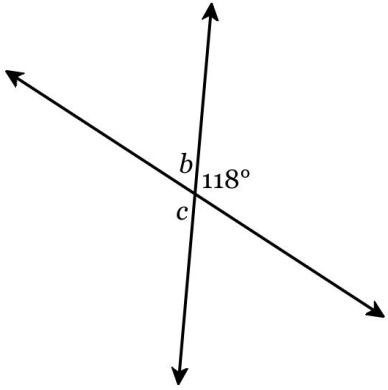**Basic Angle Relationships (~43 min)**

1. Find the measure of the missing angles.

b | $118°$
c

2. Find the measure of the missing angle.

a \ $136°$
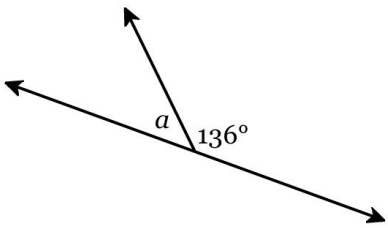
3. Find the measure of the missing angle.

$61°$
a
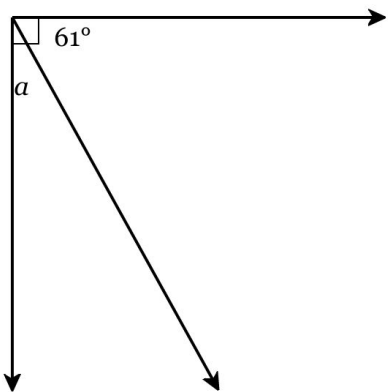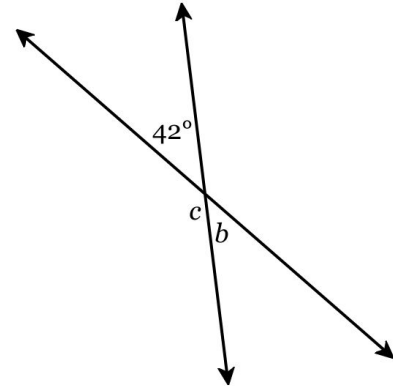
4. Find the measure of the missing angles.

$42°$

c b

5. Find the measure of the missing angle.

a
$31°$
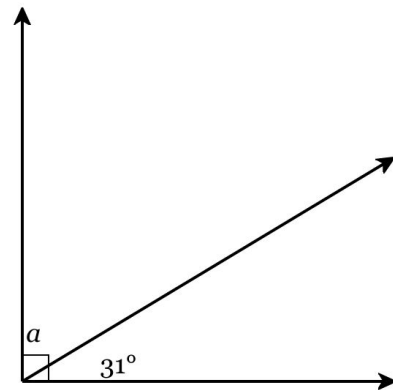
6. Find the degree measures d, e, and f of the missing angles in the diagram below.
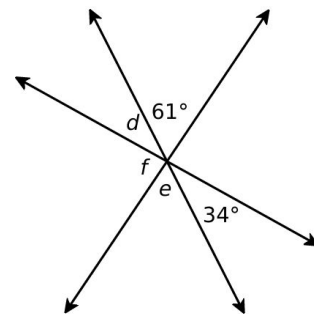
d $61°$
f
e
$34°$

7. Find the degree measures d, e, and f of the missing angles in the diagram below.

83°

e | f

d

10. Find the degree measures g, h, k, and m of the missing angles in the diagram below.

25°

h

g

m | 68°

k
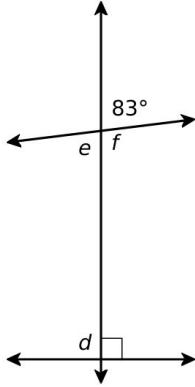
8. Find the degree measure a of the missing angle in the diagram below.

55°

a

11. Solve for the value of k.

$(k+2)°$

$(2k+1)°$
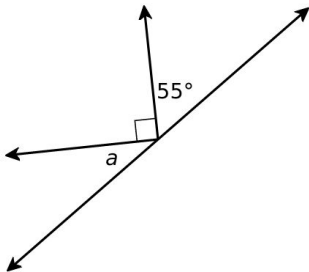
9. Find the degree measures x and y of the missing angles in the diagram below.

x | 54°

y
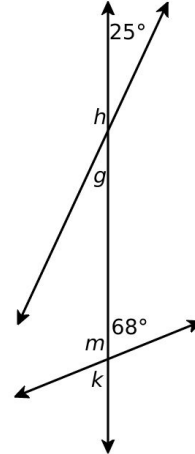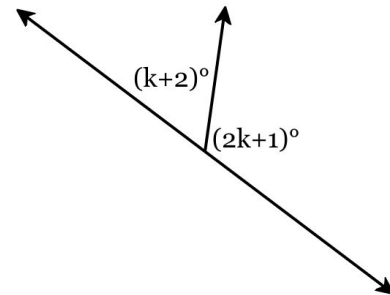
Basic Angle Relationships (~43 min)

12. Solve for the value of r.

$(r+2)°$

$40°$
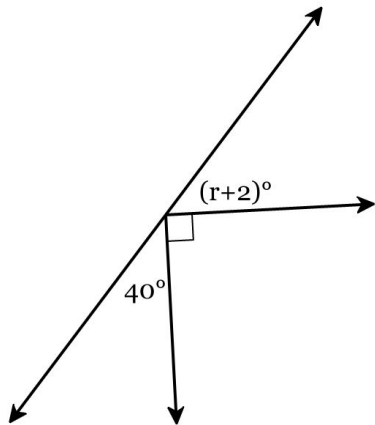
13. Solve for the value of r.

$(6r-5)°$

$(9r+5)°$
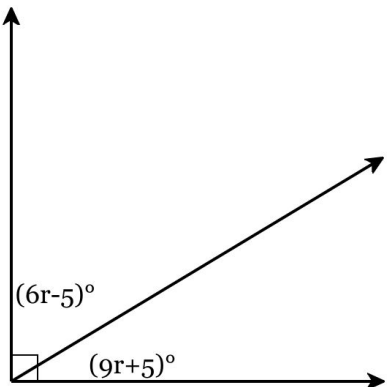
14. Solve for the value of b.

$78°$

$(b+6)°$
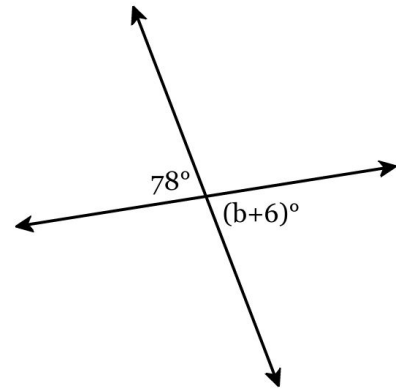
15. Solve for the value of q.

$(2q-6)°$

$(3q-4)°$
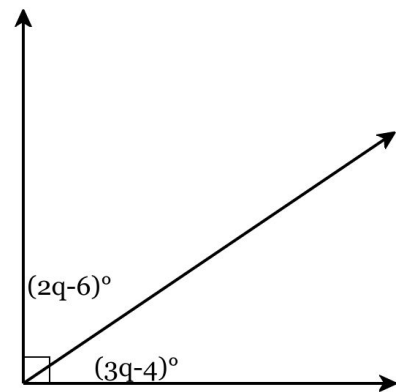
Basic Angle Relationships (~43 min)
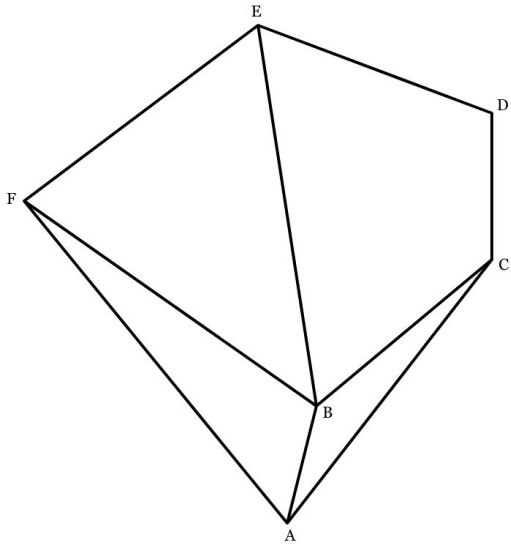
16. Identify $\angle BAF$ by by marking it with an arc on the diagram.

18. Identify $\angle BCD$ by by marking it with an arc on the diagram.
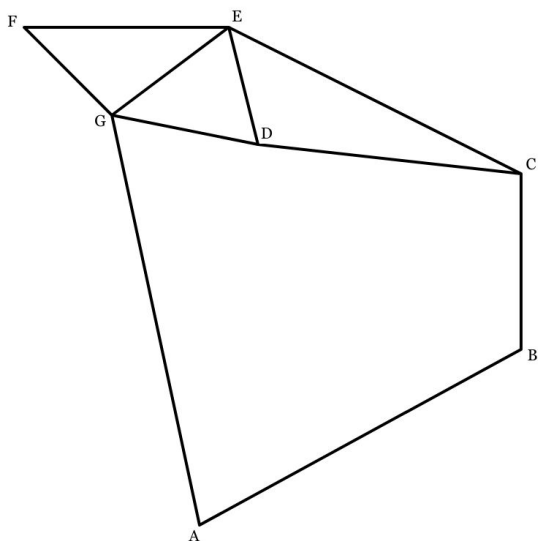
17. Identify $\angle FED$ by by marking it with an arc on the diagram.
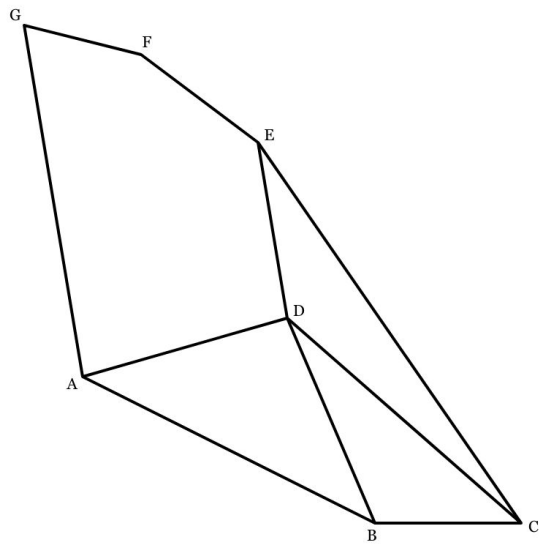
19. Identify $\angle DCB$ by by marking it with an arc on the diagram.
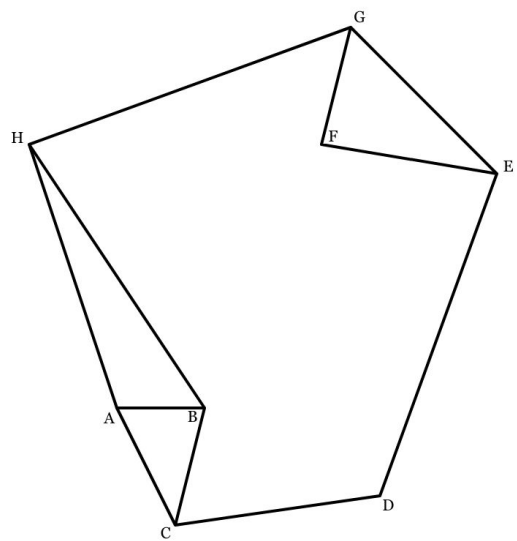
Basic Angle Relationships (~43 min)

20. Identify $\angle EFA$ by by marking it with an arc on the diagram.
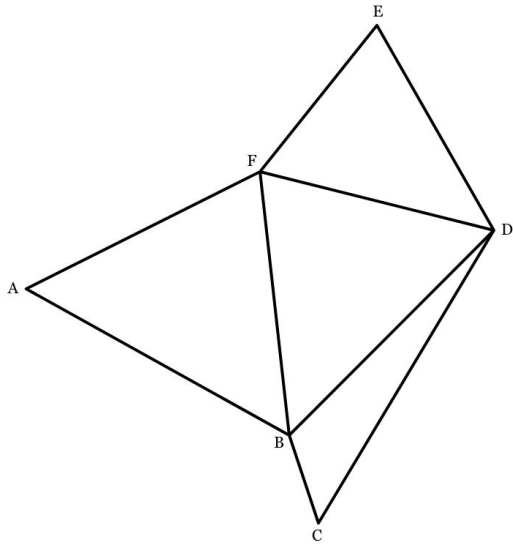
21. $\angle A$ and $\angle B$ are vertical angles. If m $\angle A = (4x + 20)°$ and m$\angle B = (6x + 24)°$, then find the value of x.

22. $\angle A$ and $\angle B$ are vertical angles. If m $\angle A = (2x - 14)°$ and m$\angle B = (3x - 29)°$, then find the measure of $\angle A$.

23. $\angle A$ and $\angle B$ are supplementary angles. If m$\angle A = (2x + 23)°$ and m$\angle B = (x - 29)°$, then find the measure of $\angle A$.

24. $\angle A$ and $\angle B$ are complementary angles. If m$\angle A = (7x - 9)°$ and m$\angle B = (2x + 18)°$, then find the measure of $\angle B$.

25. $\angle A$ and $\angle B$ are complementary angles. If m$\angle A = (5x - 3)°$ and m$\angle B = (2x + 30)°$, then find the measure of $\angle A$.

Basic Angle Relationships (~43 min)

26. Name the marked angle in 2 different ways.
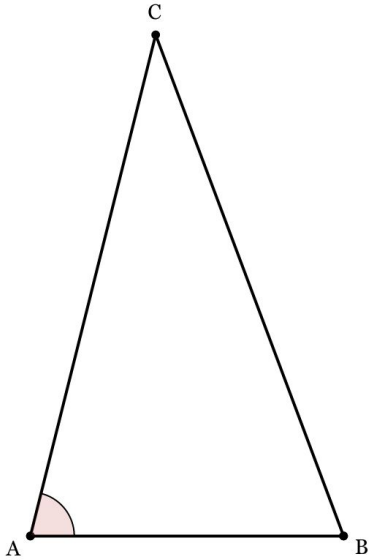
27. Name the marked angle in 2 different ways.
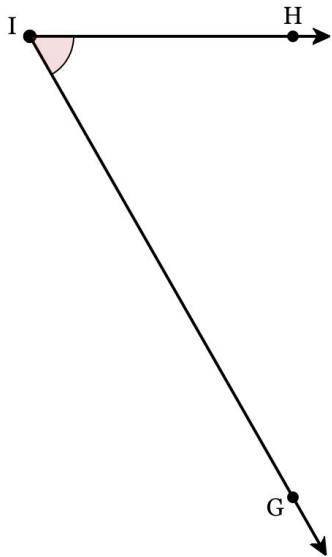
28. Name the marked angle in 2 different ways.
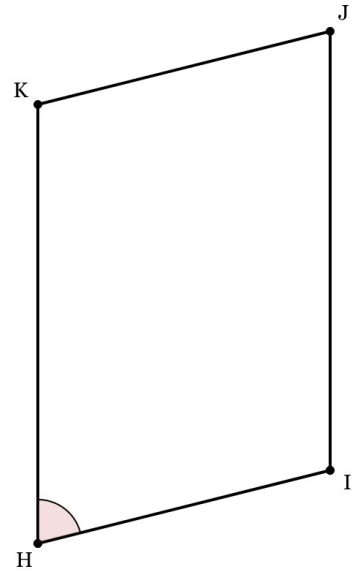
29. Name the marked angle in 2 different ways.
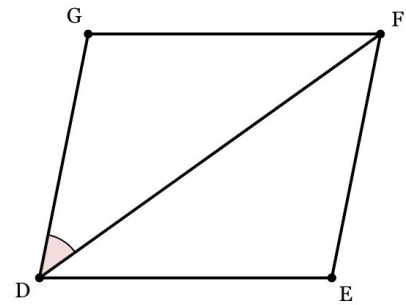
Basic Angle Relationships (~43 min)

30. Name the marked angle in 2 different ways.
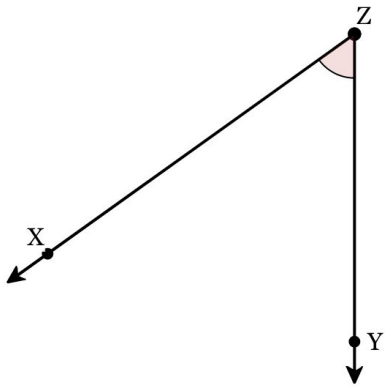
Z

X

Y

33. Name the figure below in two different ways.

P

D

U

31. Name the figure below in two different ways.

P

W

Y

32. Name the figure below in two different ways.

S

W
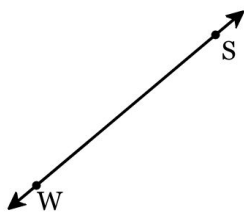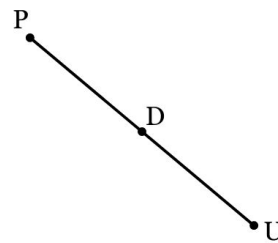
Rigid Motions (~34 min)

1. The point U is plotted on the coordinate grid below. Plot the point U', the reflection of U over the y-axis.
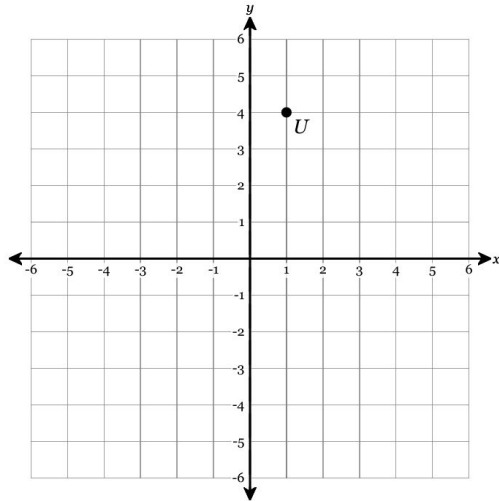
Coordinates of U: $\left(\underline{\hspace{1cm}},\underline{\hspace{1cm}}\right)$

Coordinates of U': $\left(\underline{\hspace{1cm}},\underline{\hspace{1cm}}\right)$

When a point is reflected over the y-axis, the (x-coordinate / y-coordinate) changes sign.

3. The point G is plotted on the coordinate grid below. Plot the point G', the reflection of G over the x-axis.
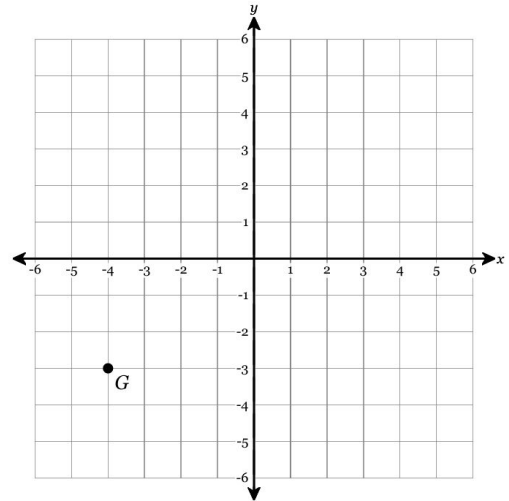
Coordinates of G: $\left(\underline{\hspace{1cm}},\underline{\hspace{1cm}}\right)$

Coordinates of G': $\left(\underline{\hspace{1cm}},\underline{\hspace{1cm}}\right)$

When a point is reflected over the x-axis, the (x-coordinate / y-coordinate) changes sign.

2. The point E is plotted on the coordinate grid below. Plot the point E', the reflection of E over the x-axis.

Coordinates of E: $\left(\underline{\hspace{1cm}},\underline{\hspace{1cm}}\right)$

Coordinates of E': $\left(\underline{\hspace{1cm}},\underline{\hspace{1cm}}\right)$

When a point is reflected over the x-axis, the (x-coordinate / y-coordinate) changes sign.

4. The point E is plotted on the coordinate grid below. Plot the point E', the reflection of E over the x-axis.
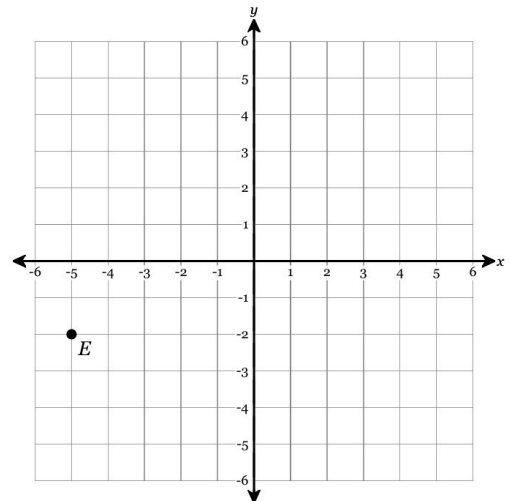
Coordinates of E: $\left(\underline{\hspace{1cm}},\underline{\hspace{1cm}}\right)$

Coordinates of E': $\left(\underline{\hspace{1cm}},\underline{\hspace{1cm}}\right)$

When a point is reflected over the x-axis, the (x-coordinate / y-coordinate) changes sign.

Rigid Motions (~34 min)

5. The point J is plotted on the coordinate grid below. Plot the point J', the reflection of J over the y-axis.
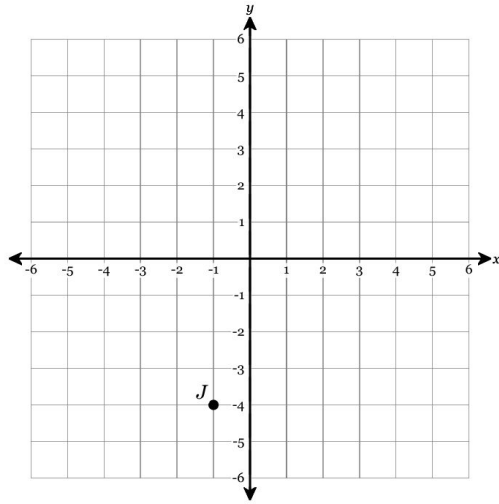
Coordinates of J: $\left(\underline{\hspace{1cm}}, \underline{\hspace{1cm}}\right)$

Coordinates of J': $\left(\underline{\hspace{1cm}}, \underline{\hspace{1cm}}\right)$

When a point is reflected over the y-axis, the (x-coordinate / y-coordinate) changes sign.

6. Translate the figure 3 units right and 6 units up.
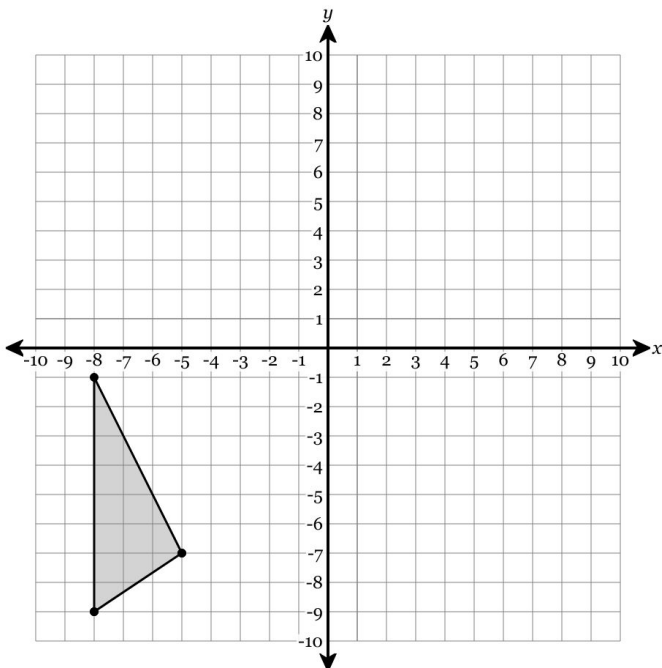
7. Translate the figure 3 units left and 2 units up.
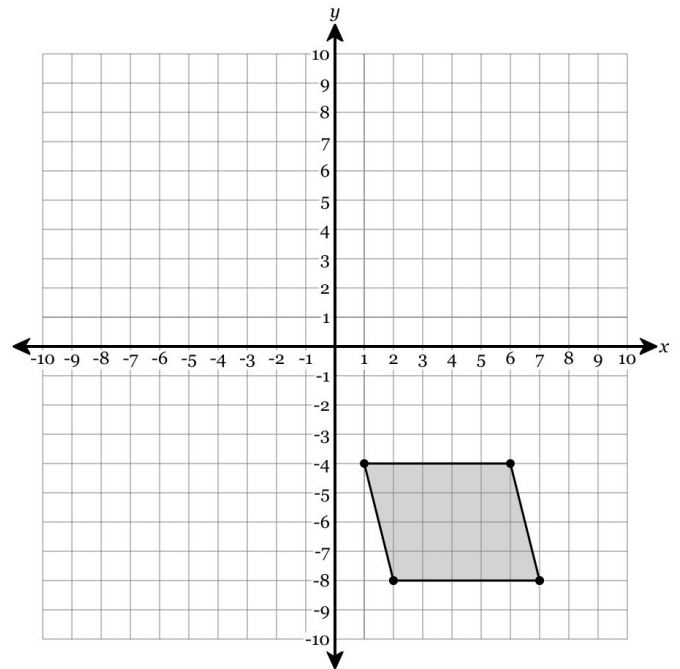
8. Translate the figure 7 units left and 1 unit down.
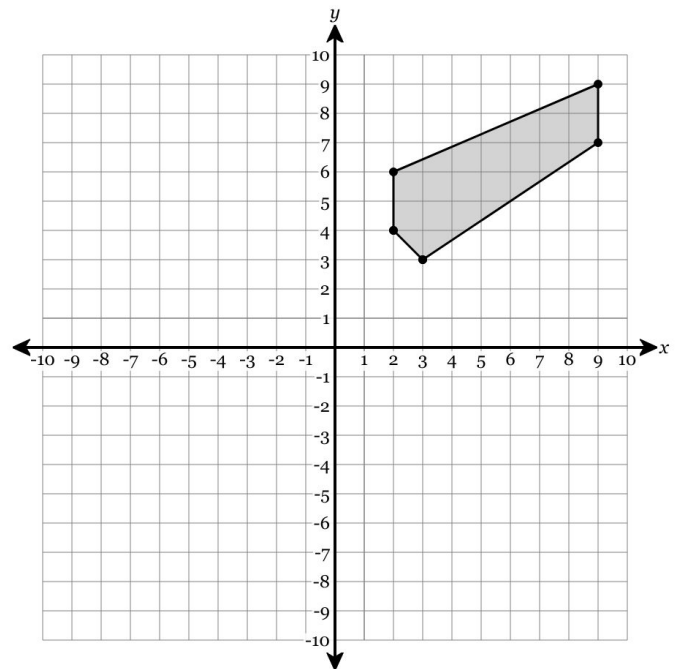
Rigid Motions (~34 min)

9. Translate the figure 7 units left and 2 units up.
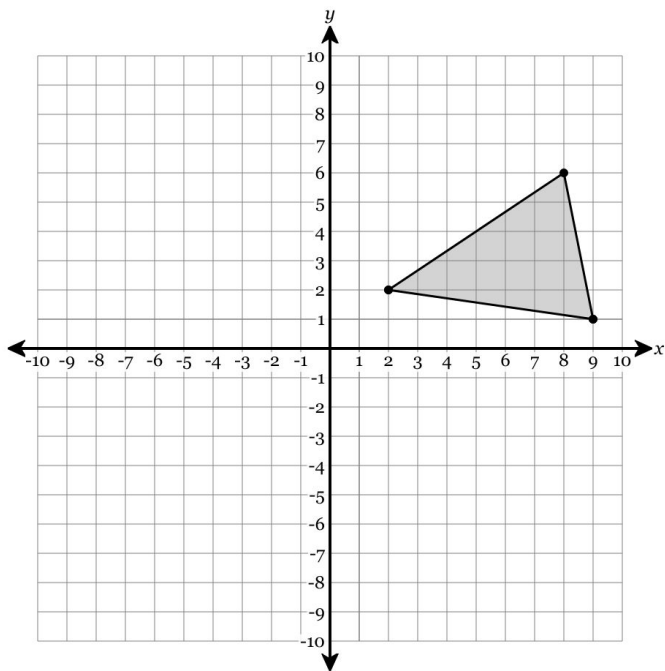
10. Translate the figure 6 units left and 2 units down.
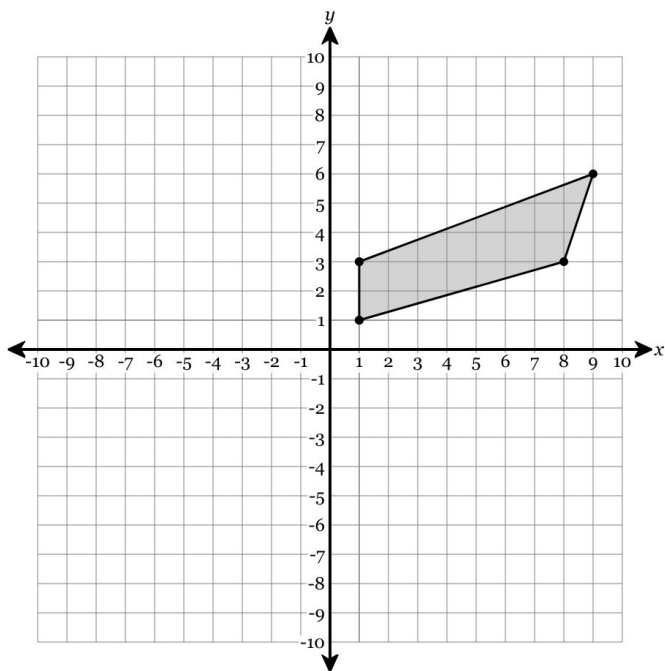
11. Figure N is the result of a transformation on Figure M. Which transformation would accomplish this?
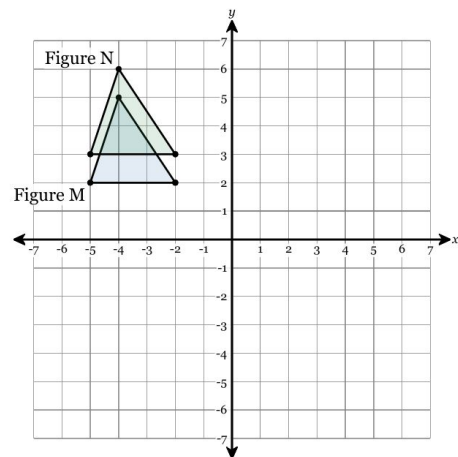
A. A translation 1 unit down

B. A rotation 90° clockwise about the origin

C. A rotation 90° counterclockwise about the origin

D. A translation 1 unit up

12. Figure X is the result of a transformation on Figure W. Which transformation would accomplish this?
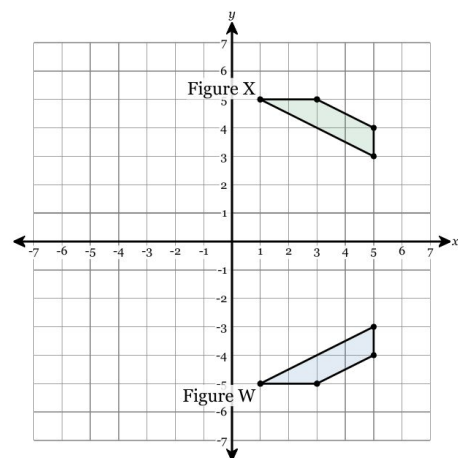
A. A reflection over the x-axis

B. A reflection over the y-axis

C. A rotation 180° clockwise about the origin

D. A translation 6 units up

Rigid Motions (~34 min)

13. Figure O is the result of a transformation on Figure N. Which transformation would accomplish this?
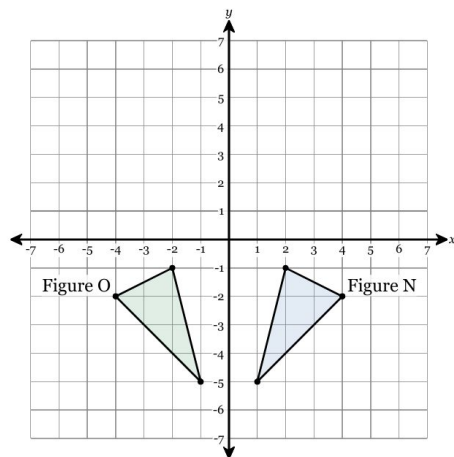
A. A translation 2 units to the right.

B. A reflection over the y-axis

C. A rotation 180° clockwise about the origin

D. A reflection over the x-axis

14. Figure H is the result of a transformation on Figure G. Which transformation would accomplish this?
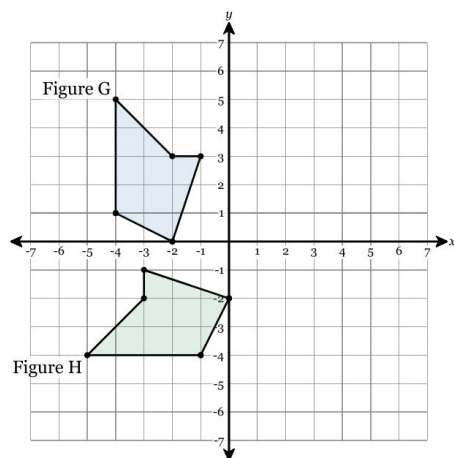
A. A rotation 90° counterclockwise about the origin

B. A rotation 180° counterclockwise about the origin

C. A rotation 90° clockwise about the origin

D. A translation 2 units to the right and 4 units up

15. Figure C is the result of a transformation on Figure B. Which transformation would accomplish this?
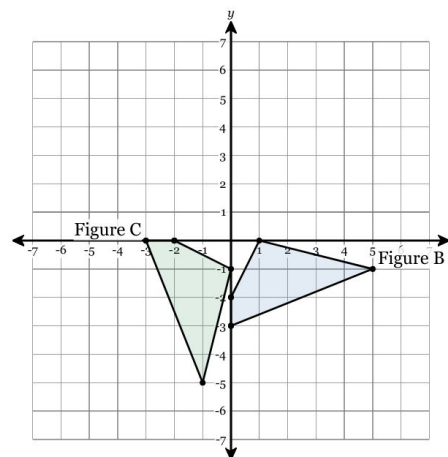
A. A reflection over the x-axis

B. A rotation 90° counterclockwise about the origin

C. A reflection over the y-axis

D. A rotation 90° clockwise about the origin

Rigid Motions (~34 min)

16. Do the following to rotate the figure below $180°$ counter-clockwise about the origin: (a) Use a compass to draw a circle centered at the origin, going through the vertex at $(2, -3)$. (b) Use a straightedge to draw a line that passes through the origin and $(2, -3)$. (c) Draw a line through the origin that is perpendicular to the line that you just drew. (d) Use the circle and two lines to guide you through a $180°$ counter-clockwise rotation of the point $(2, -3)$. Rotate the other vertices using a similar technique or find them relative to the image of the vertex at $(2, -3)$.
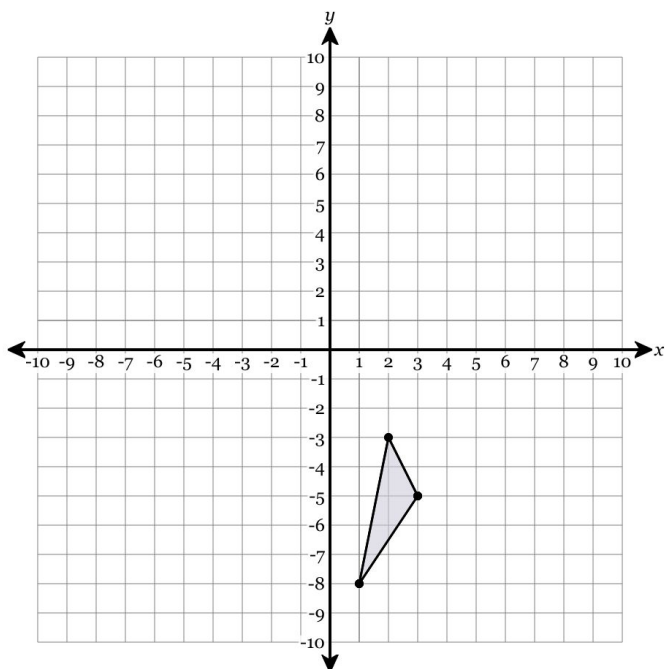
Write the coordinates of the corresponding points below.

Pre-Image		Image
$(1, -8)$	$\rightarrow$	(____, ____)
$(3, -5)$	$\rightarrow$	(____, ____)
$(2, -3)$	$\rightarrow$	(____, ____)

17. Do the following to rotate the figure below $270°$ counter-clockwise about the origin: (a) Use a compass to draw a circle centered at the origin, going through the vertex at $(2, 1)$. (b) Use a straightedge to draw a line that passes through the origin and $(2, 1)$. (c) Draw a line through the origin that is perpendicular to the line that you just drew. (d) Use the circle and two lines to guide you through a $270°$ counter-clockwise rotation of the point $(2, 1)$. Rotate the other vertices using a similar technique or find them relative to the image of the vertex at $(2, 1)$.
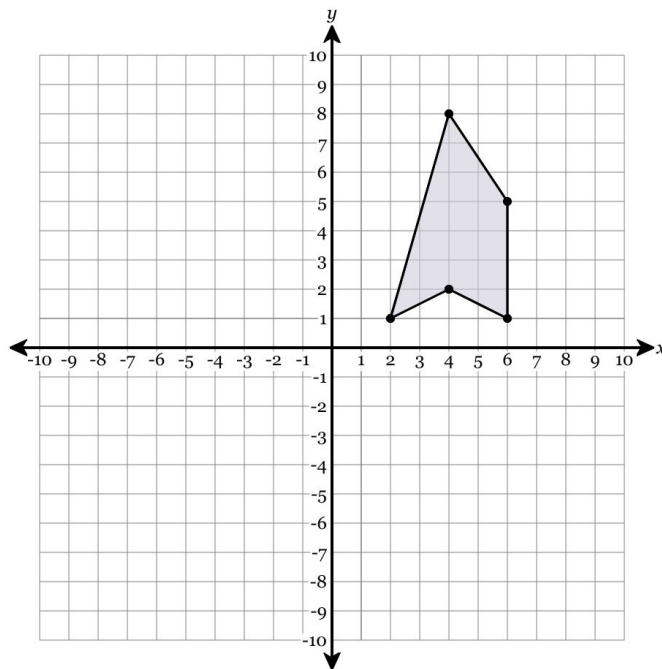
Write the coordinates of the corresponding points below.

Pre-Image		Image
$(2, 1)$	$\rightarrow$	(____, ____)
$(4, 2)$	$\rightarrow$	(____, ____)
$(6, 1)$	$\rightarrow$	(____, ____)
$(6, 5)$	$\rightarrow$	(____, ____)
$(4, 8)$	$\rightarrow$	(____, ____)

Rigid Motions (~34 min)

18. Do the following to rotate the figure below $270°$ clockwise about the origin: (a) Use a compass to draw a circle centered at the origin, going through the vertex at $(-2, 4)$. (b) Use a straightedge to draw a line that passes through the origin and $(-2, 4)$. (c) Draw a line through the origin that is perpendicular to the line that you just drew. (d) Use the circle and two lines to guide you through a $270°$ clockwise rotation of the point $(-2, 4)$. Rotate the other vertices using a similar technique or find them relative to the image of the vertex at $(-2, 4)$.
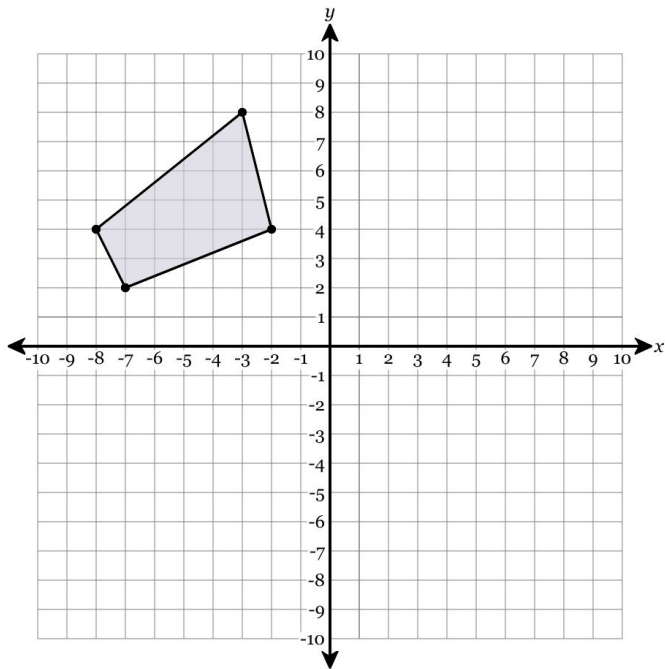
Write the coordinates of the corresponding points below.

Pre-Image		Image
$(-8, 4)$	$\rightarrow$	(____, ____)
$(-7, 2)$	$\rightarrow$	(____, ____)
$(-2, 4)$	$\rightarrow$	(____, ____)
$(-3, 8)$	$\rightarrow$	(____, ____)

19. Determine a series of transformations that would map Figure U onto Figure V.
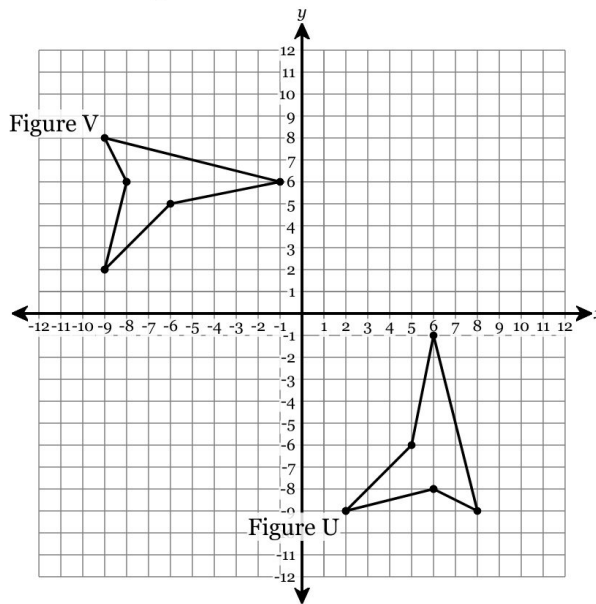
Transformation options: translation left/right/up/down ___ units, reflection over x- or y-axis, rotation $90°/180°$ clockwise/counterclockwise.

20. Determine a series of transformations that would map Figure X onto Figure Y.
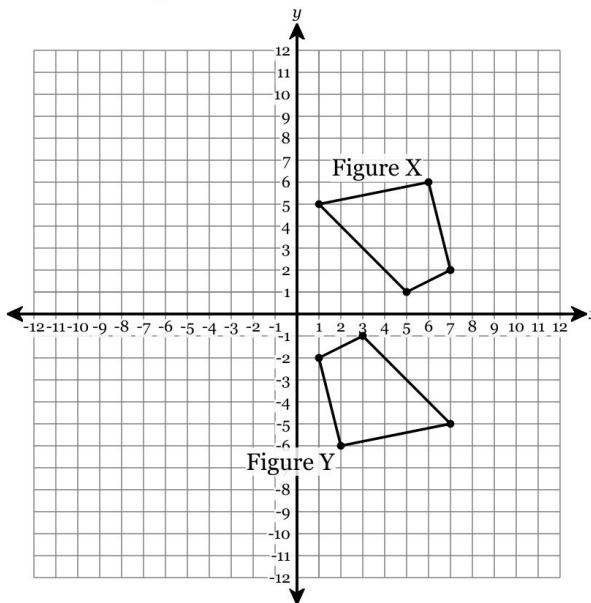
Transformation options: translation left/right/up/down ___ units, reflection over x- or y-axis, rotation $90°/180°$ clockwise/counterclockwise.

21. Determine a series of transformations that would map Figure L onto Figure M.
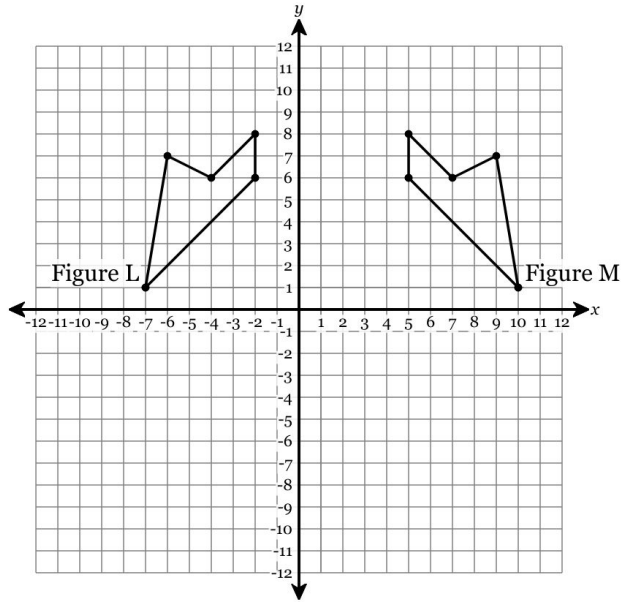
Transformation options: translation left/right/up/down ___ units, reflection over x- or y-axis, rotation $90°/180°$ clockwise/counterclockwise.

Exponents and Scientific Notation (~21 min)

1. Express in simplest radical form: $\sqrt{90}$

2. Express in simplest radical form: $\sqrt{20}$

3. Express in simplest radical form: $\sqrt{27}$

4. Solve for a. Express your answer in simplest radical form if necessary.
$$a = \left(\sqrt{54}\right)^2$$

5. Solve for m. Express your answer in simplest radical form if necessary.
$$-125 = m^3$$

6. Solve for d. Express your answer in simplest radical form if necessary.
$$d = \left(\sqrt[3]{-43}\right)^3$$

7. Solve for y. Express your answer as an integer or integers or in simplest radical form.
$$4 - 4y^3 = 4$$

8. Solve for m. Express your answer as an integer or integers or in simplest radical form.
$$38 = 8 + 5m^2$$

9. Solve for m. Express your answer as an integer or integers or in simplest radical form.
$$-6 - 5m^2 = -126$$

Exponents and Scientific Notation (~21 min)

10. Between which two consecutive whole numbers does $\sqrt{83}$ lie? Fill out the sentence below to justify your answer and plot $\sqrt{83}$ at an approximately correct location on the number line.

Since $\sqrt{\rule{2em}{0pt}}$ = ____ and $\sqrt{\rule{2em}{0pt}}$ = ____ it

is known that $\sqrt{83}$ is between ____ and ____.
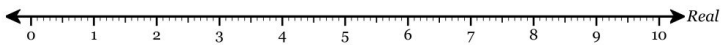
11. Between which two consecutive whole numbers does $\sqrt{31}$ lie? Fill out the sentence below to justify your answer and plot $\sqrt{31}$ at an approximately correct location on the number line.

Since $\sqrt{\rule{2em}{0pt}}$ = ____ and $\sqrt{\rule{2em}{0pt}}$ = ____ it

is known that $\sqrt{31}$ is between ____ and ____.
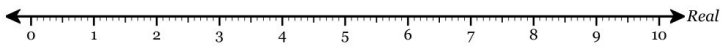
12. Between which two consecutive whole numbers does $\sqrt{82}$ lie? Fill out the sentence below to justify your answer and plot $\sqrt{82}$ at an approximately correct location on the number line.

Since $\sqrt{\rule{2em}{0pt}}$ = ____ and $\sqrt{\rule{2em}{0pt}}$ = ____ it

is known that $\sqrt{82}$ is between ____ and ____.
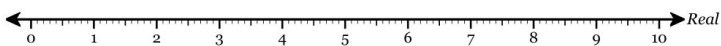
13. Approximate $\sqrt{26}$ by following the steps below.

$\sqrt{26}$ must lie between the whole numbers ____ and ____
(a) (b)

because $(\underline{})^2$ = _____ and $(\underline{})^2$ = _____, and 26
(a) (b)

lies between these values.

Plot $\sqrt{26}$ based on your estimate above:
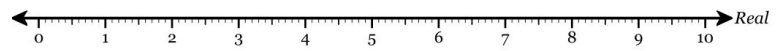
To one decimal place, $\sqrt{26}$ must lie between _____ and
(c)

____ because $(\underline{})^2$ = _____ and
(d) (c)

$(\underline{})^2$ = _____, and 26 lies between these values.
(d)

Plot $\sqrt{26}$ based on your estimate above:

To two decimal places, $\sqrt{26}$ must lie between _____ and
(e)

____ because $(\underline{})^2$ = _____ and
(f) (e)

$(\underline{})^2$ = _____, and 26 lies between these values.
(f)

Plot $\sqrt{26}$ based on your estimate above:

Exponents and Scientific Notation (~21 min)

14. Approximate $\sqrt{29}$ by following the steps below.

$\sqrt{29}$ must lie between the whole numbers ____ and ____

_(a) _(b)

because $(\_\_\_)^2 =$ _____ and $(\_\_\_)^2 =$ _____, and 29

_(a) _(b)

lies between these values.

Plot $\sqrt{29}$ based on your estimate above:

```
←————————————————————————→ Real
  0  1  2  3  4  5  6  7  8  9  10
```
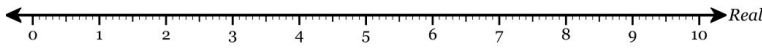
To one decimal place, $\sqrt{29}$ must lie between _____ and

_(c)

_____ because $(\_\_\_)^2 =$ _____ and

_(d) _(c)

$(\_\_\_)^2 =$ _____, and 29 lies between these values.

_(d)

Plot $\sqrt{29}$ based on your estimate above:

```
←————————————————————————→ Real
□                        □
(a)                      (b)
```
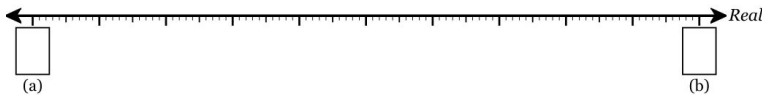
To two decimal places, $\sqrt{29}$ must lie between _____ and

_(e)

_____ because $(\_\_\_)^2 =$ _____ and

_(f) _(e)

$(\_\_\_)^2 =$ _____, and 29 lies between these values.

_(f)

Plot $\sqrt{29}$ based on your estimate above:

```
←————————————————————————→ Real
□                        □
(c)                      (d)
```

15. Approximate $\sqrt{14}$ by following the steps below.

$\sqrt{14}$ must lie between the whole numbers ____ and ____

_(a) _(b)

because $(\_\_\_)^2 =$ _____ and $(\_\_\_)^2 =$ _____, and 14

_(a) _(b)

lies between these values.

Plot $\sqrt{14}$ based on your estimate above:

```
←————————————————————————→ Real
  0  1  2  3  4  5  6  7  8  9  10
```

To one decimal place, $\sqrt{14}$ must lie between _____ and

_(c)

_____ because $(\_\_\_)^2 =$ _____ and

_(d) _(c)

$(\_\_\_)^2 =$ _____, and 14 lies between these values.

_(d)

Plot $\sqrt{14}$ based on your estimate above:

```
←————————————————————————→ Real
□                        □
(a)                      (b)
```

To two decimal places, $\sqrt{14}$ must lie between _____ and

_(e)

_____ because $(\_\_\_)^2 =$ _____ and

_(f) _(e)

$(\_\_\_)^2 =$ _____, and 14 lies between these values.

_(f)

Plot $\sqrt{14}$ based on your estimate above:

```
←————————————————————————→ Real
□                        □
(c)                      (d)
```

Exponents and Scientific Notation (~21 min)

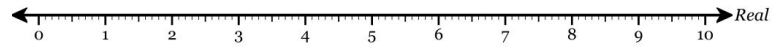**16.** Determine if $0.054227406110177...$ is rational or irrational and give a reason for your answer.

The number $0.054227406110177...$ is _____
_{word bank 1}

because

_____
_{word bank 2}

This word bank also applies to questions 17 - 18.

Word bank 1: **(a)** irrational, **(b)** rational

Word bank 2: **(a)** it is a decimal that repeats, **(b)** it is a decimal that does not repeat or terminate, **(c)** it is a decimal that terminates, **(d)** it is the square root of a perfect square, **(e)** it is the square root of a non-perfect square

17. Determine if $\sqrt{49}$ is rational or irrational and give a reason for your answer.

The number $\sqrt{49}$ is _____ because
_{word bank 1}

_____
_{word bank 2}

18. Determine if 0.875 is rational or irrational and give a reason for your answer.

The number 0.875 is _____ because
_{word bank 1}

_____
_{word bank 2}

19. Find the length of the third side. If necessary, round to the nearest tenth.
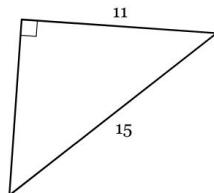
20. Find the length of the third side. If necessary, round to the nearest tenth.
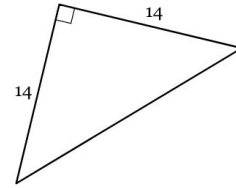
21. Find the length of the third side. If necessary, round to the nearest tenth.
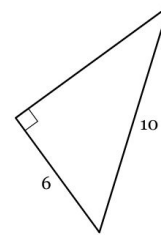
22. Solve for x *to the nearest tenth*.
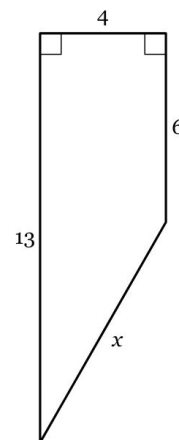
23. Solve for x. Leave your answer in simplest radical form.

25. $ABCD$ is a kite, so $\overline{AC} \perp \overline{DB}$ and $DE = EB$. Calculate the length of $\overline{AC}$, to the nearest tenth of a centimeter.
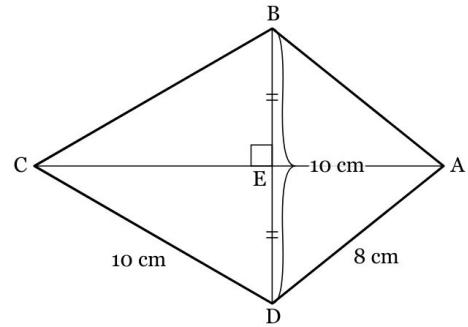
26. A straw is placed inside a rectangular box that is 3 inches by 5 inches by 6 inches, as shown. If the straw fits *exactly* into the box diagonally from the bottom left corner to the top right back corner, how long is the straw? Leave your answer in simplest radical form.

24. Find the value of x *to the nearest tenth*.
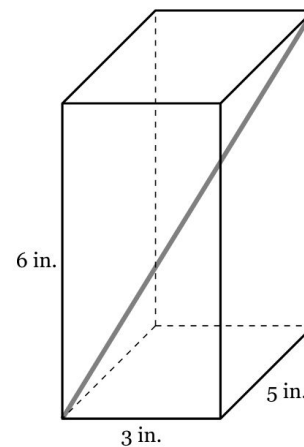
Exponents and Scientific Notation (~21 min)

27. A straw is placed inside a rectangular box that is 9 inches by 6 inches by 3 inches, as shown. If the straw fits *exactly* into the box diagonally from the bottom left corner to the top right back corner, how long is the straw? Leave your answer in simplest radical form.

3 in.

6 in.

9 in.
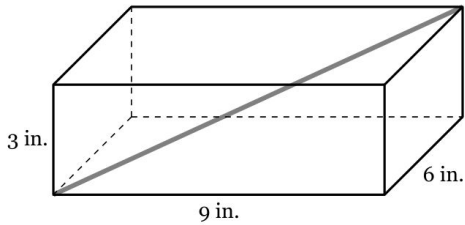
28. Graph a right triangle with the points $(2, 3)$ and $(-7, -9)$ forming the hypotenuse. Using the sides, find the distance between the two points in simplest radical form.
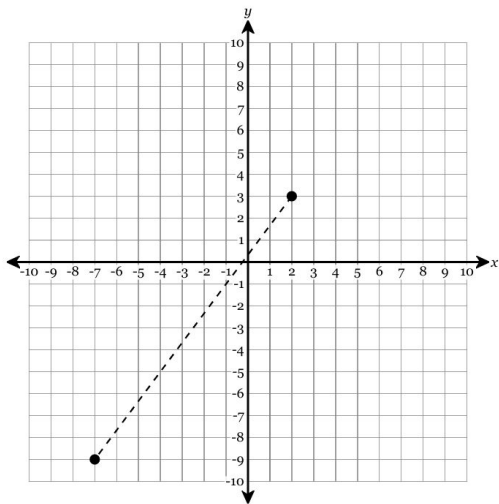
Leg 1: _____ Leg 2: _____ Hypotenuse: _____

29. Graph a right triangle with the points $(9, -5)$ and $(4, -2)$ forming the hypotenuse. Using the sides, find the distance between the two points in simplest radical form.
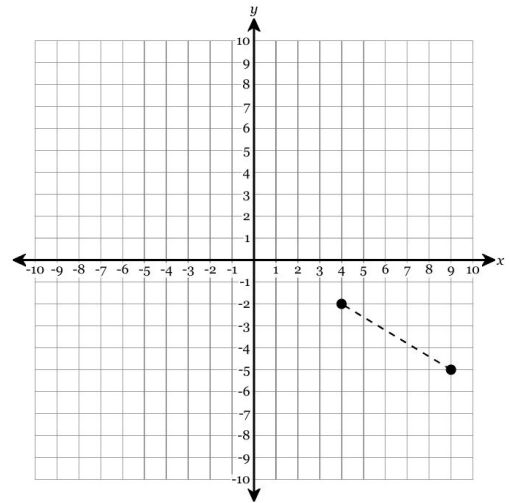
Leg 1: _____ Leg 2: _____ Hypotenuse: _____

30. Graph a right triangle with the points $(7, 5)$ and $(5, 7)$ forming the hypotenuse. Using the sides, find the distance between the two points in simplest radical form.

Leg 1: _____ Leg 2: _____ Hypotenuse: _____

6
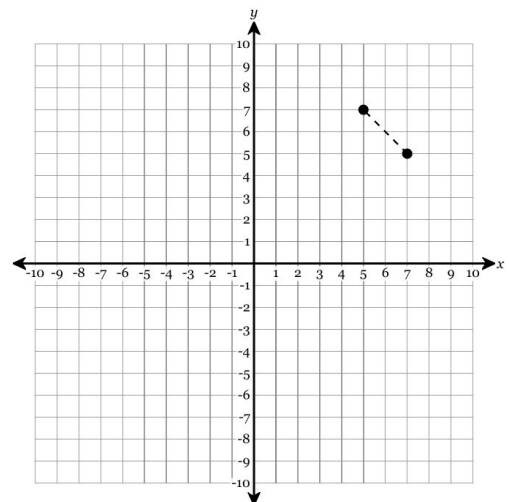
Parallel Lines and Triangles (~41 min)

1. Given $m \| n$, find the value of x.
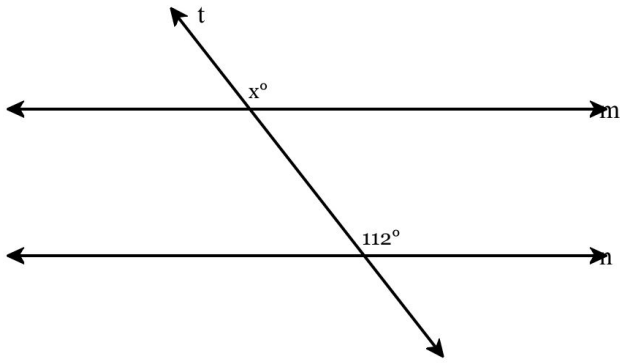
2. Given $m \| n$, find the value of x.
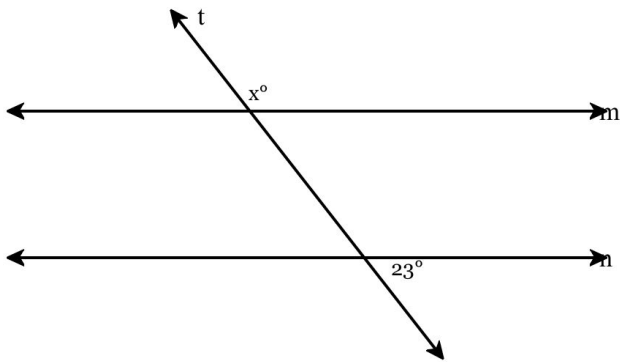
3. Given $m \| n$, find the value of x.
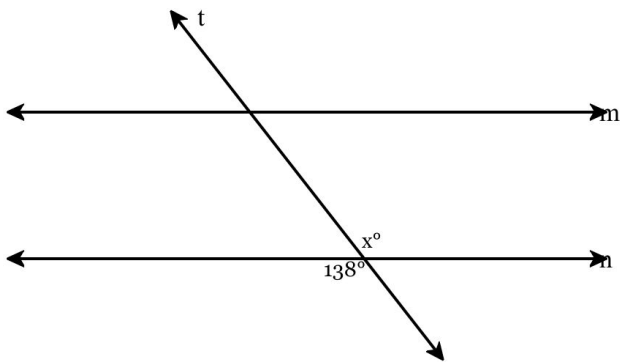
4. Given $l \| m \| n$, find the value of x.
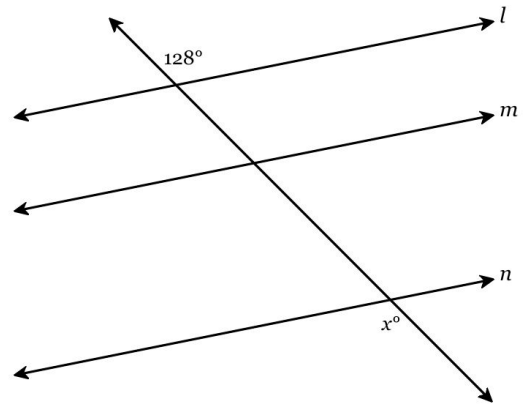
5. Given $m \| n$, find the value of x.
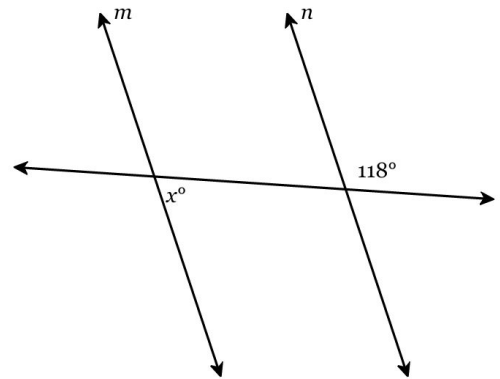
6. Given $m \| n$, find the value of x and y.
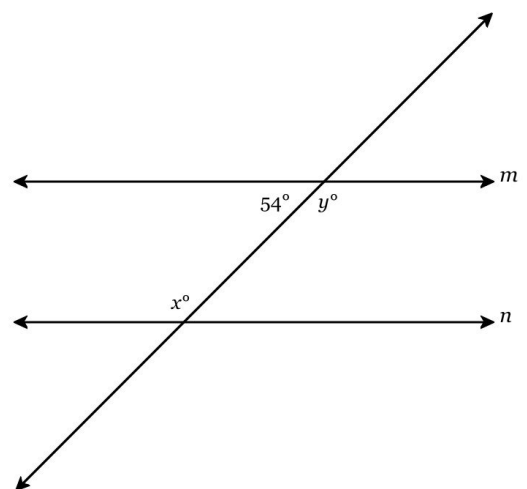
Parallel Lines and Triangles (~41 min)

7. Given $m \| n$, find the value of x.

t

$(6x+2)°$

m

$(x+17)°$

n

8. Given $m \| n$, find the value of x.

t

$(10x-2)°$

m

$(9x+5)°$

n

9. Given $m \| n$, find the value of x.

t

$(7x-30)°$

m

$(6x-10)°$

n
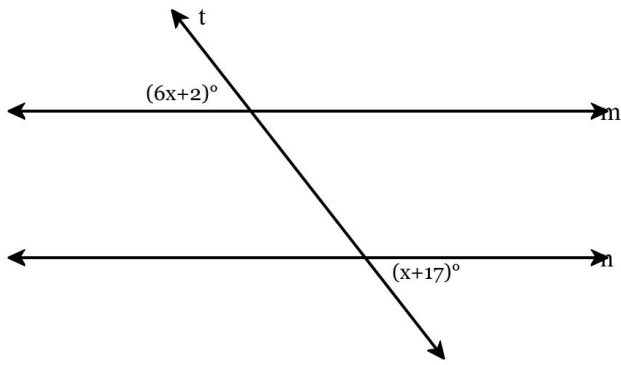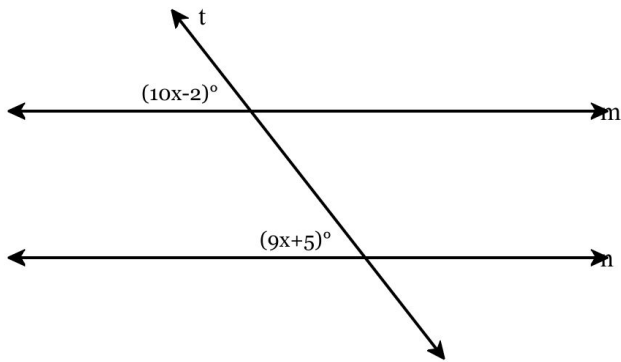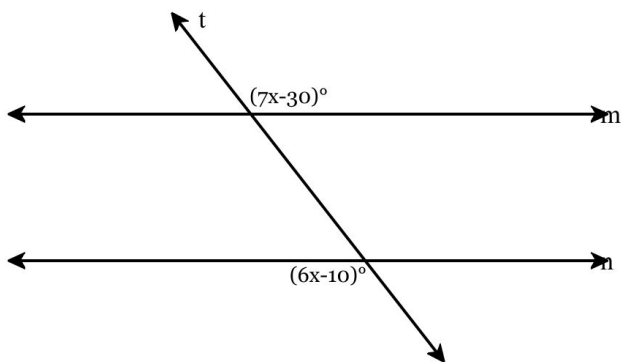
10. Given $m \| n$, find the value of x.

m

n

$(8x-9)°$

$(9x+2)°$
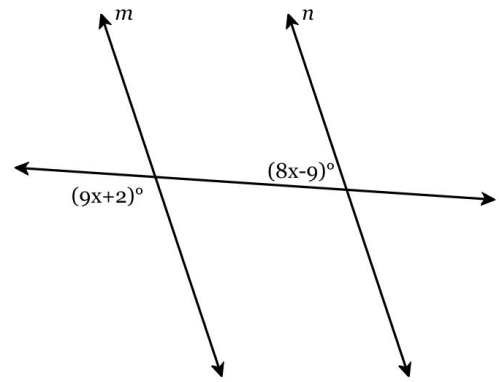
11. Given $m \| n$, find the value of x and y.

m

$(9x-6)°$

$(4y-3)°$ $(3x+6)°$

n
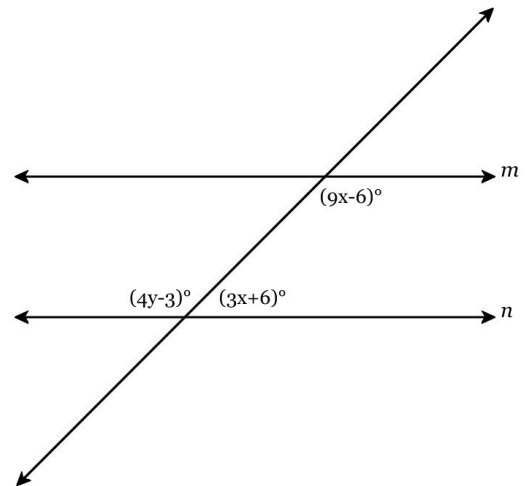
Parallel Lines and Triangles (~41 min)

12. Given $l \parallel m \parallel n$, find the value of x.

$(8x+3)^\circ$

$(6x+11)^\circ$
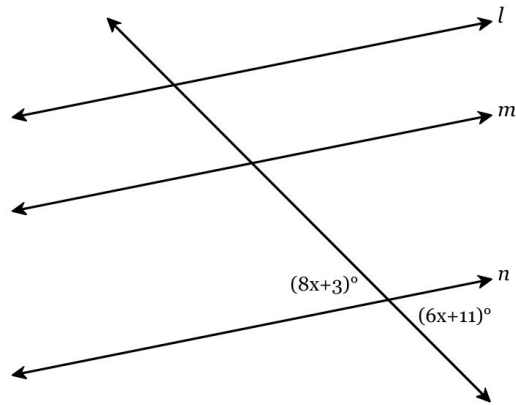
13. In the figure below, $\triangle MNO$ is drawn. The line $\overleftrightarrow{PMQ}$ is drawn such that $\overleftrightarrow{PMQ} \parallel \overline{NO}$.
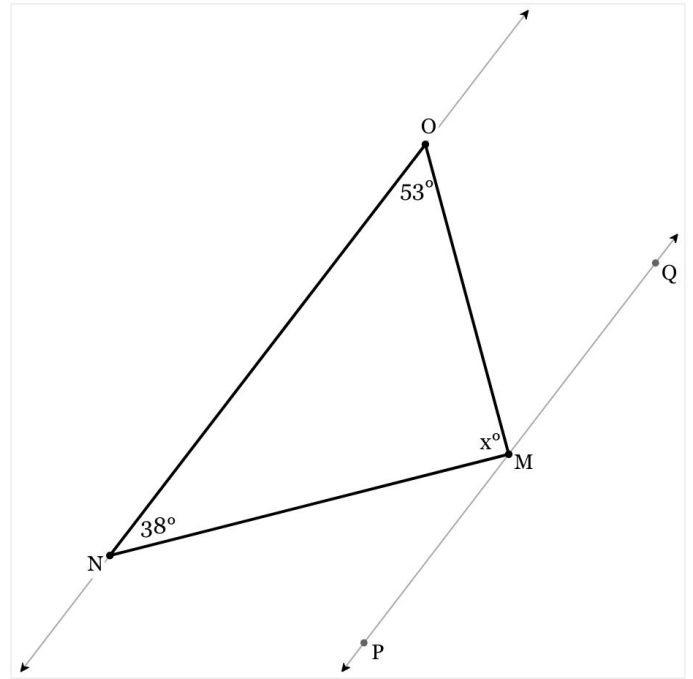
m∠NMP = _____° because ∠NMP and ∠MNO are

_____.

m∠OMQ = _____° because ∠OMQ and ∠NOM

are _____.

m∠NMP + x° + m∠OMQ = _____° because the three angles (form a straight line / are vertical angles / are all acute / are complementary / are all congruent).

So the value of x must be _____.

14. In the figure below, $\triangle ABC$ is drawn. The line $\overleftrightarrow{DAE}$ is drawn such that $\overleftrightarrow{DAE} \parallel \overline{BC}$.
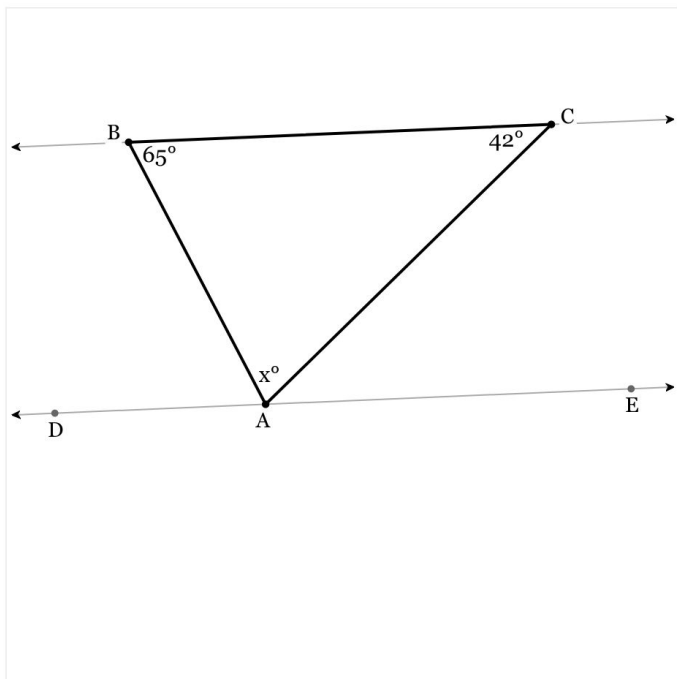
m∠BAD = _____° because ∠BAD and ∠ABC are

_____.

m∠CAE = _____° because ∠CAE and ∠BCA are

_____.

m∠BAD + $x°$ + m∠CAE = _____° because the three angles (are all acute / are vertical angles / form a straight line / are all congruent / are complementary).

So the value of x must be _____.

15. In the figure below, $\triangle JKL$ is drawn. The line $\overleftrightarrow{MJN}$ is drawn such that $\overleftrightarrow{MJN} \parallel \overline{KL}$.
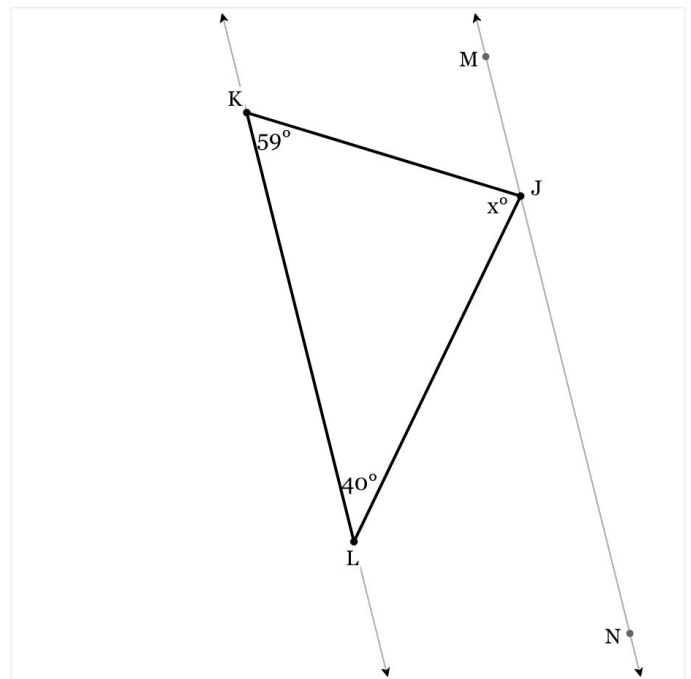
m∠KJM = _____° because ∠KJM and ∠JKL are

_____.

m∠LJN = _____° because ∠LJN and ∠KLJ are

_____.

m∠KJM + $x°$ + m∠LJN = _____° because the three angles (are complementary / are all congruent / are all acute / are vertical angles / form a straight line).

So the value of x must be _____.

Parallel Lines and Triangles (~41 min)

16. The measures of the angles of a triangle are shown in the figure below. Solve for x.

x°
34°
42°
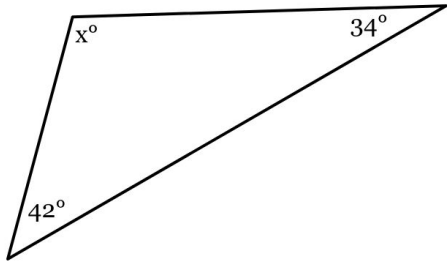
17. The measures of the angles of a triangle are shown in the figure below. Solve for x.

x°
54°
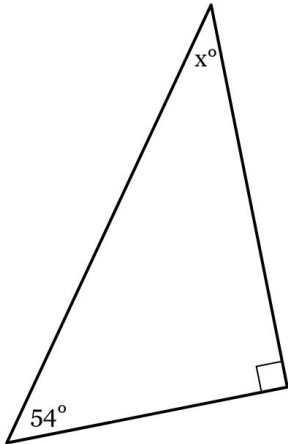
18. The measures of the angles of a triangle are shown in the figure below. Solve for x.

33°
98°
x°
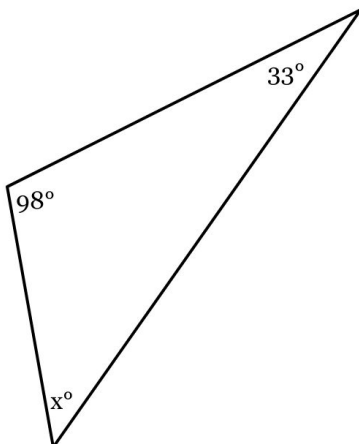
19. The measures of the angles of a triangle are shown in the figure below. Solve for x.

63°
74°
(9x-2)°
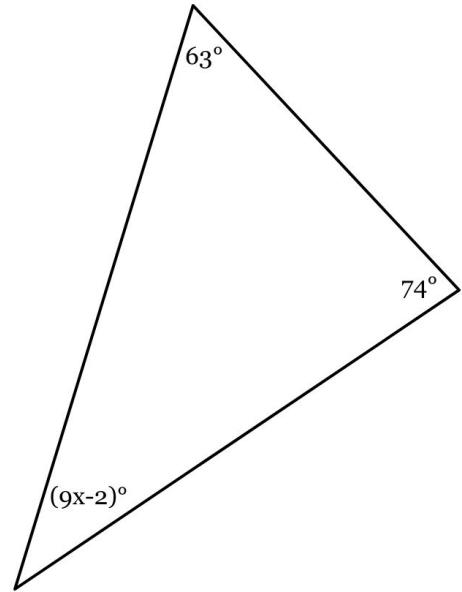
20. The measures of the angles of a triangle are shown in the figure below. Solve for x.

(3x+15)°
39°
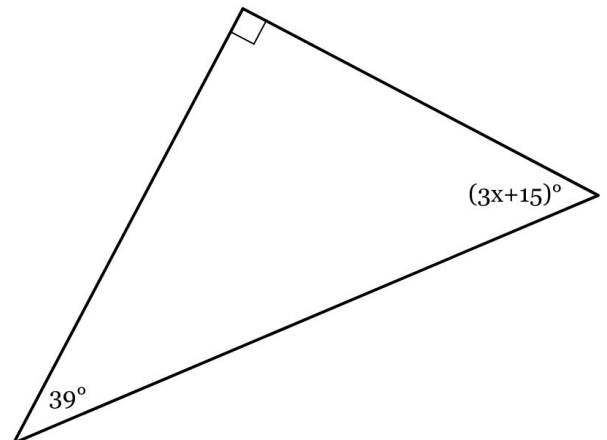
21. The measures of the angles of a triangle are shown in the figure below. Solve for x.

$(3x+8)°$

$(4x+11)°$

$84°$
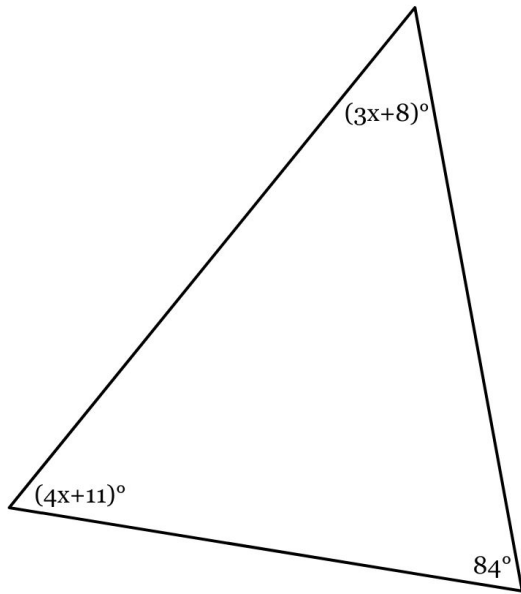
22. Which of the following sets of numbers could represent the three sides of a triangle?

A. $\{8, 11, 16\}$ B. $\{7, 12, 19\}$

C. $\{9, 21, 31\}$ D. $\{10, 22, 34\}$

23. Which of the following sets of numbers could represent the three sides of a triangle?

A. $\{5, 19, 21\}$ B. $\{12, 23, 36\}$

C. $\{4, 18, 24\}$ D. $\{6, 17, 25\}$

24. Which of the following sets of numbers could represent the three sides of a triangle?

A. $\{9, 20, 28\}$ B. $\{10, 17, 27\}$

C. $\{14, 20, 36\}$ D. $\{9, 11, 21\}$

Pre-Algebra (~37 min)

1. A triangle has side lengths of $(3a - 5)$ centimeters, $(7a - 9)$ centimeters, and $(b - 3)$ centimeters. Which expression represents the perimeter, in centimeters, of the triangle?

A. $-14 - 2b + 10a$ B. $-2b - 4a$

C. $-2 - 2b - 2a$ D. $b + 10a - 17$

2. Which expression is equivalent to $2m + m - 3$?

A. $2m - 2$ B. $-2m$

C. $3m - 3$ D. $0m$

3. Which expression is equivalent to $3a + a + 3a$?

A. $a + 6$ B. $7a$ C. $1 + 6a$ D. $5a$

4. The width of a rectangle measures $(9g - 4)$ centimeters, and its length measures $(3g - 4)$ centimeters. Which expression represents the perimeter, in centimeters, of the rectangle?

A. $12g - 8$ B. $24g - 16$

C. $-1 + 5g$ D. $10g - 2$

5. The width of a rectangle measures $(3b + 3c)$ centimeters, and its length measures $(6b + 10c)$ centimeters. Which expression represents the perimeter, in centimeters, of the rectangle?

A. $13 + 9b$ B. $26c + 18b$

C. $3 + 20c + 18b$ D. $26 + 18b$

6. Which expression is equivalent to $0.18h + 0.14 + h$?

A. $0.18h + 1.14$ B. $1.32h$

C. $1.18h + 0.14$ D. $0.96h$

7. The width of a rectangle measures $(9.3q + 3.6)$ centimeters, and its length measures $(4.4q - 3.3)$ centimeters. Which expression represents the perimeter, in centimeters, of the rectangle?

A. $25.8q + 2.2$ B. $1.1 + 12.9q$

C. $0.6 + 27.4q$ D. $13.7q + 0.3$

Pre-Algebra (~37 min)

8. A triangle has side lengths of $(1.7t - 4.9)$ centimeters, $(8.4t + 7.4)$ centimeters, and $(4.5u + 3.2)$ centimeters. Which expression represents the perimeter, in centimeters, of the triangle?

A. $-3.2t + 15.8 + 7.7u$

B. $7.7u + 2.5 + 10.1t$

C. $10.1t + 4.5u + 5.7$

D. $12.6t + 7.7u$

9. Which expression is equivalent to $k + 0.15k + 0.7k$?

A. $k + 0.85$ B. $-0.15k$

C. $1 + 0.85k$ D. $1.85k$

10. Which expression is equivalent to $1.5t - 2.1 + 9.4t - 6.4$?

A. $-8.5 + 10.9t$ B. $-7.9t + 4.3$

C. $-7.9t - 8.5$ D. $-0.6t + 3$

11. Write an equivalent expression by distributing the "$-$" sign outside the parentheses:
$$-(-4.5t + 6)$$

12. Write an equivalent expression by distributing the "$-$" sign outside the parentheses:
$$-(-0.4h - 3k - 7)$$

13. Write an equivalent expression by distributing the "$-$" sign outside the parentheses:
$$-(-9.1d + 6f) - 4.9$$

14. Write an equivalent expression by distributing the "$-$" sign outside the parentheses:
$$-k - (-9.3m + 0.3)$$

15. Write an equivalent expression by distributing the "$-$" sign outside the parentheses:
$$-(10m + 7.1n + 8.6)$$

16. Rewrite in simplest terms:
$$-7(-6w + 8w - 7) - 7w$$

17. Rewrite in simplest terms: $-5w - 9(6w + 3)$

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Pre-Algebra (~37 min)

18. Rewrite in simplest terms:

$2(10u + 5) - 9(-2u - 3)$

19. Rewrite in simplest terms:

$-10(-5y + 3z) + z - 7(-5z + 5y)$

20. Rewrite in simplest terms: $-8(6y - 4) + 4y$

21. Use the distributive property to write an equivalent expression.

$$4(2x + 5y - 10)$$

22. Use the distributive property to write an equivalent expression.

$$7(s - 6t + 10)$$

23. Use the distributive property to write an equivalent expression.

$$5(v + 10)$$

24. What is the value of the expression $5y - 6z$ when $y = 5$ and $z = 2$?

25. What is the value of the expression $3y^2 - 2y - 7$ when $y = 4$?

26. What is the value of the expression $z^2 + 3z - 10$ when $z = 4$?

27. What is the value of the expression $3w + 7$ when $w = 7$?

28. What is the value of the expression $2x^2 - 4x - 4$ when $x = 7$?

Exponents and Scientific Notation (~21 min)

1. Simplify to a single power of 3:

$$3^6 \cdot 3^5$$

2. Simplify to a single power of 3:

$$\left(3^6\right)^2$$

3. Simplify to a single power of 4:

$$\frac{4^8}{4^5}$$

4. Which expression is equivalent to $\left(3^4\right)^{-4}$?

A. 3^{-8} B. 3^{-20} C. 3^{-12} D. 3^{-16}

5. Which expression is equivalent to $\frac{6^{-4}}{6^{-1}}$?

A. 6^5 B. 6^{-4} C. 6^{-3} D. 6^4

6. Which expression is equivalent to $6^{-1} \times 6^{-1}$?

A. 6 B. 36 C. $\frac{1}{36}$ D. 1

7. Which expression is equivalent to $4^4 \times \left(4^{-2}\right)^4$?

A. 4^{-32} B. 4^{-3} C. 4^{-4} D. 4^{-2}

8. Which expression is equivalent to $\frac{4^2}{4^3} \cdot 4^0$?

A. 4 B. 16 C. $\frac{1}{4}$ D. $\frac{1}{16}$

9. Which expression is equivalent to $\left(\frac{5^{-2}}{5^{-1}}\right)^{-4}$?

A. 5^{-12} B. 5^{-8} C. 5^4 D. 5^{-5}

10. Write the number 6.5×10^{-2} in standard form.

11. Write the number 7.6×10^5 in standard form.

12. Write the number 9.6×10^4 in standard form.

13. Write the number 89,000 in scientific notation.

Exponents and Scientific Notation (~21 min)

14. Write the number 0.00002 in scientific notation.

15. Write the number 0.066 in scientific notation.

16. What is the quotient of 1.232×10^8 and 3.85×10^5 expressed in scientific notation?

17. What is the product of 8300 and 7.7×10^2 expressed in scientific notation?

18. What is the quotient of 5.348×10^7 and 9.55×10^4 expressed in scientific notation?

19. Evaluate. Express your answer in scientific notation.
$$4.42 \times 10^6 - 6.87 \times 10^5$$

20. Evaluate. Express your answer in scientific notation.
$$7.3 \times 10^6 + 2.2 \times 10^4$$

21. Evaluate. Express your answer in scientific notation.
$$43,000,000 - 6.9 \times 10^6$$

Solving Equations (~46 min)

1. Solve for y.

$$48 = 45 - \frac{y}{6}$$

2. Solve for a.

$$-23 = -4a + 1$$

3. Solve for x.

$$-43 = \frac{x}{5} - 47$$

4. Solve for b.

$$1.7b + 0.3 = 6.76$$

5. Solve for x.

$$\frac{x}{2.2} + 2.8 = 1.8$$

6. Solve for x.

$$-0.4 + \frac{x}{0.1} = -15.4$$

7. Solve for z.

$$53 = -\frac{4}{7}z + 17$$

8. Solve for c.

$$\frac{7}{10}c + 5 = 54$$

Solving Equations (~46 min)

9. Solve for z.

$$\frac{1}{3}z + 23 = 32$$

10. Solve for x. Express your answer as a proper or improper fraction in simplest terms.

$$\frac{7}{8} = -\frac{3}{4}x + \frac{1}{2}$$

11. Solve for y. Express your answer as a proper or improper fraction in simplest terms.

$$-\frac{5}{8} = \frac{5}{6}y - \frac{1}{4}$$

12. Solve for c. Express your answer as a proper or improper fraction in simplest terms.

$$\frac{2}{3} = \frac{2}{5}c + \frac{2}{3}$$

13. Solve. $3(2x - 1) = 3$

14. Solve. $6(z + 2) = 48$

15. Solve. $10(y - 5) = 30$

Solving Equations (~46 min)

16. Solve for x.

$$4(-4x - 1) + x + 3 = 44$$

17. Solve for x.

$$2(x + 5) + 3x + 5 = 35$$

18. Solve for x.

$$2(-4x + 2) + 5x - 2 = -19$$

19. What value of z makes the equation below true?

$$8z + 6 = 14$$

A. 1   B. 6   C. 9   D. 13

20. Which equation has the solution $x = 2$?

A. $3x + 7 = 13$ B. $4x - 7 = 37$

C. $3x - 2 = -4$ D. $4x - 1 = 33$

21. What value of z makes the equation below true?

$$8z - 6 = 26$$

A. 4   B. 6   C. 16   D. 17

22. Which value of x satisfies the equation $\frac{3}{2}\left(x - \frac{5}{4}\right) = -\frac{39}{8}$?

A. -1 B. 1 C. 2 D. -2

23. Which value of x satisfies the equation $\frac{1}{5}\left(x - \frac{3}{2}\right) = -\frac{7}{10}$?

A. -3 B. 2 C. 3 D. -2

Solving Equations (~46 min)

24. Which value of x satisfies the equation $\frac{3}{2}\left(x - \frac{2}{3}\right) = 11$?

A. 7   B. -8 C. 8   D. -7

25. Solve for x in simplest form.

$$9 = \frac{8}{5}(x + 5)$$

26. Solve for x in simplest form.

$$12 = \frac{2}{5}(9x + 25)$$

27. Solve for x in simplest form.

$$3 = \frac{7}{2}(3x - 4)$$
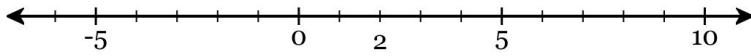
28. Solve for x:

$$-6x - 3 = -3x - 27$$

29. Solve for x:

$$-9x + 3 = -4x + 18$$

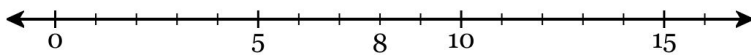**30.** Solve for x:

$$-x + 9 = -6x + 24$$

Inequalities (~40 min)

1. Select the values that make the inequality $k > 2$ true. (Numbers written in order from least to greatest going across.)
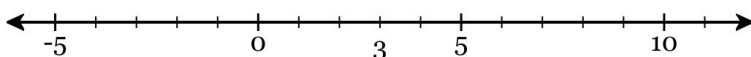

- [ ] -6
- [ ] -3
- [ ] -1
- [ ] 1
- [ ] 1.9
- [ ] 1.99
- [ ] 1.999
- [ ] 2
- [ ] 2.001
- [ ] 2.01
- [ ] 2.1
- [ ] 3
- [ ] 5
- [ ] 7
- [ ] 10

2. Select the values that make the inequality $n < 8$ true. (Numbers written in order from least to greatest going across.)

- [ ] 0
- [ ] 3
- [ ] 5
- [ ] 7
- [ ] 7.9
- [ ] 7.99
- [ ] 7.999
- [ ] 8
- [ ] 8.001
- [ ] 8.01
- [ ] 8.1
- [ ] 9
- [ ] 11
- [ ] 13
- [ ] 16

3. Select the values that make the inequality $b \geq 3$ true. (Numbers written in order from least to greatest going across.)

- [ ] -5
- [ ] -2
- [ ] 0
- [ ] 2
- [ ] 2.9
- [ ] 2.99
- [ ] 2.999
- [ ] 3
- [ ] 3.001
- [ ] 3.01
- [ ] 3.1
- [ ] 4
- [ ] 6
- [ ] 8
- [ ] 11

4. Select the values that make the inequality $-p < 8$ true. Then write an equivalent inequality, in terms of p. (Numbers written in order from least to greatest going across.)
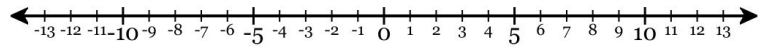
- [ ] -13
- [ ] -9
- [ ] -8.1
- [ ] -8
- [ ] -7.9
- [ ] -7
- [ ] -3
- [ ] 0
- [ ] 3
- [ ] 7
- [ ] 7.9
- [ ] 8
- [ ] 8.1
- [ ] 9
- [ ] 13

5. Select the values that make the inequality $-b \geq 6$ true. Then write an equivalent inequality, in terms of b. (Numbers written in order from least to greatest going across.)
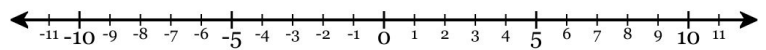
- [ ] -11
- [ ] -7
- [ ] -6.1
- [ ] -6
- [ ] -5.9
- [ ] -5
- [ ] -1
- [ ] 0
- [ ] 1
- [ ] 5
- [ ] 5.9
- [ ] 6
- [ ] 6.1
- [ ] 7
- [ ] 11

Inequalities (~40 min)

6. Select the values that make the inequality $-g \leq -6$ true. Then write an equivalent inequality, in terms of g. (Numbers written in order from least to greatest going across.)
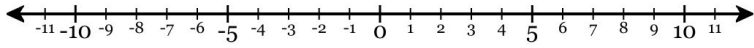
- ☐ -11
- ☐ -7
- ☐ -6.1
- ☐ -6
- ☐ -5.9
- ☐ -5
- ☐ -1
- ☐ 0
- ☐ 1
- ☐ 5
- ☐ 5.9
- ☐ 6
- ☐ 6.1
- ☐ 7
- ☐ 11

7. Select the values that make the inequality $\dfrac{w}{4} < 8$ true. Then write an equivalent inequality, in terms of w. (Numbers written in order from least to greatest going across.)

- ☐ 24
- ☐ 28
- ☐ 29
- ☐ 31
- ☐ 32
- ☐ 33
- ☐ 35
- ☐ 36
- ☐ 40

8. Select the values that make the inequality $\dfrac{z}{-4} > 7$ true. Then write an equivalent inequality, in terms of z. (Numbers written in order from least to greatest going across.)

- ☐ -36
- ☐ -32
- ☐ -31
- ☐ -29
- ☐ -28
- ☐ -27
- ☐ -25
- ☐ -24
- ☐ -20

9. Select the values that make the inequality $-5m > -75$ true. Then write an equivalent inequality, in terms of m. (Numbers written in order from least to greatest going across.)

- ☐ 5
- ☐ 10
- ☐ 12
- ☐ 14
- ☐ 15
- ☐ 16
- ☐ 18
- ☐ 20
- ☐ 25

10. Solve for x and graph the solution on the number line below.

$$-1 \leq -1 + x$$

2
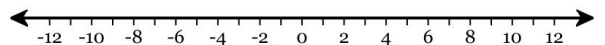
Inequalities (~40 min)

11. Solve for x and graph the solution on the number line below.

$$3 > x - 2$$

-12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12
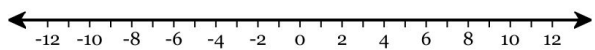
12. Solve for x and graph the solution on the number line below.

$$1 \geq \frac{x}{4}$$

-12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12
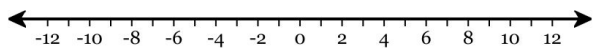
13. Solve the inequality and graph the solution on the line provided.

$$2x - 19 \geq -23$$

-12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12
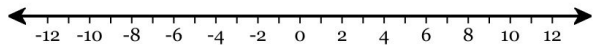
14. Solve the inequality and graph the solution on the line provided.

$$4x - 5 \geq -17$$

-12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12
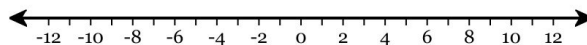
15. Solve the inequality and graph the solution on the line provided.

$$4x + 17 \leq 37$$

-12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12
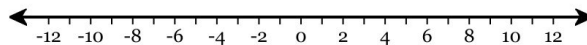
Inequalities (~40 min)

16. Which of the following values are solutions to the inequality $2x - 8 < 2$?

I. 3   II. 6   III. 5

A. None   B. I only

C. II only   D. III only

E. I and II   F. I and III

G. II and III   H. I, II and III

18. Which of the following values are solutions to the inequality $10 + 4x \geq -6$?

I. -1 II. -4 III. 2

A. None   B. I only

C. II only   D. III only

E. I and II   F. I and III

G. II and III   H. I, II and III

17. Which of the following values are solutions to the inequality $6 < 4x + 9$?

I. 2   II. 6   III. -2

A. None   B. I only

C. II only   D. III only

E. I and II   F. I and III

G. II and III   H. I, II and III

Linear Relationships/Functions (~76 min)

1. Ruby left her house and drove to the store. She stopped and went inside. From there, she drove in the same direction until she got to the bank. She stopped and went inside the bank. Then she drove home. The graph below shows the number of blocks away from home Ruby is x minutes after she left her house, until she got back home.

Time Elapsed (Minutes)
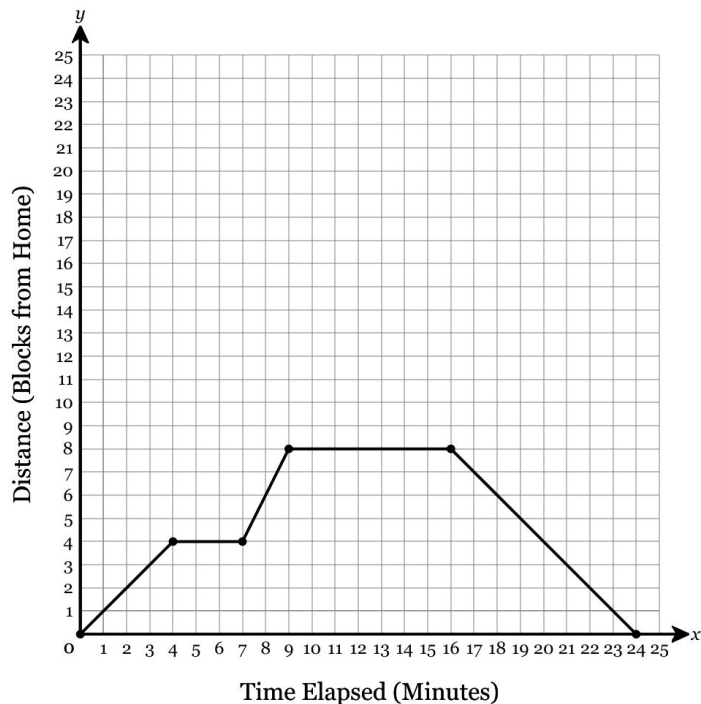
How far away from her house was Ruby after 13 minutes?

2. During a snowstorm, snow fell at a constant rate for a number of hours. Then it stopped snowing for a number of hours. Then it started up again at a different constant rate. Chloe made a graph showing the inches of snow on the ground over time using the data that she collected.

Time Since Storm Began (Hours)
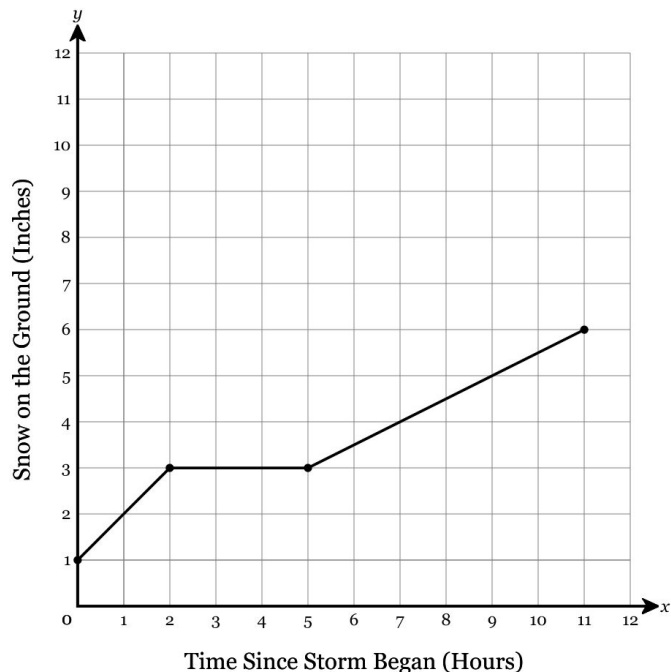
How much snow was on the ground when it stopped snowing the first time?

Linear Relationships/Functions (~76 min)

3. One spring day, Christopher noted the time of day and the temperature, in degrees Fahrenheit. During that time, the temperature rose, stayed steady, and fell, at different rates. On the set of axes below, Christopher created a graph of temperature over time.
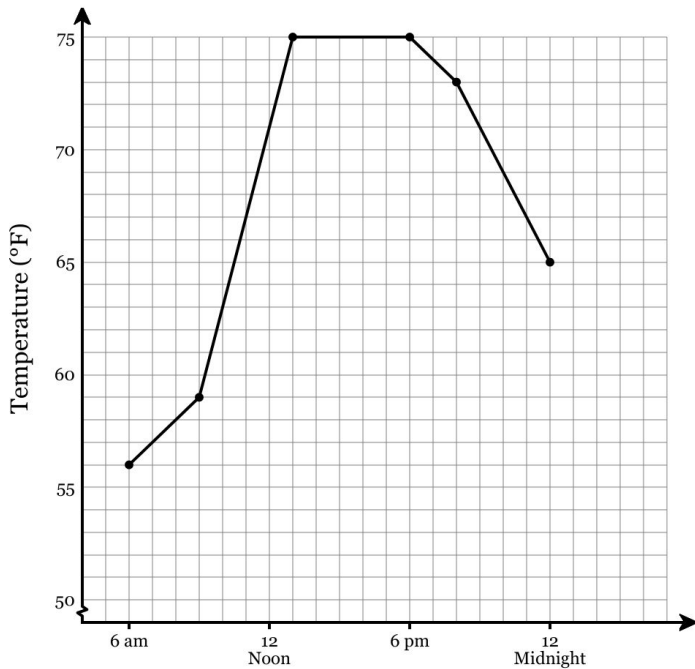
How hot was it when the temperature held steady?

4. Assuming a linear relationship, find the missing value in the table below.

x	1	2	3	4	5
y	9	15	21	27	

5. Assuming a linear relationship, find the missing value in the table below.

x	1	2	3	4	5
y	14	20	26	32	

6. Assuming a linear relationship, find the missing value in the table below.

x	1	2	3	4	5
y	10	18	26	34	

7. Which table of values represents a linear function?

A

x	y
2	2
5	4
7	6
9	8

B

x	y
-3	-8
-2	-5
0	1
1	4

C

x	y
-1	9
1	6
3	4
5	2

D

x	y
-6	5
-4	1
-1	-3
2	-7

Linear Relationships/Functions (~76 min)

8. Which set of ordered pairs (x, y) could represent a linear function?

$$A = \{(-2, 6),\ (1, 1),\ (4, -4),\ (7, -9)\}$$
$$B = \{(-3, 5),\ (-1, 3),\ (1, 1),\ (4, -1)\}$$
$$C = \{(-1, -3),\ (0, 0),\ (1, 4),\ (2, 8)\}$$
$$D = \{(-9, -3),\ (-3, 0),\ (3, 2),\ (9, 5)\}$$

9. Which set of ordered pairs (x, y) could represent a linear function?

$$A = \{(0, -7),\ (2, -4),\ (4, -2),\ (6, 0)\}$$
$$B = \{(0, 2),\ (3, 1),\ (6, 0),\ (9, -1)\}$$
$$C = \{(2, -6),\ (4, -1),\ (5, 4),\ (6, 9)\}$$
$$D = \{(-2, 8),\ (-1, 5),\ (0, 3),\ (1, 1)\}$$

10. The graph of a function is shown below. What is true about the function between $x = 4$ and $x = 9$?
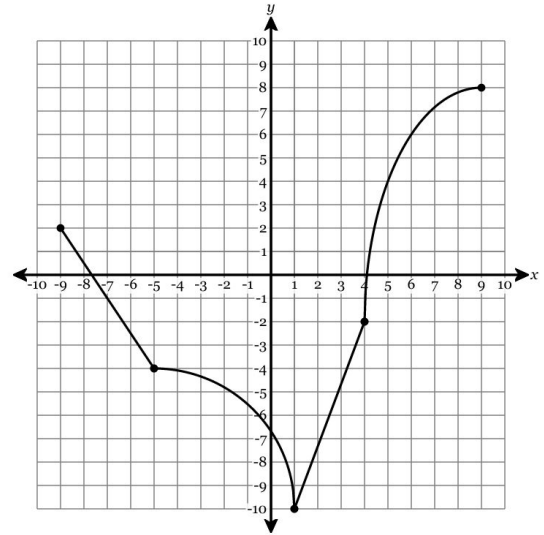
A. it is increasing and linear

B. it is decreasing and linear

C. it is increasing and non-linear

D. it is decreasing and non-linear

Linear Relationships/Functions (~76 min)

11. The graph of a function is shown below. On which interval is the function increasing and linear?
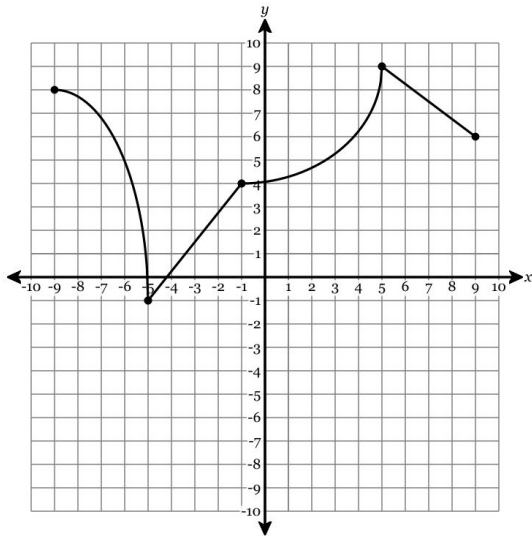
A. between $x = -9$ and $x = -5$

B. between $x = -5$ and $x = -1$

C. between $x = -1$ and $x = 5$

D. between $x = 5$ and $x = 9$

12. The graph of a function is shown below. What is true about the function between $x = -5$ and $x = -1$?
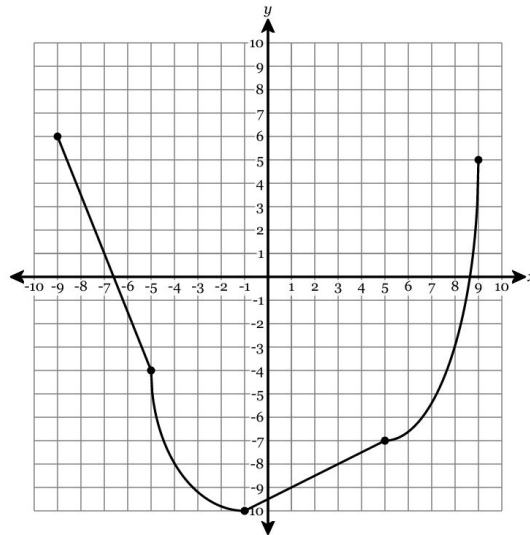
A. it is increasing and linear

B. it is decreasing and linear

C. it is increasing and non-linear

D. it is decreasing and non-linear

13. Find the equation of the linear function represented by the table below in slope-intercept form.

x	0	1	2	3	4
y	8	12	16	20	24

Linear Relationships/Functions (~76 min)

14. Find the equation of the linear function represented by the table below in slope-intercept form.

x	0	1	2	3	4
y	6	14	22	30	38

15. Find the equation of the linear function represented by the table below in slope-intercept form.

x	0	1	2	3	4
y	5	8	11	14	17

16. Find the equation of the linear function represented by the table below in slope-intercept form.

x	y
1	2
2	3
3	4
4	5

17. Find the equation of the linear function represented by the table below in slope-intercept form.

x	y
1	3
2	7
3	11
4	15

18. Find the equation of the linear function represented by the table below in slope-intercept form.

x	y
1	5
2	9
3	13
4	17

19. What is the rate of change of the function $y = \frac{5}{2}x + 3$?

Linear Relationships/Functions (~76 min)

20. The graph of a function is shown on the coordinate plane below. Identify the rate of change of the function.
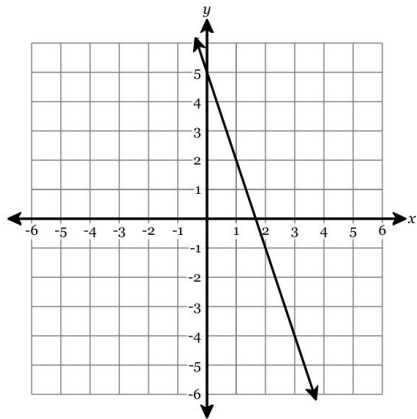
21. The table below represents a linear function. Identify the rate of change of the function.

x	-4	-2	0	2
y	-7	-4	-1	2

22. Which of the relationships below represents a function with a lesser slope than the function $y = 3x - 5$?

A

B
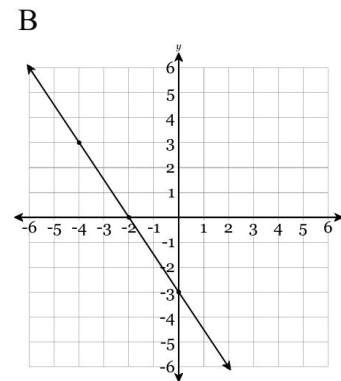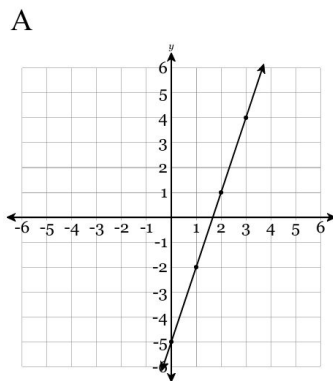
C

x	y
-5	-23
-3	-15
-1	-7
1	1

D

x	y
1	9
4	24
7	39
10	54

Linear Relationships/Functions (~76 min)

23. The graph of a function is shown on the coordinate plane below. Which relationship represents a function with the same rate of change as the function graphed?
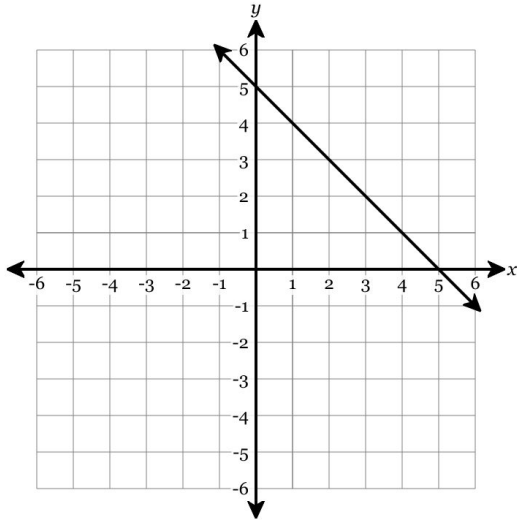
A

x	y
4	0
8	−3
12	−6
16	−9

B

x	y
−4	−3
−2	0
0	3
2	6

C

$$y = -x - 2$$

D

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

24. The table below represents a linear function. Which relationship represents a function with a greater rate of change than the function represented by the table?

x	y
0	1
2	4
4	7
6	10

A

$$y = \frac{5}{4}x - 4$$

B

C

D
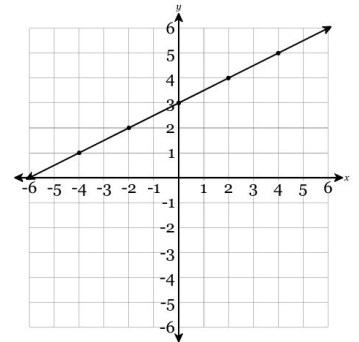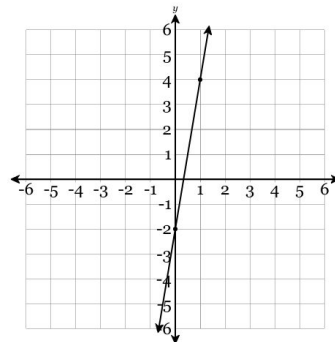
$$y = \frac{3}{2}x + 2$$

25. Bo's cab company charges a one-time pickup fee for every ride, as well as a charge for each mile traveled. The graph below represents what Bo's company charges. Find the rate of change.

Bo's Taxicab Company

(10,$22)

(0,$5)

Total Charges (Dollars)
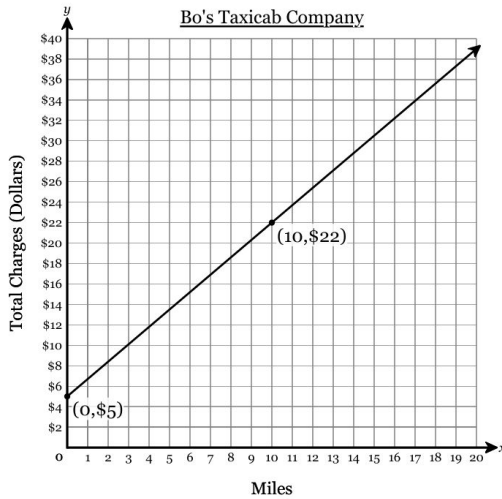
Miles

26. The satellite Space Explorer flies 35200 miles in 11 hours. Find the rate of change.

27. A health club charges a one-time sign-up fee and a monthly membership fee. The equation $y = 24x + 40$ represents what the health club charges. Find the rate of change.

28. Two friends, Mason and Serenity, took summer jobs. Mason earned $713.60 in 32 hours. The graph below represents Serenity's earnings in dollars and cents, y, for working x hours. Complete the sentence below.

Serenity's Earnings

(20,$428)

(10,$214)

Earnings (Dollars)

Hours Worked
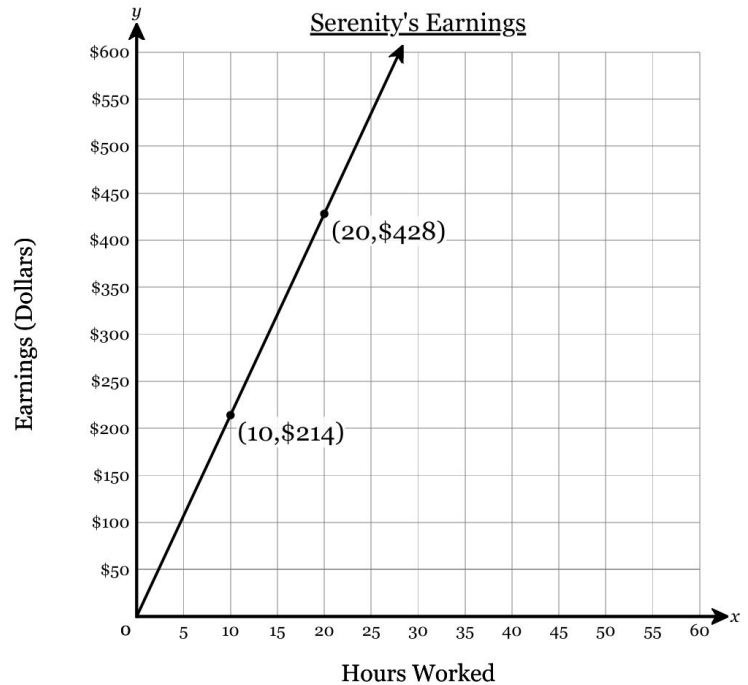
Mason earns $_____ per hour (more / less) than Serenity.

Linear Relationships/Functions (~76 min)

29. Two health clubs offer different pricing plans for their members. Both health clubs charge a one-time sign-up fee and a monthly membership fee. Health Club A charges a $15 sign-up fee and $35 per month. The table below represents what Health Club B charges. Complete the sentence below.

Health Club B

Months (x)	Total Cost (y)
10	415
12	489
14	563
16	637

Health Club B costs $_____ (more / less) in monthly membership fees than Health Club A.

30. Scientists are preparing two satellites to be launched. The equation $y = 2200x$ represents the number of miles, y, that the satellite, Space Explorer A, flies in x hours. The satellite, Space Explorer B, flies 72000 miles in 8 hours. Complete the sentence below.

Space Explorer A travels _____ miles per hour (faster / slower) than Space Explorer B.

31. Which set of ordered pairs does *not* represent a function?

A. $\{(0, 9), (0, -9), (7, 1), (4, 6)\}$

B. $\{(-2, 6), (-9, -9), (4, -1), (-8, -1)\}$

C. $\{(7, 7), (5, 9), (2, 9), (-2, -2)\}$

D. $\{(9, -9), (-9, -2), (-3, 8), (8, -2)\}$

32. Which set of ordered pairs represents a function?

A. $\{(-9, -3), (-4, 7), (-9, -7), (2, 4)\}$

B. $\{(-4, 1), (2, 2), (-8, -7), (-8, -3)\}$

C. $\{(0, -9), (-6, 5), (-1, 5), (4, 0)\}$

D. $\{(-5, 5), (3, -4), (-9, 9), (-9, 3)\}$

33. Which set of ordered pairs represents a function?

A. $\{(7, 7), (7, -3), (-5, -1), (3, 6)\}$

B. $\{(1, -1), (-3, 5), (-2, 5), (-5, -2)\}$

C. $\{(-8, 9), (-8, -7), (0, -2), (-9, -8)\}$

D. $\{(4, -3), (-4, -3), (-4, 0), (3, -7)\}$

34. Determine whether the following graph represents a function.
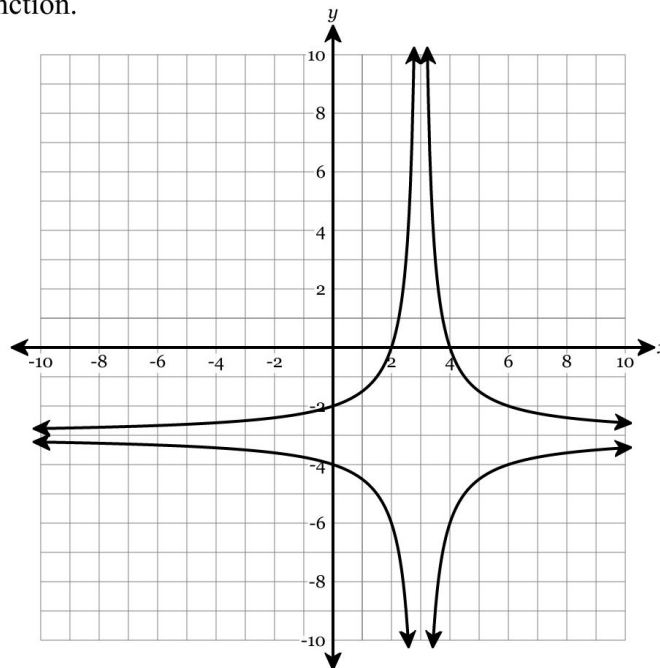
A. Function   B. Not a Function

35. Determine whether the following graph represents a function.
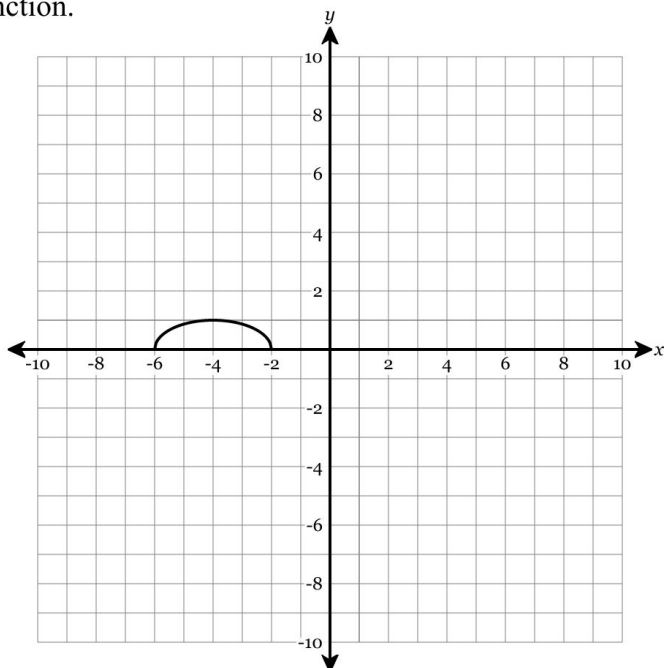
A. Function   B. Not a Function

36. Determine whether the following graph represents a function.
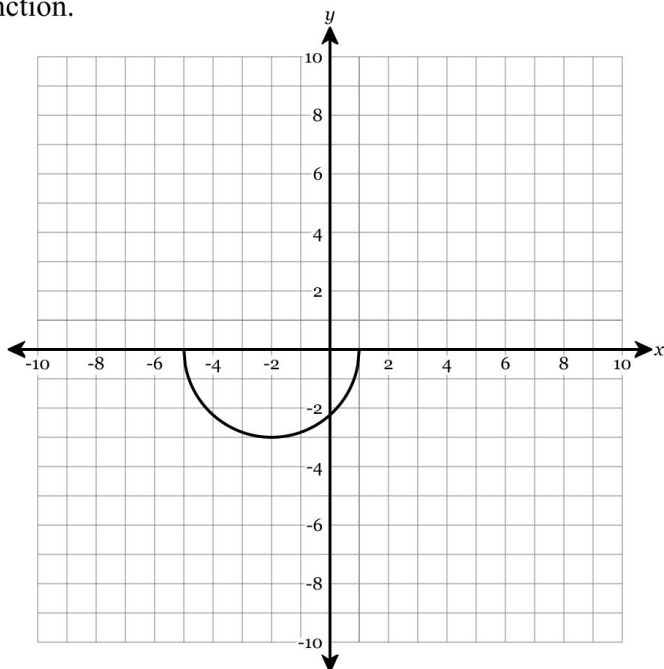
A. Function   B. Not a Function

37. One spring day, Xochitl noted the time of day and the temperature, in degrees Fahrenheit. Her findings are as follows: At 6 a.m., the temperature was 50° F. For the next 6 hours, the temperature rose 2° every 3 hours. For the next 4 hours, it rose 2° per hour. The temperature then stayed steady until 6 p.m. For the next 3 hours, the temperature dropped 2° per hour. The temperature then dropped steadily until the temperature was 55° at midnight. On the set of axes below, graph Xochitl's data.
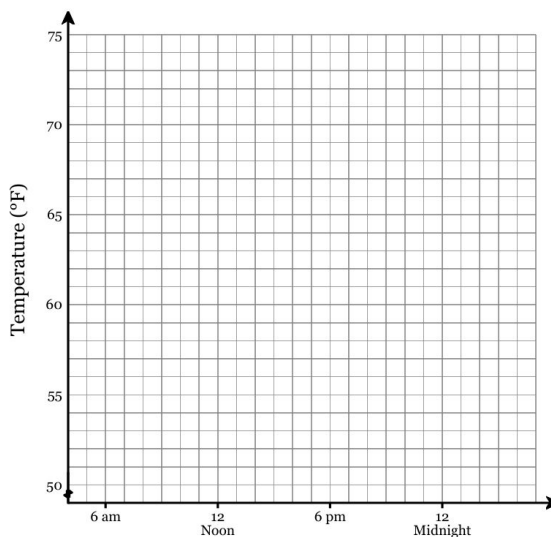
Linear Relationships/Functions (~76 min)

38. During a snowstorm, Yasmin tracked the amount of snow on the ground. When the storm began, there was no snow on the ground. For the first 6 hours of the storm, snow fell at a constant rate of 1 inch every 3 hours. The storm then stopped for 6 hours and then started again at a constant rate of 1 inch per hour for the next 2 hours. When the storm stopped again, the sun came out and melted the snow for the next 4 hours at a constant rate of 1 inch per hour. Make a graph showing the inches of snow on the ground over time using the data that Yasmin collected.

Time Since Storm Began (Hours)
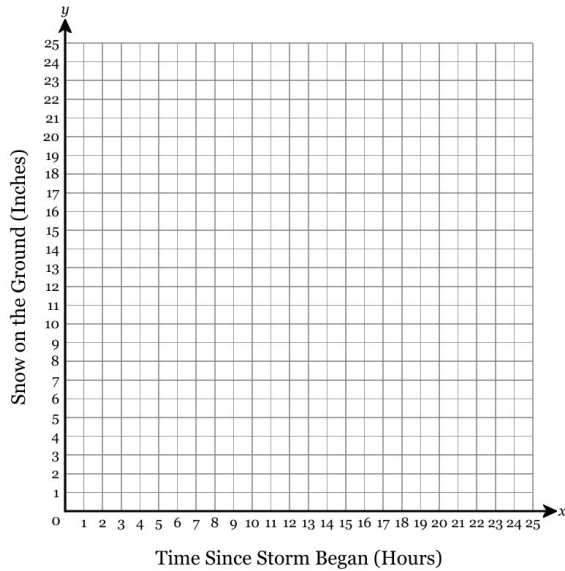
39. Keshawn left his house at time zero and drove for 10 minutes to the store at a speed of 2 blocks every 5 minutes. Then he stopped and went into the store for 3 minutes. From there, he drove in the same direction at a speed of 2 blocks per minute until he got to the bank, which is 4 blocks away from the store. He stopped at the bank for 2 minutes. Then he drove home at a speed of 4 blocks every 3 minutes. Make a graph of showing the number of blocks away from home that Keshawn is x minutes after he leaves his house, until he gets back home.

Time Elapsed (minutes)
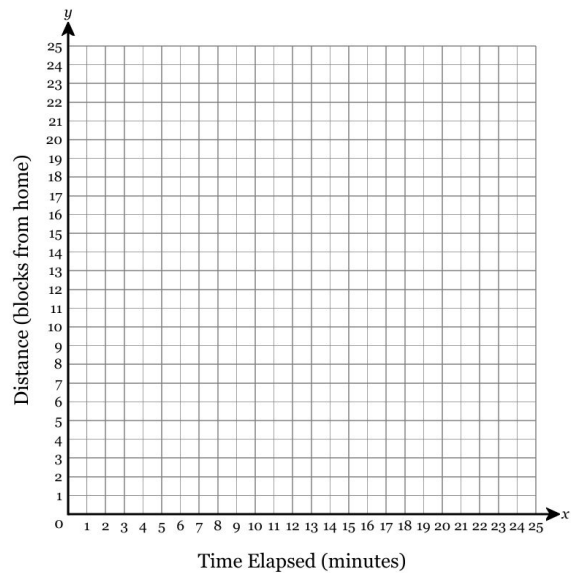
40. Olivia has a smart phone data plan that costs $50 per month that includes 6 GB of data, but will charge an extra $40 per GB over the included amount. How much would Olivia have to pay in a month where she used 4 GB *over* the limit? How much would Olivia have to pay in a month where she used went over by x GB?

41. Blake went to the store to buy some cherries. The price per pound of the cherries is $7.25 per pound and he has a coupon for $2 off the final amount. With the coupon, how much would Blake have to pay to buy 3 pounds of cherries? Also, write an expression for the cost to buy p pounds of cherries, assuming at least one pound is purchased.

42. Keilantra is saving up to buy a new video game. She already has $25 and can save an additional $10 per week using money from her after school job. How much total money would Keilantra have after 9 weeks of saving? Also, write an expression that represents the amount of money Keilantra would have saved in w weeks.

43. Ethan finds some nickels and quarters in his piggy bank. How much money (in cents) does he have if he has 11 nickels and 5 quarters? How much money (in cents) does he have if he has n nickels and q quarters?

44. Hailey finds some dimes and quarters in her piggy bank. How many coins does she have if she has 11 dimes and 9 quarters? How many coins does she have if she has d dimes and q quarters?

45. At the gift shop, they sell small greeting cards and large greeting cards. The cost of a small greeting card is $1.65 and the cost of a large greeting card is $3.65. How much would it cost to get 2 small greeting cards and 5 large greeting cards? How much would it cost to get x small greeting cards and y large greeting cards?

46. Dominic's math teacher finds that there's roughly a linear relationship between the amount of time students spend on their homework and their weekly quiz scores. This relationship can be represented by the equation $y = 60 + 7.2x$, where y represents the expected quiz score and x represents hours spent on homework that week. What is the meaning of the x-value when $y = 96$?

A. The number of hours a student should spend on their homework to expect a score of 96 on the quiz.

B. The change in expected quiz score for every additional one hour students spend on their homework.

C. A student's expected quiz score if they spent 96 hours on their homework.

D. A student's expected quiz score if they spent 1 hour on their homework.

Linear Relationships/Functions (~76 min)

47. There's a roughly linear relationship between the length of someone's femur (the long leg-bone in your thigh) and their expected height. Within a certain population, this relationship can be expressed using the formula $h = 2.45f + 56.3$, where h represents the expected height in centimeters and f represents the length of the femur in centimeters. What is the meaning of the h-value when $f = 38$?

A. The expected height for someone with a femur length of 38 centimeters.

B. The femur length for someone with an expected height of 38 centimeters.

C. The change in expected height for every one additional centimeter of femur length.

D. The expected height for someone with a femur length of 149.4 centimeters.

48. There's a roughly linear relationship between the number of times a species of cricket will chirp in one minute and the temperature outside. For a certain type of cricket, this relationship can be expressed using the formula $T = 0.27c + 40$, where T represents the temperature in degrees Fahrenheit and c represents the number of times the cricket chirps in one minute. What could the number 0.27 represent in the equation?

A. The expected temperature in degrees Fahrenheit if the cricket has chirped 0.27 times per minute.

B. The expected temperature in degrees Fahrenheit if the cricket has chirped 0 times per minute.

C. The change in temperature in degrees Fahrenheit for each additional cricket chirp in one minute.

D. The change in cricket chirps per minute for each additional degree Fahrenheit.

49. Kennedy signed up for a streaming music service where there's a fixed cost for monthly membership and a cost per song downloaded. Her total cost is given by the linear graph below. What does the slope of the line represent?
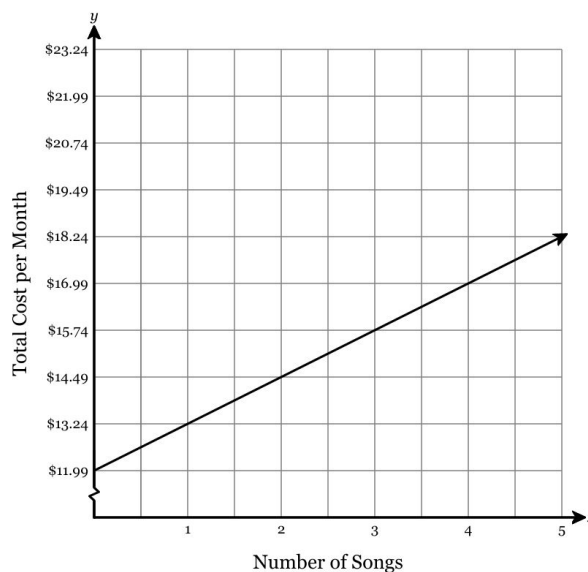
A. The cost to download 100 songs.

B. The cost to use the service for one month if zero songs are downloaded.

C. The total cost per month assuming one song is downloaded.

D. The change in the total cost for every one additional download.

Linear Relationships/Functions (~76 min)

50. Gabriella's math teacher finds that there's roughly a linear relationship between the amount of time students spend on their homework and their weekly quiz scores. This relationship can be represented by the graph below. What is the meaning of the y-value when $x = 1$?

Time Spent on Homework per Week (hours)
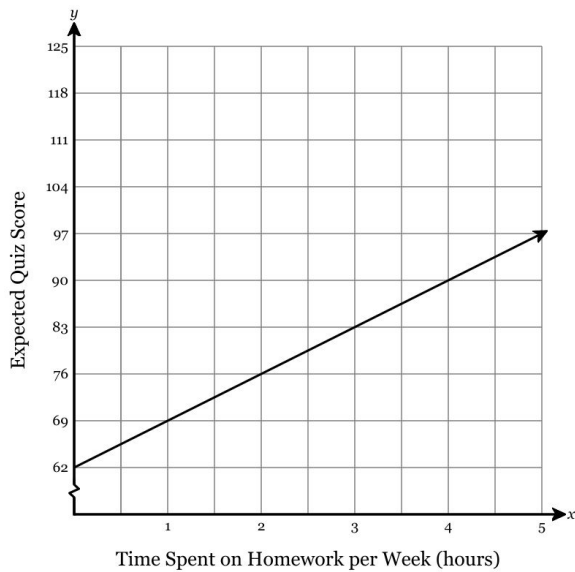
A. A student's expected quiz score if they spent 1 hour on their homework.

B. The number of hours a student should spend on their homework to expect a score of 69 on the quiz.
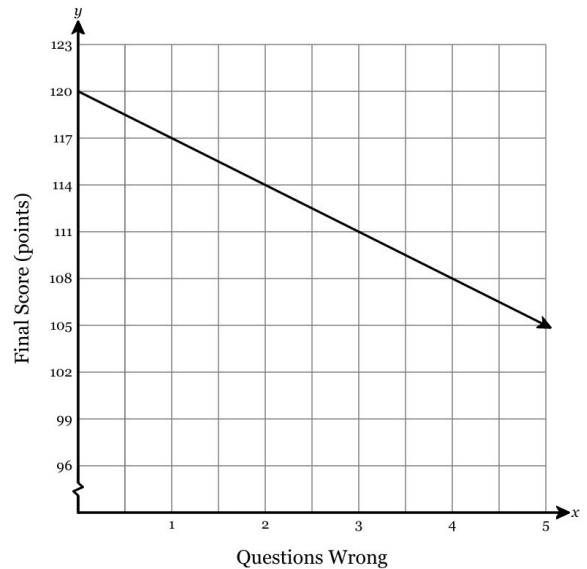
C. A student's expected quiz score if they spent 69 hours on their homework.

D. The change in expected quiz score for every additional one hour students spend on their homework.

51. Alonso is taking a multiple choice test. The linear graph below represents his final score if he gets x questions wrong. What does the y-intercept in the graph represent?

Questions Wrong

A. The score he would get if he missed every question.

B. The score he would get if he only missed one question.

C. His score with 0 problems wrong.

D. The change in his score for every one problem he got wrong.

Graphs of Linear Equations (~32 min)

1. Graph the following features:

- Y-intercept = -1
- Slope = 4

3. Graph the following features:

- Slope = $\frac{4}{3}$
- Y-intercept = 3
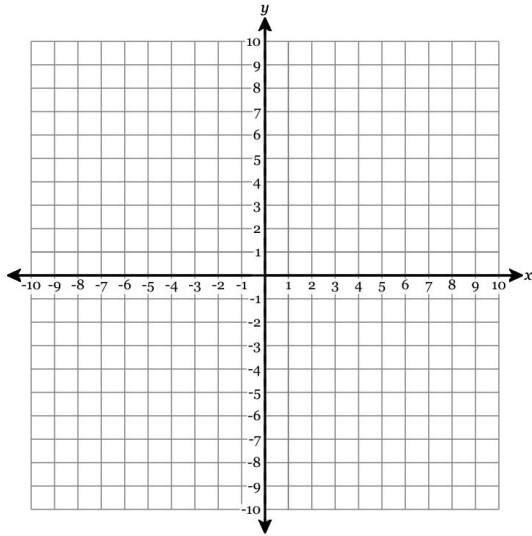
2. Graph the following features:

- Slope = $-\frac{1}{2}$
- Y-intercept = 1

4. Draw a line representing the "rise" and a line representing the "run" of the line. State the slope of the line in simplest form.
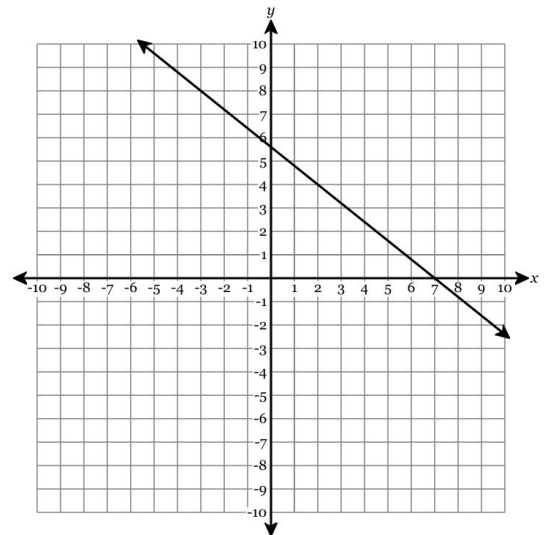
Graphs of Linear Equations (~32 min)

5. Draw a line representing the "rise" and a line representing the "run" of the line. State the slope of the line in simplest form.
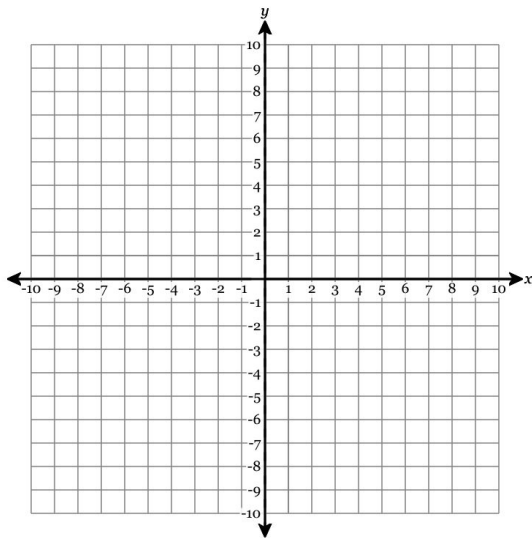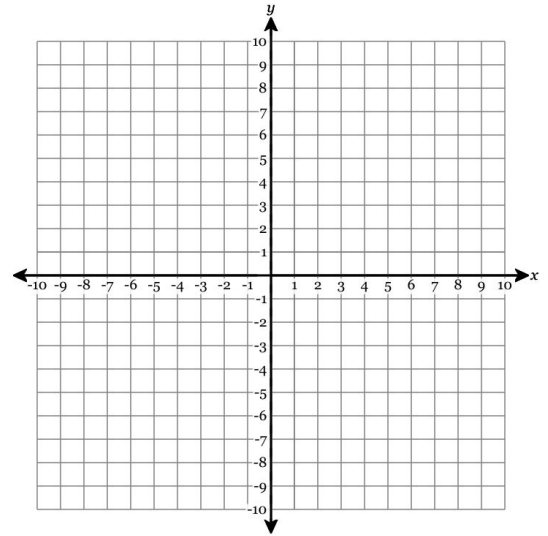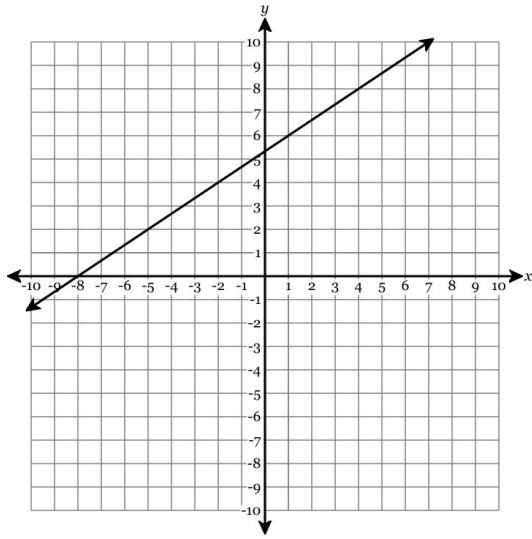

6. Draw a line representing the "rise" and a line representing the "run" of the line. State the slope of the line in simplest form.
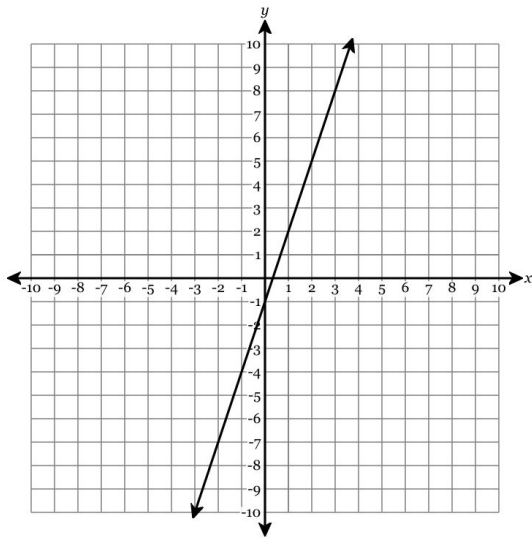
7. What is the slope of the line that passes through the points $(-8, 10)$ and $(-9, 11)$? Write your answer in *simplest form*.

8. What is the slope of the line that passes through the points $(-5, 9)$ and $(-2, 9)$? Write your answer in *simplest form*.

9. What is the slope of the line that passes through the points $(-10, -2)$ and $(-19, 4)$? Write your answer in *simplest form*.

10. Write the equation of the line in fully simplified slope-intercept form.
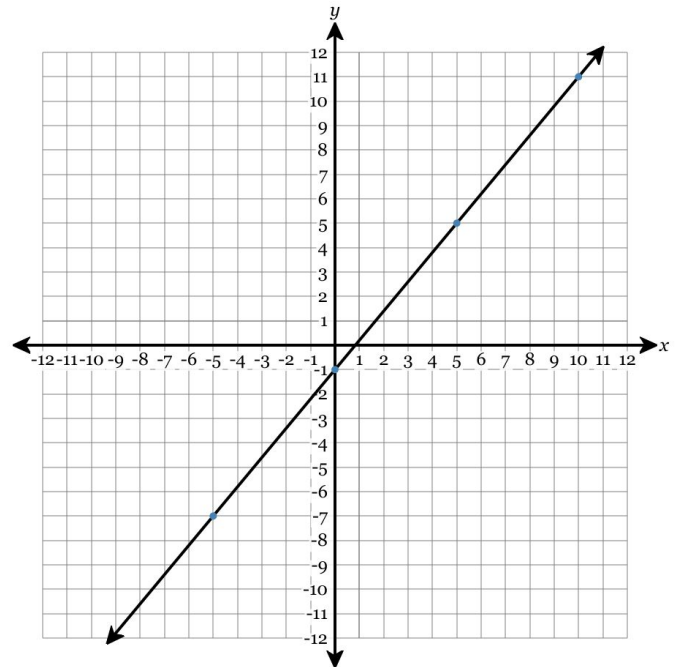
11. Write the equation of the line in fully simplified slope-intercept form.
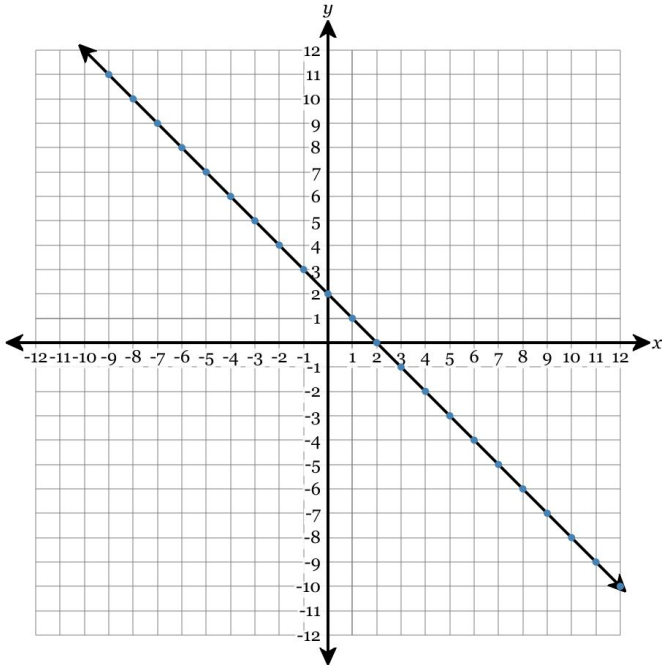
12. Write the equation of the line in fully simplified slope-intercept form.
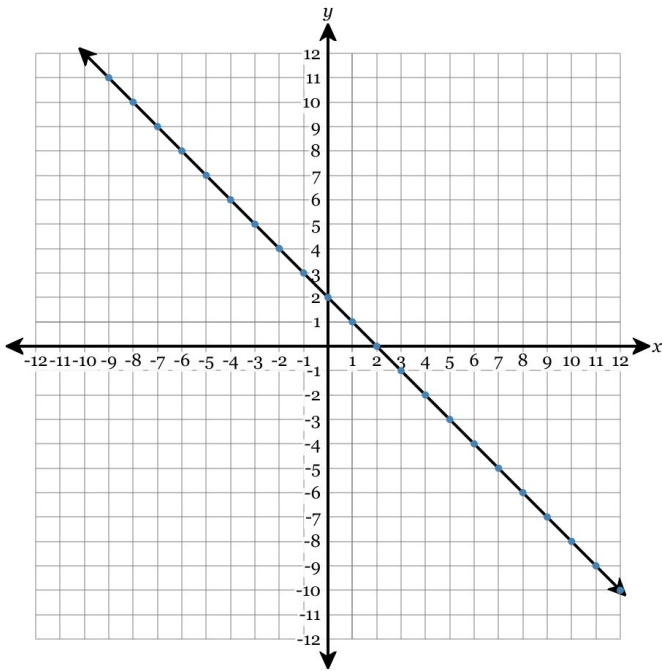
13. Write the equation of the line graphed below.
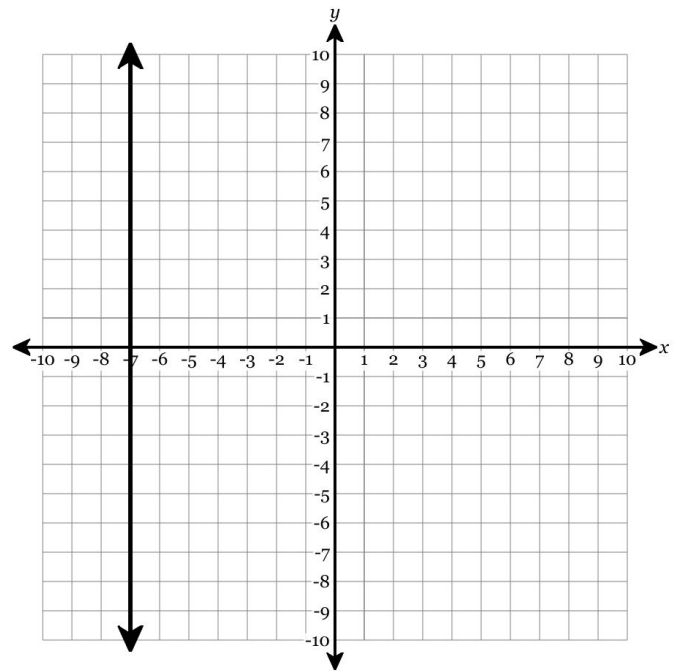
14. Write the equation of the line graphed below.
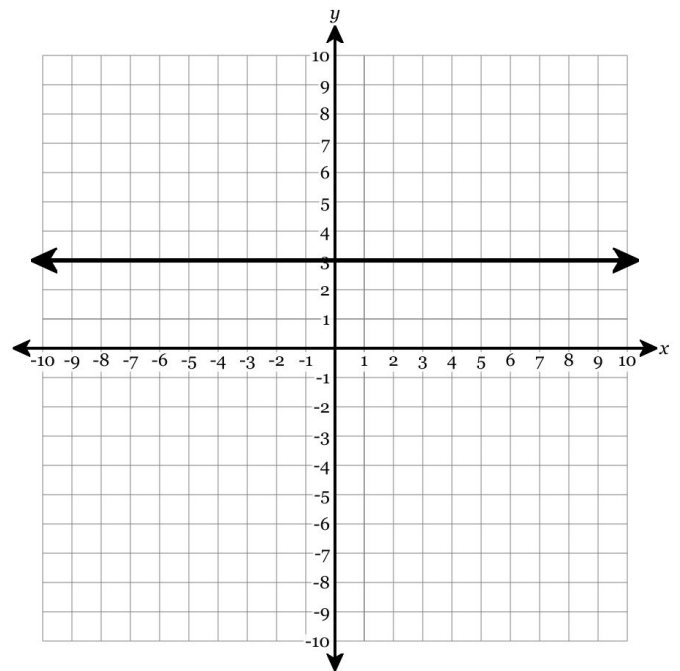
Graphs of Linear Equations (~32 min)

15. Graph the line $x = 3$ on the axes shown below.
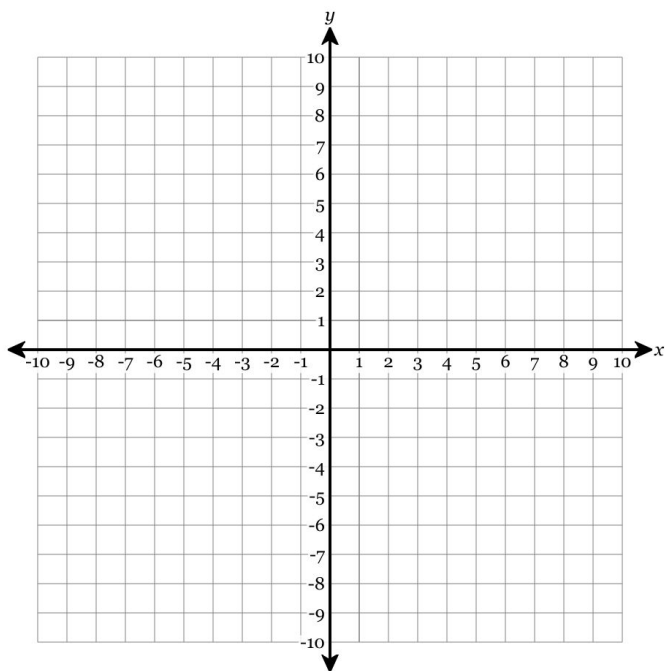
16. What is an equation of the line that passes through the points $(-4, -8)$ and $(8, 4)$?

17. What is an equation of the line that passes through the points $(-5, 0)$ and $(-7, 2)$?

18. What is an equation of the line that passes through the points $(3, -5)$ and $(-3, -7)$?

19. Which of the following equations does the graph below represent?
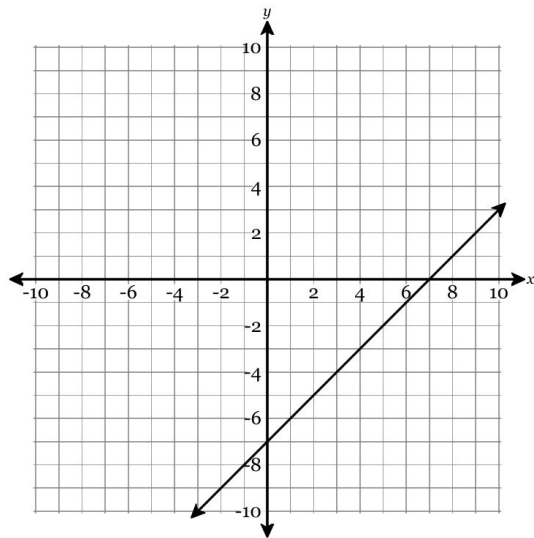
A. $-3x + 3y = 21$ B. $x - 3y = 21$

C. $3x + 3y = 21$ D. $3x - 3y = 21$

Graphs of Linear Equations (~32 min)

20. Which of the following graphs represents the equation $10x + 2y = 8$?

A
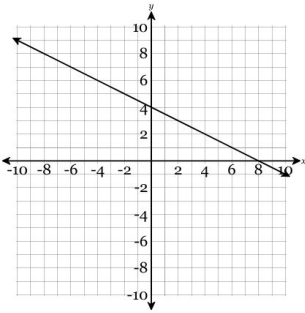
B
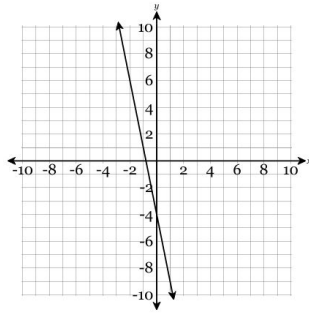
C
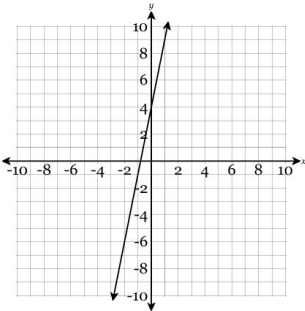
D
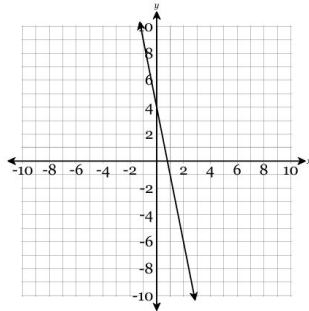
21. Which of the following equations does the graph below represent?
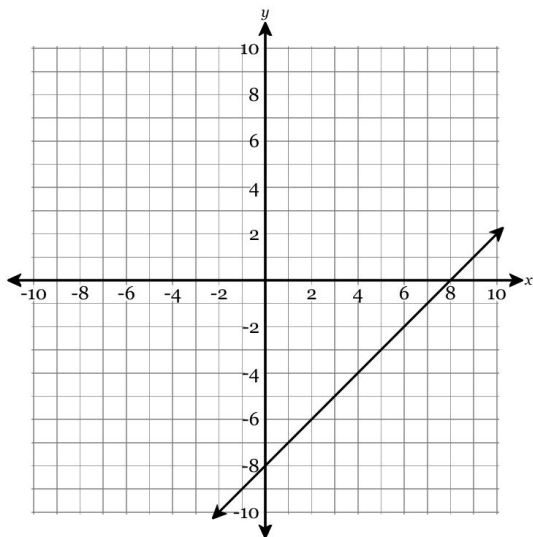
A. $5x + 5y = 40$

B. $5x - 5y = 40$

C. $-5x + 5y = 40$

D. $5x + y = 40$

22. Graph the line with the equation $y = \frac{1}{2}x + 5$.
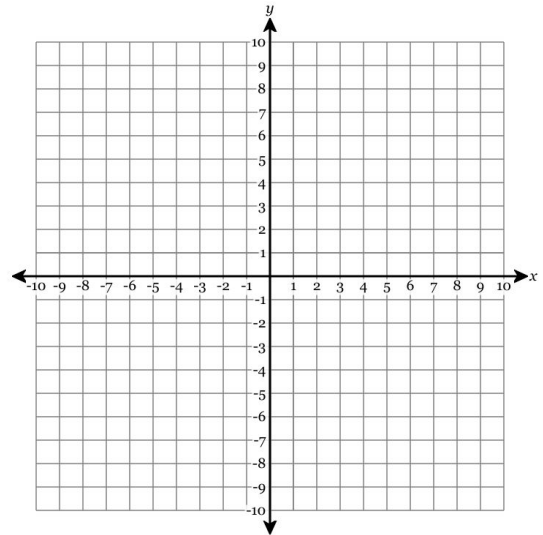
23. Graph the line with the equation $y = -\frac{2}{3}x + 4$.
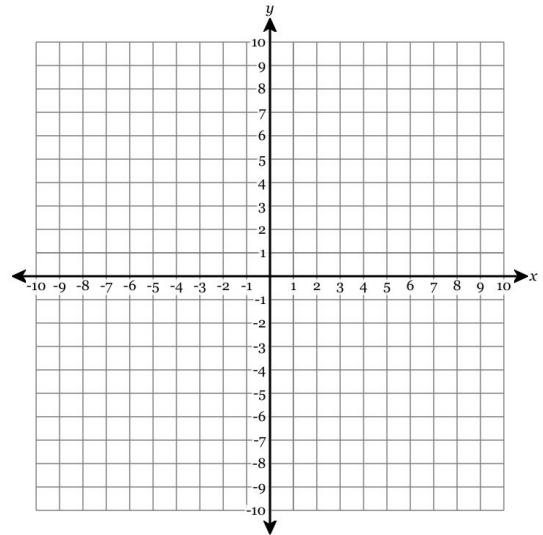
24. Graph the line with the equation $y = \frac{1}{3}x - 6$.
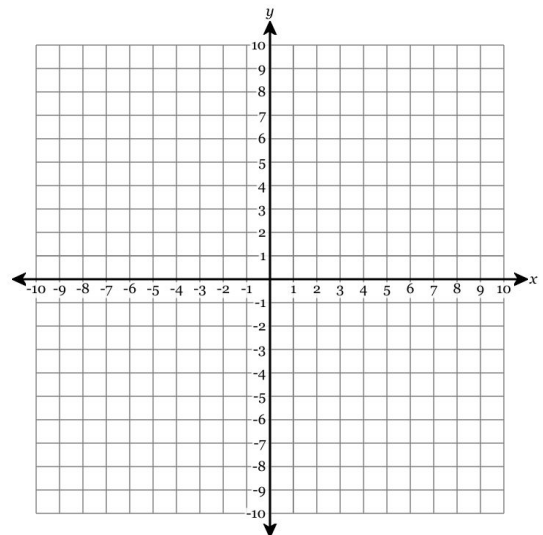
Systems of Equations (~45 min)

1. Xavier has $0.90 worth of nickels and dimes. He has 12 more nickels than dimes. By following the steps below, determine the number of nickels, x, and the number of dimes, y, that Xavier has.

Determine **three ways** to have 12 more nickels than dimes:

(nickels, dimes) = (___ , ___)

(nickels, dimes) = (___ , ___)

(nickels, dimes) = (___ , ___)

On the graph below, plot the three points as if they were coordinate pairs. Then draw a line through the points.

Determine **three ways** to have a total value of $0.90:

(nickels, dimes) = (___ , ___)

(nickels, dimes) = (___ , ___)

(nickels, dimes) = (___ , ___)

On the graph below, plot the three points as if they were coordinate pairs. Then use them to draw a second line.

Use the graph to answer the question:

Xavier has _____ nickels and _____ dimes.

2. Khadija and her children went into a grocery store and she bought $9 worth of apples and bananas. Each apple costs $1.50 and each banana costs $0.50. She bought 3 times as many bananas as apples. By following the steps below, determine the number of apples, x, and the number of bananas, y, that Khadija bought.

Determine **three ways** to have 3 times as many bananas as apples:

(apples, bananas) = (___ , ___)

(apples, bananas) = (___ , ___)

(apples, bananas) = (___ , ___)

On the graph below, plot the three points as if they were coordinate pairs. Then draw a line through the points.

Determine **three ways** to have a total cost of $9:

(apples, bananas) = (___ , ___)

(apples, bananas) = (___ , ___)

(apples, bananas) = (___ , ___)

On the graph below, plot the three points as if they were coordinate pairs. Then use them to draw a second line.
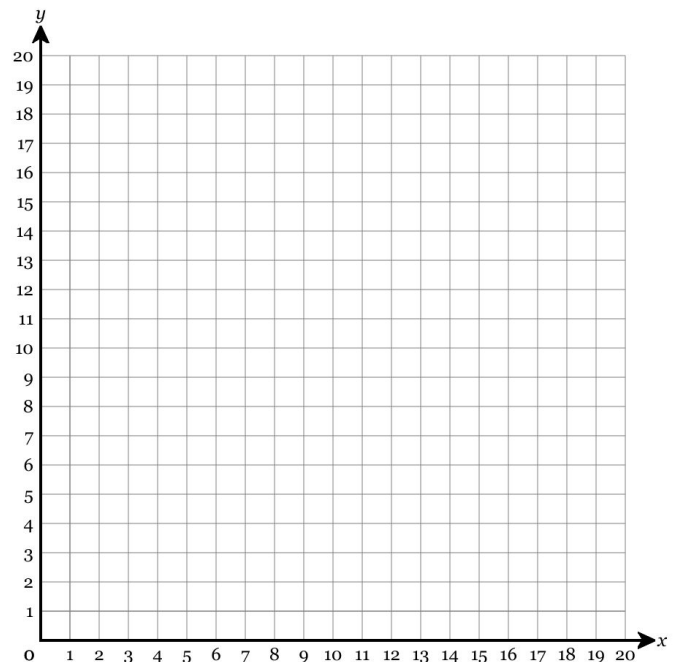
Use the graph to answer the question:

Khadija bought _____ apples and _____ bananas.

Systems of Equations (~45 min)

3. Harper has $0.70 worth of nickels and dimes. She has 5 more nickels than dimes. By following the steps below, determine the number of nickels, x, and the number of dimes, y, that Harper has.

Determine **three ways** to have 5 more nickels than dimes:

   (nickels, dimes) = (___ , ___)

   (nickels, dimes) = (___ , ___)

   (nickels, dimes) = (___ , ___)

On the graph below, plot the three points as if they were coordinate pairs. Then draw a line through the points.

Determine **three ways** to have a total value of $0.70:
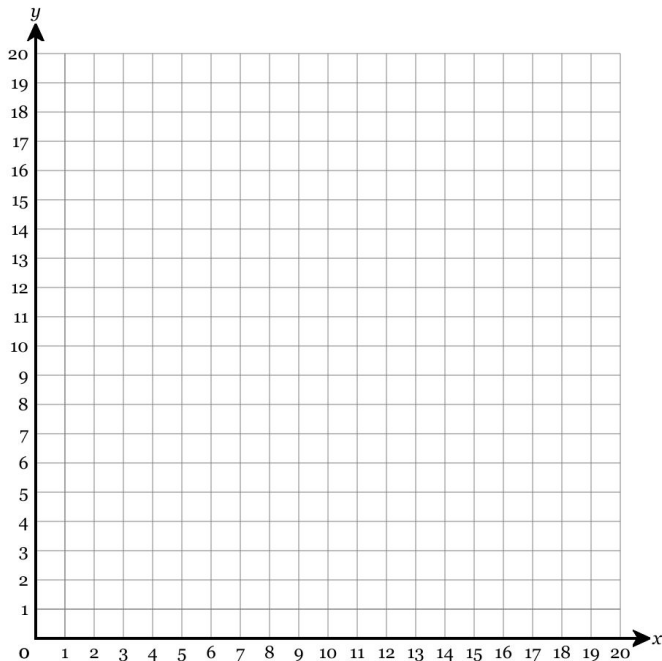
   (nickels, dimes) = (___ , ___)

   (nickels, dimes) = (___ , ___)

   (nickels, dimes) = (___ , ___)

On the graph below, plot the three points as if they were coordinate pairs. Then use them to draw a second line.
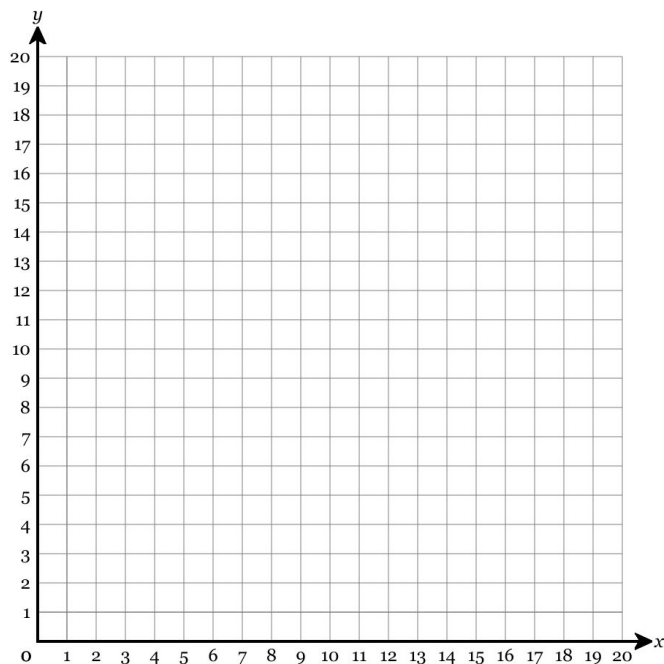
Use the graph to answer the question:

      Harper has _____ nickels and _____ dimes.

4. Put the following equation of a line into slope-intercept form, simplifying all fractions.

$$2y - 10x = 14$$

5. Put the following equation of a line into slope-intercept form, simplifying all fractions.

$$4x - 5y = -40$$

6. Put the following equation of a line into slope-intercept form, simplifying all fractions.

$$2x - y = 1$$

Systems of Equations (~45 min)

7. Solve the system of equations graphed on the coordinate axes below.

$$y = 3x + 5$$
$$y = -x + 5$$
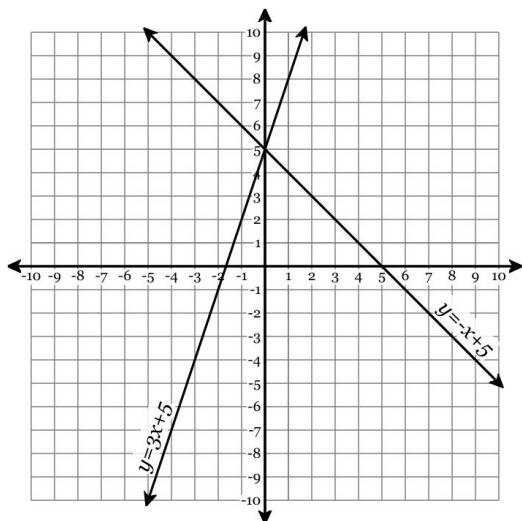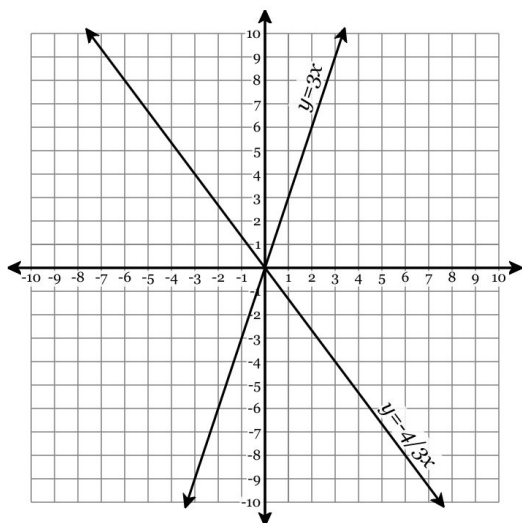
9. Solve the system of equations graphed on the coordinate axes below.

$$y = \frac{3}{2}x - 7$$
$$y = -4x + 4$$

8. Solve the system of equations graphed on the coordinate axes below.

$$y = 3x$$
$$y = -\frac{4}{3}x$$
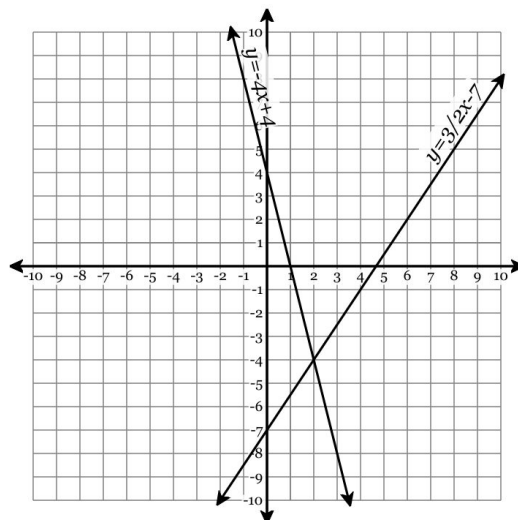
10. Solve the following system of equations graphically on the set of axes below and state the coordinates of the solution.

$$y = \frac{1}{4}x + 7 \qquad y = -\frac{1}{2}x + 1$$
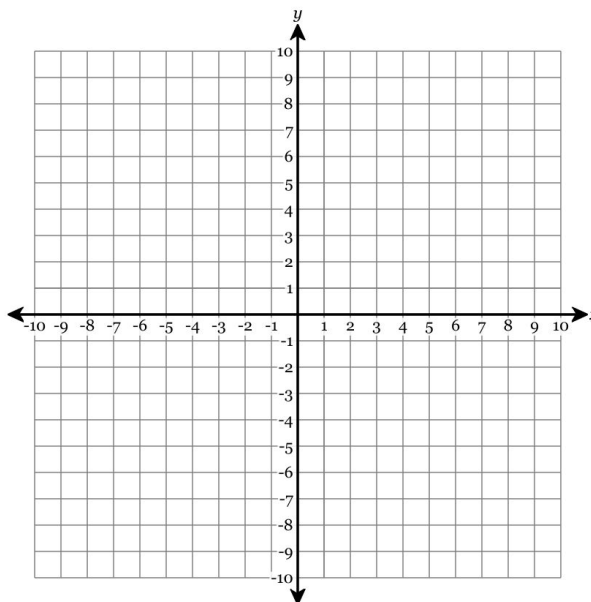
Systems of Equations (~45 min)

11. Solve the following system of equations graphically on the set of axes below and state the coordinates of the solution.

$$y = 2x - 4 \qquad y = -x - 7$$
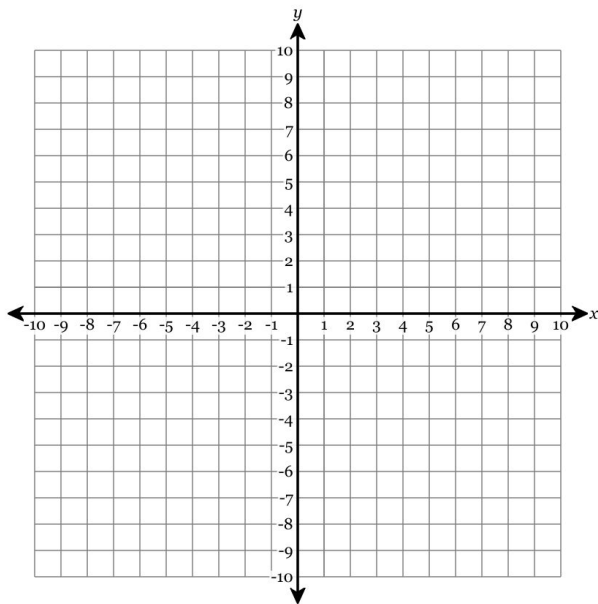
12. Solve the following system of equations graphically on the set of axes below and state the coordinates of the solution.

$$y = -2x - 7 \qquad y = \frac{2}{5}x + 5$$
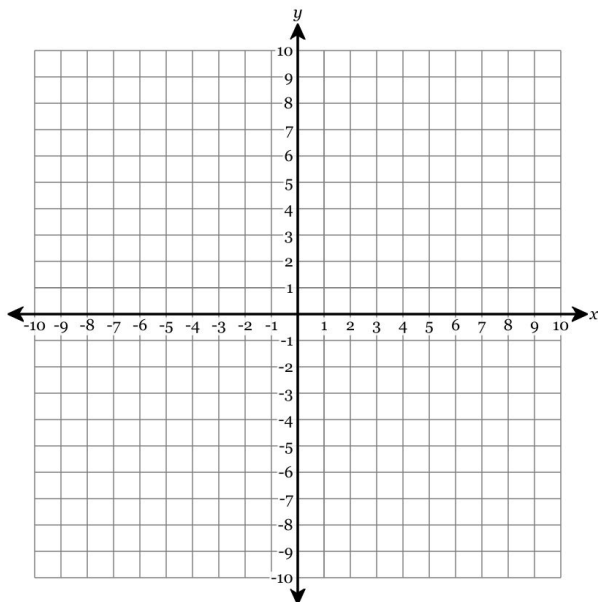
13. Solve the following system of equations graphically on the set of axes below and state the coordinates of the solution.

$$y = -\frac{3}{2}x - 1 \qquad x - y = 6$$
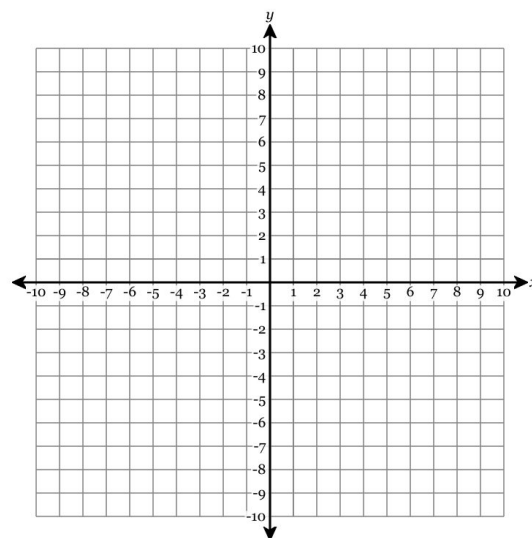
14. Solve the following system of equations graphically on the set of axes below and state the coordinates of the solution.

$$y = x - 8 \qquad 5x + 2y = -2$$
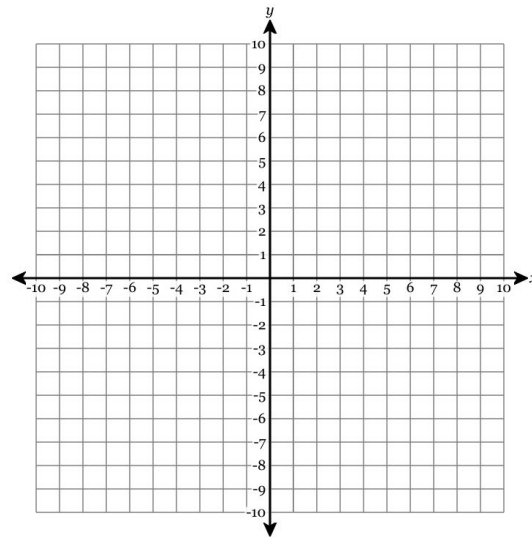
Systems of Equations (~45 min)

15. Solve the following system of equations graphically on the set of axes below and state the coordinates of the solution.

$$y = -\frac{3}{4}x + 5 \qquad 2x - y = 6$$
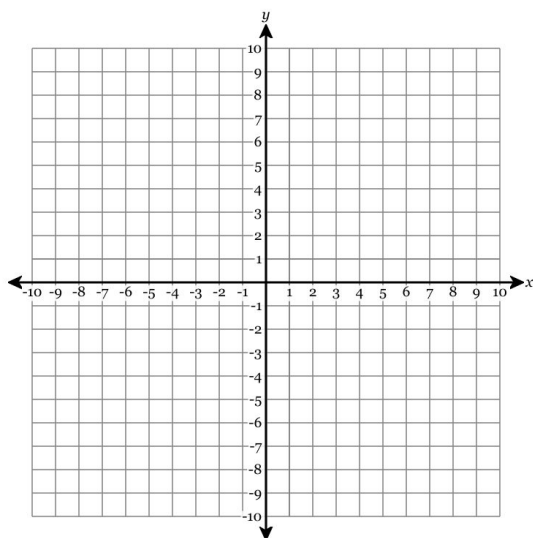
16. Determine if the following system of equations has no solutions, infinitely many solutions or exactly one solution.

$$-x + 2y = 5$$
$$x - 2y = -5$$

A. One Solution

B. Infinitely Many Solutions

C. No Solutions

17. Determine if the following system of equations has no solutions, infinitely many solutions or exactly one solution.

$$-5x + y = -3$$
$$-25x + 8y = -18$$

A. One Solution

B. Infinitely Many Solutions

C. No Solutions

18. Determine if the following system of equations has no solutions, infinitely many solutions or exactly one solution.

$$6x + y = 7$$
$$-12x - 2y = -14$$

A. Infinitely Many Solutions

B. No Solutions

C. One Solution

19. If $3x + 5y = 8$ is a true equation, what would be the value of $3x + 5y + 2$?

Systems of Equations (~45 min)

20. If $-8x - 3y = 6$ and $2x + 8y = -9$ are true equations, what would be the value of $10x + 11y$?

21. If $-2x + 9y = -5$ is a true equation, what would be the value of $9y - 2x$?

Statistics (~24 min)

1. A random sample of people were surveyed on their favorite sport, as shown in the table below sorted by the respondent's age.

Favorite Sport

	Basketball	Football	Soccer	Baseball	Other/Hate Sports	Total
under 21	9	9	8	8	9	43
21-34	6	10	10	9	7	42
35-54	8	10	9	5	8	40
55 and older	5	5	6	7	9	32
Total	28	34	33	29	33	157

How many total people were surveyed?

2. A random sample of students were surveyed as to how much non-school screen time they had each week (for purposes of the survey, screen time was defined as: time spent online, on social media, watching TV, or playing video games) and if their grade average was above or below 80.

Screen Time

	above	below	Total
less than 4 hours	10	5	15
4-8 hours	14	13	27
8-12 hours	20	11	31
more than 12 hours	10	15	25
Total	54	44	98

How many total students were surveyed?

3. A random sample of students was surveyed and asked to list their grade level and whether or not they have a pet. Results are shown in the table below.

Pets Survey

	Pets	No Pets	Total
6th grade	28	11	39
7th grade	16	17	33
8th grade	14	19	33
Total	58	47	105

How many 8th graders were surveyed?

4. Use the data table below to create the given scatter plot, then complete the sentence below.

x	5	9	2	7	1	4	8	3
y	4	5	7	4	6	5	3	4
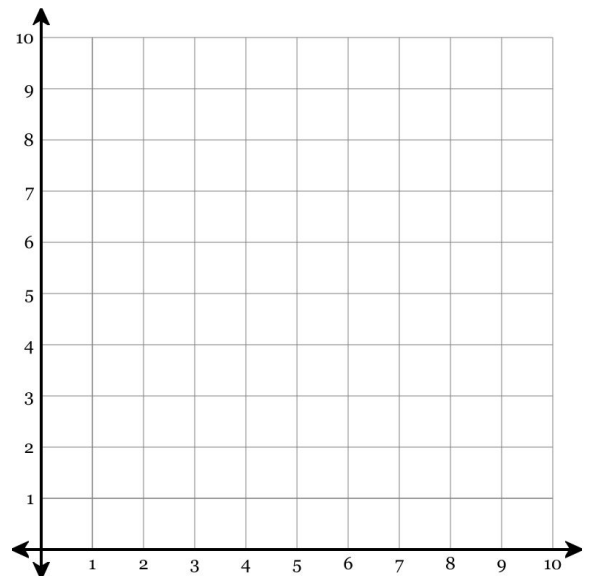
The scatter plot shows (negative / positive) correlation because as the plotted values of x increase, the values of y generally (decrease / increase).

Statistics (~24 min)

5. Use the data table below to create the given scatter plot, then complete the sentence below.

x	0	3	1	9	6	5	4	8
y	4	6	4	7	6	8	6	7
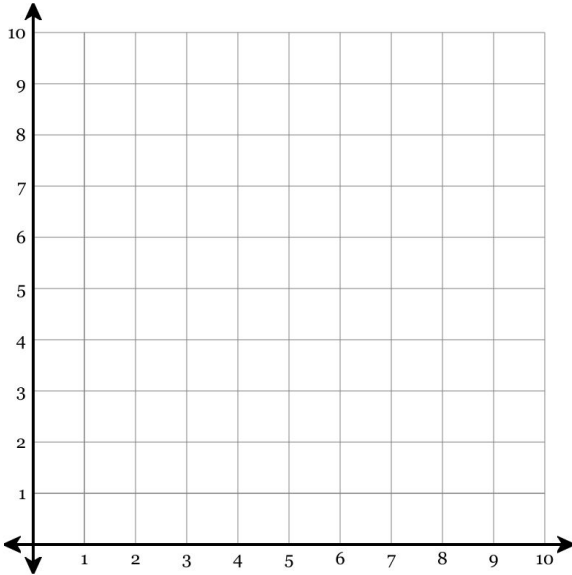
The scatter plot shows (negative / positive) association because as the plotted values of x increase, the values of y generally (decrease / increase).

6. Use the data table below to create the given scatter plot, then complete the sentence below.

x	y
4	7
0	5
6	1
9	3
5	2
7	1
2	4
3	6
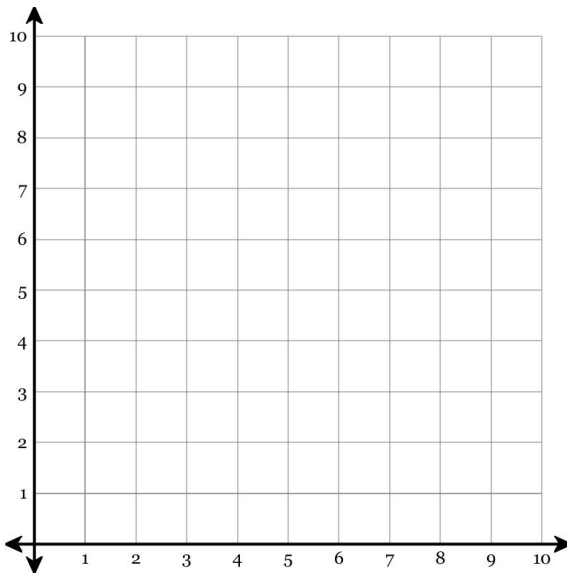
The scatter plot shows (negative / positive) correlation because as the plotted values of x increase, the values of y generally (decrease / increase).

7. Caroline decides to research the relationship between the length in inches and the weight of a certain species of catfish. She measures the length and weight of a number of specimens she catches then throws back into the water. After plotting all her data, she draws a line of best fit. What does the point $(42, 71.1)$ represent?

Catfish Length (inches)
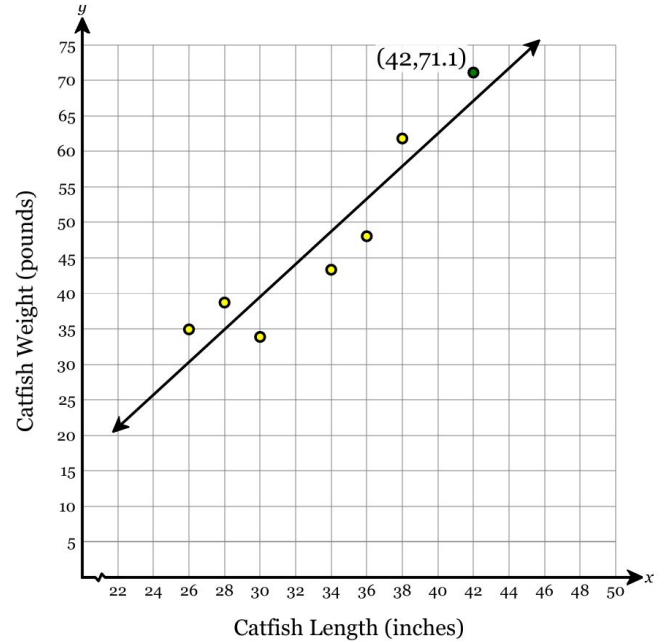
A. Caroline should expect a catfish 71.1 inches long to weigh 42 pounds.

B. Caroline caught a catfish 71.1 inches long that weighed 42 pounds.

C. Caroline caught a catfish 42 inches long that weighed 71.1 pounds.

D. Caroline should expect a catfish 42 inches long to weigh 71.1 pounds.

Statistics (~24 min)

8. Tyee's math teacher plots student grades on their weekly quizzes against the number of hours they say they study on the pair of coordinate axes and then draws the line of best fit. What is the meaning of the x-value on the line when $y = 95$?

Time Spent on Homework per Week (hours)
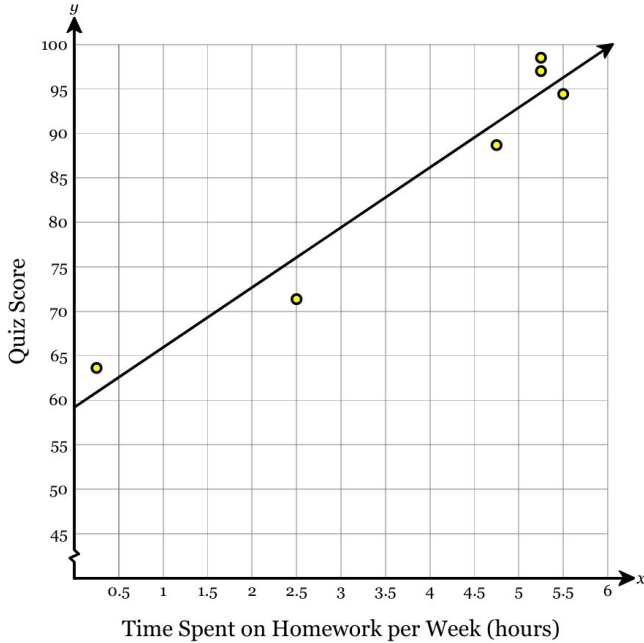
A. The number of hours a student should spend on their homework to expect a score of 95 on the quiz.

B. The number of hours a student actually spent on homework before earning a score of 95 on the quiz.

C. A student's actual quiz score after spending 95 hours on their homework.

D. A student's expected quiz score if they spent 95 hours on their homework.

9. Lamonte keeps track of the number of people inside a music hall to attend a concert by looking at the number of scanned tickets. He plotted the data on the graph below, where $x = 0$ represents the time at 6 p.m., then drew a line of best fit. What does the point $(1.75, 130.5)$ on the line of best fit represent?

Hours Past 6 p.m.
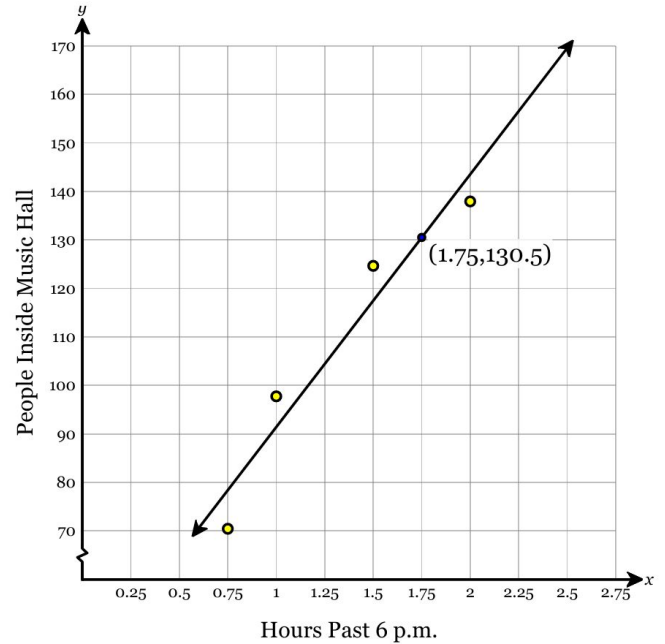
A. At 1:45, Lamonte should expect about 130.5 people in the music hall.

B. At 7:45, Lamonte should expect about 130.5 people in the music hall.

C. At 7:45, there were exactly 131 people in the music hall.

D. At 1:45, there were exactly 131 people in the music hall.

10. Graph the line of best fit.
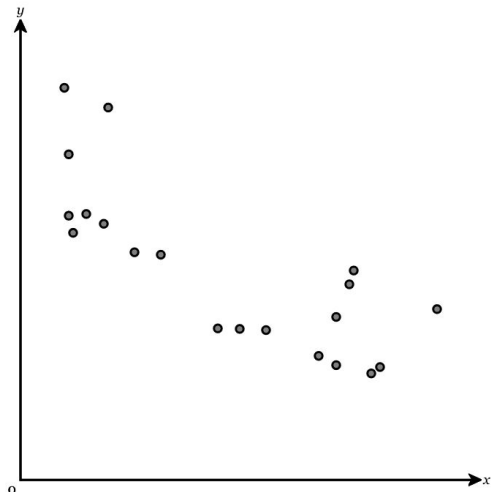
11. Graph the line of best fit.
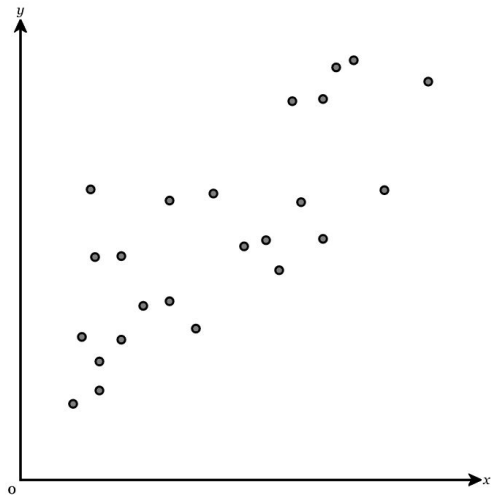
12. Graph the line of best fit.
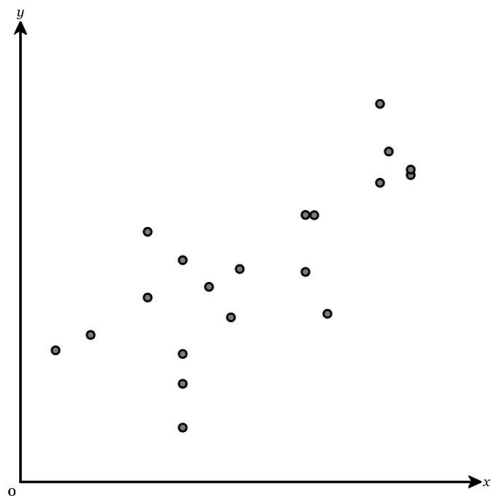
13. A line of best fit was drawn to the plotted points in a data set below. Based on the line of best fit, for what y-value does $x = 15$?
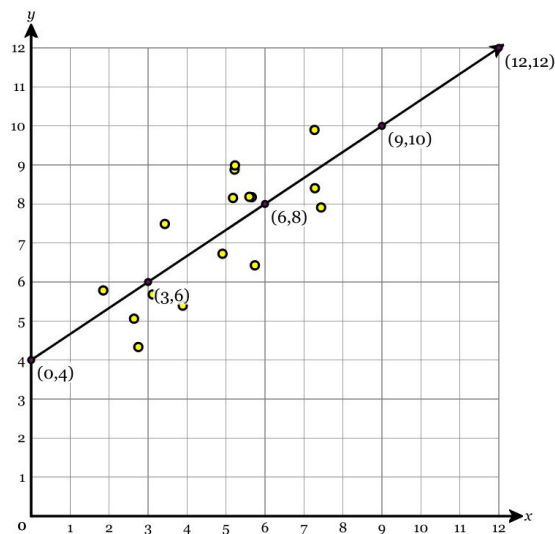
14. A researcher studied the relationship between the number of times a certain species of cricket will chirp in one minute and the temperature outside. Her data is expressed in the scatter plot and line of best fit below. Based on the line of best fit, how many times would the cricket mostly likely chirp per minute if the temperature outside were $66°$F?
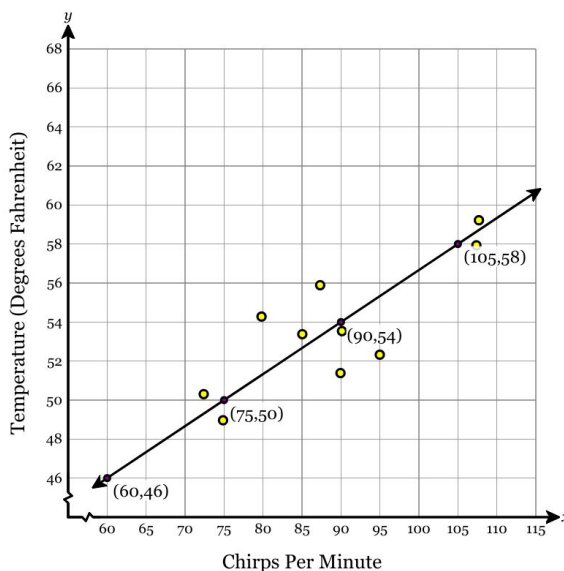
Statistics (~24 min)

15. Mei Mei decides to research the relationship between the length in inches and the weight of a certain species of catfish. She measures the length and weight of a number of specimens she catches, then throws back into the water. After plotting all her data, she draws a line of best fit. Based on the line of best fit, how much would you predict a catfish with a length of 35 inches would weigh?
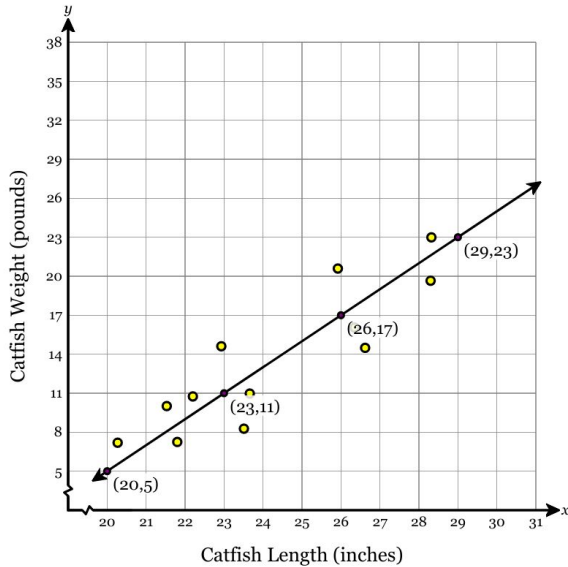
16. A survey asked a random sample students if they estimated they spent more or less than an hour a day on social media.

Social Media

	More	Less
7th grade	27	17
8th grade	25	27

What percent of the 7th graders estimated they spend less than an hour a day on social media? Round your answer to the nearest tenth of a percent.

17. A random sample of students were surveyed as to how much non-school screen time they had each week (for purposes of the survey, screen time was defined as: time spent online, on social media, watching TV, or playing video games) and if their grade average was above or below 80.

Screen Time

	above	below	Total
less than 4 hours	9	8	17
4-8 hours	15	15	30
8-12 hours	15	14	29
more than 12 hours	11	15	26
Total	50	52	102

What percent of the students who spend 8-12 hours a week on screens reported a grade average below 80? Round your answer to the nearest tenth of a percent.

18. Lavaughn recorded the grade level and instrument of everyone in the middle school School of Rock below.

School of Rock

	Guitar	Bass	Drums	Keyboard
6th grade	12	12	16	15
7th Grade	12	12	18	13
8th Grade	10	11	19	12

What percent of the students in the School of Rock play bass? Round your answer to the nearest whole number percent.

Algebraic Expressions

1. What is the value of the expression $5y - 7$ when $y = 9$?

$$\boxed{38}$$

2. What is the value of the expression $8z^2 - 10z - 6$ when $z = 3$?

$$\boxed{36}$$

3. What is the value of the expression $5x - 4y$ when $x = 8$ and $y = 5$?

$$\boxed{20}$$

4. Combine like terms.

$$5y - 5y^2 - 5 + 2 + 2y + 3y^2 - 1$$

$$\boxed{7y - 2y^2 - 4}$$

5. Combine like terms.

$$5x^2 + 4 + 6y - 1 + 3y - 4x^2 - 5$$

$$\boxed{x^2 - 2 + 9y}$$

6. Combine like terms.

$$6x^3 + 5y^3 + 4 + y^3 + 6 + x^3 - 3x^3$$

$$\boxed{4x^3 + 6y^3 + 10}$$

7. Which expression is equivalent to $-6 + h - 9h$?

A. $-14h$ B. $-5 - 9h$

C. $-16h$ $\boxed{\text{D.} \quad -8h - 6}$

8. Which expression is equivalent to $-3a + 1 - 9a - 10$?

A. -21 B. $-21a$

$\boxed{\text{C.} \quad -12a - 9}$ D. $-2a - 19$

Algebraic Expressions

9. The width of a rectangle measures $(6d + 9)$ centimeters, and its length measures $(5d - 8)$ centimeters. Which expression represents the perimeter, in centimeters, of the rectangle?

A. $\boxed{2 + 22d}$ B. $15d - 3$

C. $30d - 6$ D. $11d + 1$

10. Which expression is equivalent to $9r + r - r$?

A. $\boxed{9r}$ B. $1 + 8r$

C. $-11r$ D. $r + 8$

11. The width of a rectangle measures $(6m + 2n)$ centimeters, and its length measures $(9m - 9n)$ centimeters. Which expression represents the perimeter, in centimeters, of the rectangle?

A. $30m + 2 - 18n$ B. $30m - 14$

C. $\boxed{30m - 14n}$ D. $15m - 7$

12. A triangle has side lengths of $(3.1s + 2.5t)$ centimeters, $(4.6s + 5.2u)$ centimeters, and $(8.4u - 8.9t)$ centimeters. Which expression represents the perimeter, in centimeters, of the triangle?

A. $\boxed{7.7s - 6.4t + 13.6u}$

B. $16.1su - 1.2tu$

C. $-0.5u + 7.7s + 7.7t$

D. $5.6st + 9.8su - 0.5tu$

13. The width of a rectangle measures $(4.2m - 1.2n)$ centimeters, and its length measures $(8.4m - 5.5n)$ centimeters. Which expression represents the perimeter, in centimeters, of the rectangle?

A. $25.2m - 11n - 1.2$ B. $-13.4 + 25.2m$

C. $\boxed{-13.4n + 25.2m}$ D. $-6.7 + 12.6m$

14. Which expression is equivalent to $0.32t + t - 0.53$?

A. $0.79t$ B. $\boxed{1.32t - 0.53}$

C. $-1.21t$ D. $0.32t + 0.47$

ANSWER KEY

Algebraic Expressions

15. Which expression is equivalent to $0.83v + v - 0.69v$?

A. $\boxed{1.14v}$

B. $-0.52v$

C. $1 + 0.14v$

D. $v + 0.14$

16. Which expression is equivalent to $4.3w + 4.2 + 2.9w - 1.7$?

A. $1.4w + 2.5$

B. $\boxed{2.5 + 7.2w}$

C. $1.4w + 5.9$

D. $8.5w + 1.2$

17. Write an equivalent expression by distributing the "$-$" sign outside the parentheses:

$$-(-0.9m + 5n) - 2$$
$$\boxed{0.9m - 5n - 2}$$

18. Write an equivalent expression by distributing the "$-$" sign outside the parentheses:

$$-(-7w + 2.4x - 6)$$
$$\boxed{7w - 2.4x + 6}$$

19. Write an equivalent expression by distributing the "$-$" sign outside the parentheses:

$$-(-8.7x - 9)$$
$$\boxed{8.7x + 9}$$

20. Write an equivalent expression by distributing the "$-$" sign outside the parentheses:

$$0.6f - (-2g + 1)$$
$$\boxed{0.6f + 2g - 1}$$

21. Write an equivalent expression by distributing the "$-$" sign outside the parentheses:

$$-(-6p - 9.2q - 2.3)$$
$$\boxed{6p + 9.2q + 2.3}$$

22. Use the distributive property to write an equivalent expression.

$$4(v + 2w)$$
$$\boxed{4v + 8w}$$

23. Use the distributive property to write an equivalent expression.

$$5(6x + 3y - 6)$$
$$\boxed{30x + 15y - 30}$$

24. Use the distributive property to write an equivalent expression.

$$7(6s - 7t + 4)$$
$$\boxed{42s - 49t + 28}$$

25. Use the distributive property to write an equivalent expression.

$$8(8p + 10)$$
$$\boxed{64p + 80}$$

26. Use the distributive property to write an equivalent expression.

$$3(s - 10t + 1)$$
$$\boxed{3s - 30t + 3}$$

27. Rewrite in simplest terms: $8(-6f - 8) + 5f$

$$\boxed{-43f - 64}$$

Algebraic Expressions

28. Rewrite in simplest terms:

$-9(4n - 3) - 3(-n - 8)$

$$\boxed{-33n + 51}$$

29. Rewrite in simplest terms: $-6a - 8(2a - 1)$

$$\boxed{-22a + 8}$$

30. Rewrite in simplest terms:

$-5(-7r - 8r - 3) - 9r$

$$\boxed{66r + 15}$$

31. Rewrite in simplest terms:

$-10(-10g + 3h) - 9h - 2(-10h - 10g)$

$$\boxed{120g - 19h}$$

32. Which expression is equivalent to the expression below?

$$5(6v + 6) - 7v$$

A. $37v + 6$ B. $5(6v + 6 - 7v)$

C. $18v + 11$ $\boxed{\text{D. } 23v + 30}$

33. Which expression is equivalent to the expression below?

$$f + f + f + f + f + f + f + g + g + g$$

A. $f^7 g^3$ B. $10fg$

C. $\frac{f}{7} + \frac{g}{3}$ $\boxed{\text{D. } 7f + 3g}$

34. Which expression is equivalent to the expression below?

$$w + w + w + w + w$$

$\boxed{\text{A. } 5w}$ B. 5 C. $\frac{w}{5}$ D. w^5

35. Which pair of expressions below are equivalent?

A. $6r + 3r$ and $9r^2$

$\boxed{\text{B. } 6(3r - 8) \text{ and } 18r - 48}$

C. $6r - 3s$ and $3s - 6r$

D. $6(3r - 8)$ and $18r - 8$

ANSWER KEY

Algebraic Expressions

36. Which expression is equivalent to the expression below?

$$6(7t) + 3t$$

A. $25t$ B. $42t + 7t^2$

C. $10t + 6$ D. $45t$