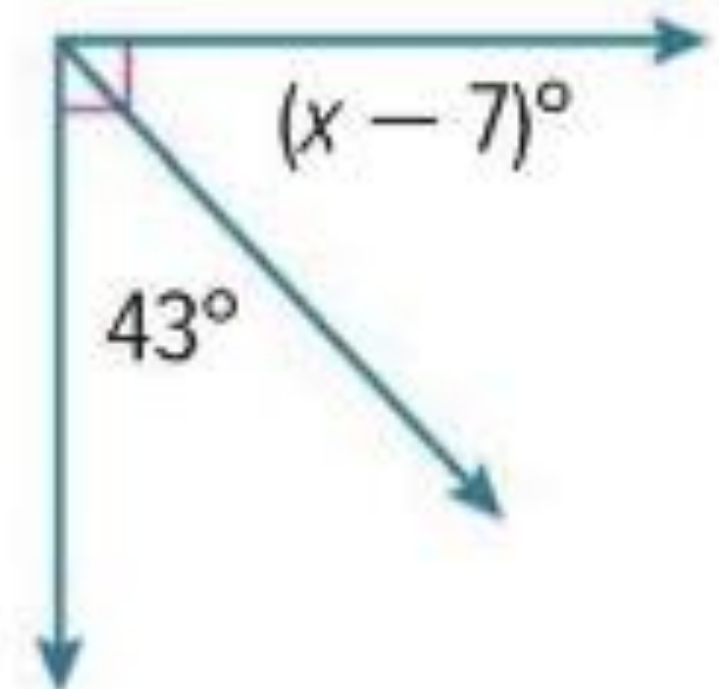
$X - 7 + 43 = 90$
$X + 36 = 90$
$ -36 \quad -36$

X = 54

Identify complementary and supplementary angles and use them to write and solve equations to find unknown angle measures.
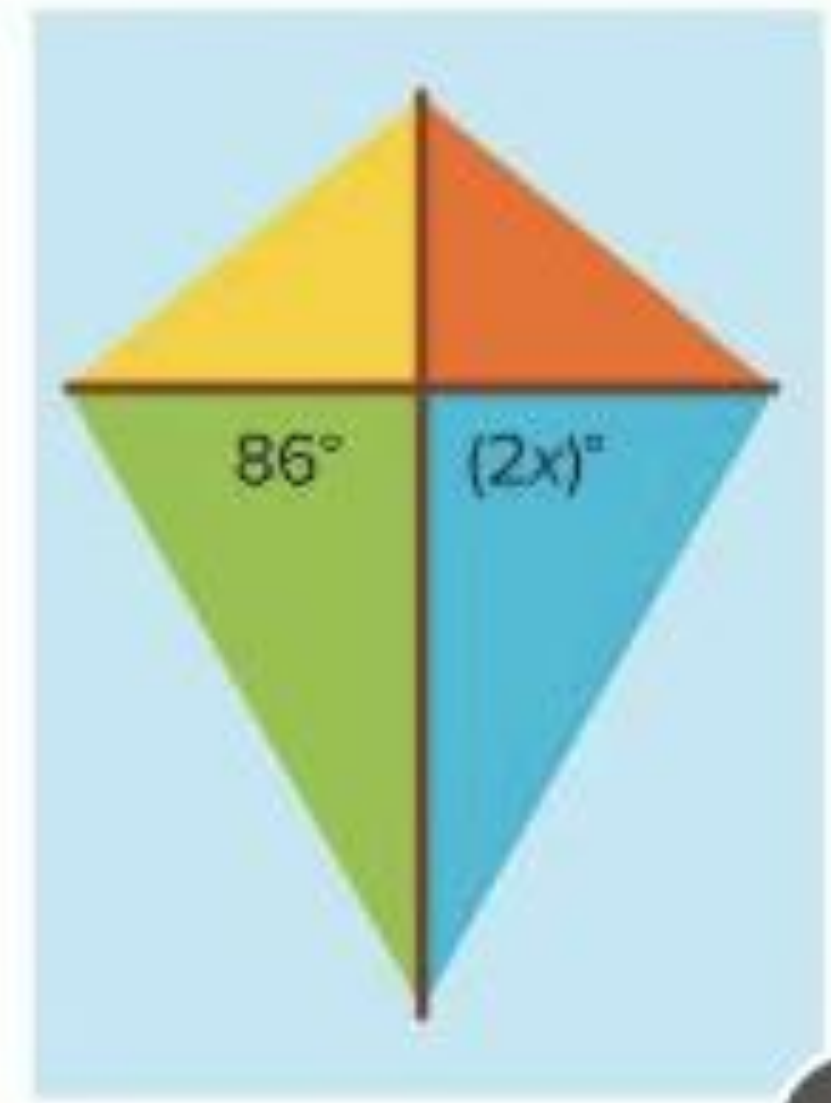
10.

110°

7x°
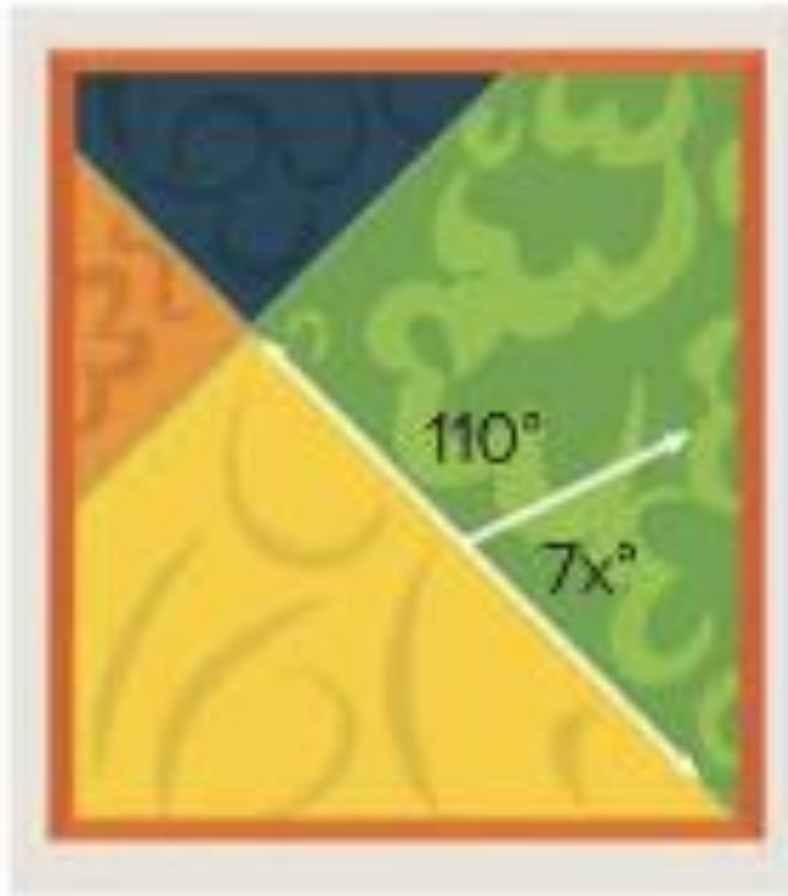
7x + 110 = 180

-110   -110

7x = 70

X = 10

11.

72°   (x + 4)°

x + 4 +72 = 180

X + 76 = 180

-76   -76

X = 104

12.

86°   (2x)°

2x + 86 = 180

-86   -86

2x = 94

X = 47

Classify and draw triangles freehand, with tools, and with technology given certain conditions, such as angle measures or side lengths.

---

9. The figure shows the Oak Creek trail, which is shaped like a triangle. Solve the equation $61 + 78 + x = 180$ to find the value of x in the figure. Then classify the triangle by its angles and by its sides.

Rocky Peak

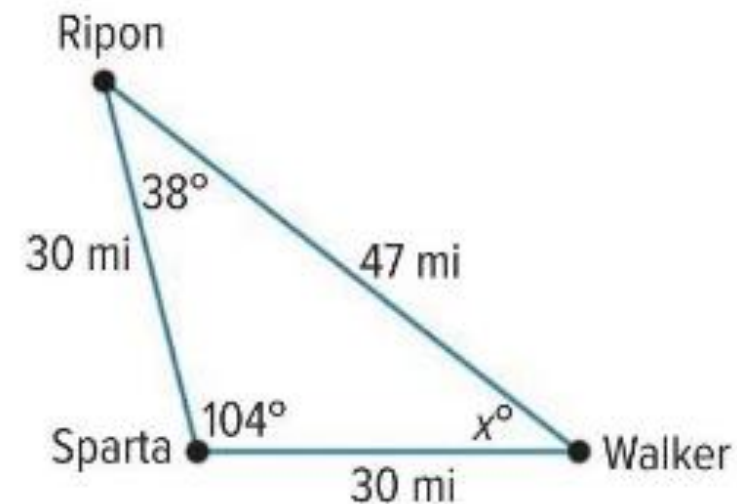0.8 mi / 61° \ 1.2 mi

Oak Creek

78° $x°$

Meadow   1.1 mi   Trail Head
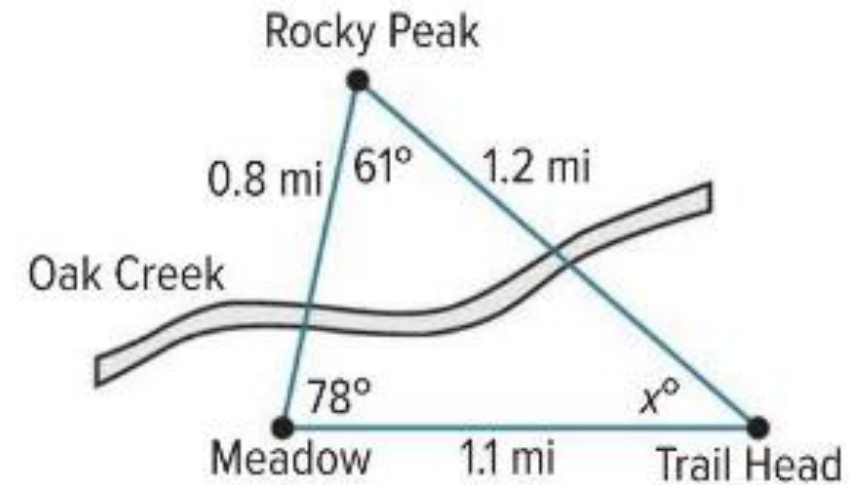
61 + 78 + x = 180
139 + x = 180
X = 41°
Acute triangle
Scalene triangle

10. The three towns of Ripon, Sparta, and Walker form a triangle as shown. Solve the equation $38 + 104 + x = 180$ to find the value of x in the triangle. Then classify the triangle by its angles and by its sides.

Ripon

38°

30 mi   47 mi

Sparta 104° $x°$ Walker
        30 mi

38 + 104 + x = 180
142 + x = 180
X = 38°
Obtuse triangle
isosceles triangle

Classify and draw triangles freehand, with tools, and with technology given certain conditions, such as angle measures or side lengths.
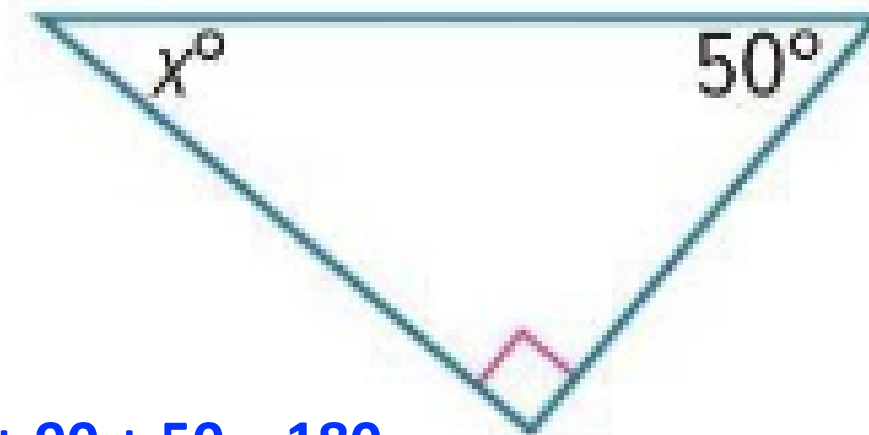
11. 🅜🅟 **Reason Abstractly** Without drawing the triangle, how do you know a triangle with a 95° angle, a 95° angle, and a 5-inch side is not possible?

$95° + 95° = 190°$

The sum of two angles is greater than 180°

The sum of all angles of triangle must be equal 180°

12. Find the value of x in the diagram. Then, find the supplement of the missing angle.

$X + 90 + 50 = 180$

$X + 140 = 180$
$X = 40°$

Supplement $= 180 - 40$
$\qquad\qquad = 140°$

THE END

Good Luck :)

بالنجاح والتوفيق
لا تنسونا من دعائكم