Math Grade 8

The lead4ward transitional items are designed to provide teachers and leaders with examples of how released multiple-choice items could look in the format of the STAAR 2.0 new item types. The lead4ward crew has adapted elementary and secondary items in various TEKS clusters for STAAR-tested courses. Within those TEKS clusters, new item types that are applicable to the specific grade and subject are represented.

The transitional items can be used with the PLC:

- when planning for application of learning and transfer to STAAR

- to analyze and discuss the STAAR 1.0 and 2.0 examples, including:

  ◦ the similarities and differences between multiple-choice and new item type thinking, stimuli, and representation of the content
  ◦ how the new item types may be better or more challenging for students
  ◦ student misconceptions and mistakes
  ◦ how specific online tools and resources may support particular new item types

The transitional items can also be used with students during instruction:

- as prompts for bell ringers, modeling with assessment items, analysis and discussion in centers or workstations, and with Learning from Mistakes strategies on the lead4ward playlist

- to analyze and discuss the STAAR 1.0 and 2.0 examples, including:

  ◦ the similarities and differences between multiple-choice and new item type thinking, stimuli, and representation of the content
  ◦ how the new item types may be better or more challenging
  ◦ possible learning mistakes
  ◦ how specific online tools may support particular new item types

Grade 8

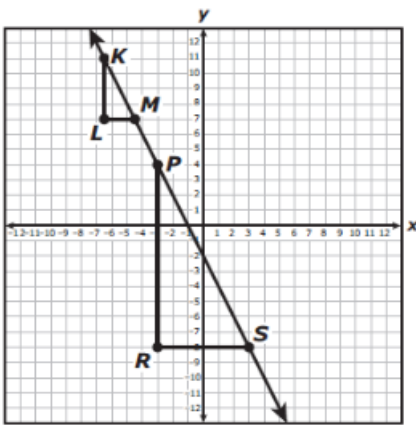# Proportional and Non-Proportional Reasoning

STAAR Released Item	Multiselect

8.4(A) 2021 item 15
[Slope]

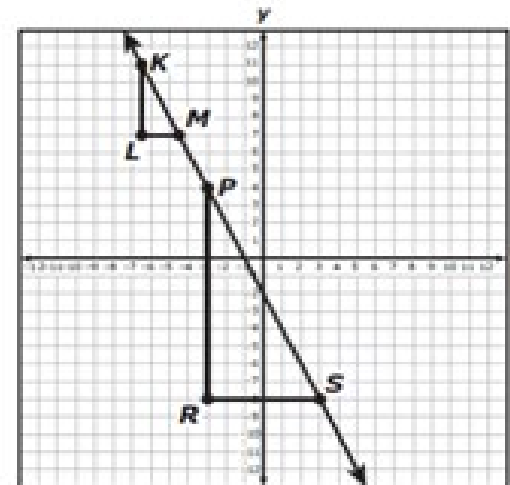Triangle *KLM* and triangle *PRS* are similar right triangles.

Which proportion can be used to show that the slope of $\overline{KM}$ is equal to the slope of $\overline{PS}$?

A $\dfrac{KL}{LM} = \dfrac{PR}{RS}$

B $\dfrac{RS}{SP} = \dfrac{LM}{MK}$

C $\dfrac{ML}{LK} = \dfrac{SP}{RP}$

D $\dfrac{PS}{PR} = \dfrac{KM}{KL}$

Triangle *KLM* and triangle *PRS* are similar right triangles.

Which **TWO** proportions can be used to show that the slope of $\overline{KM}$ is equal to the slope of $\overline{PS}$?

A $\dfrac{KL}{LM} = \dfrac{PR}{RS}$

B $\dfrac{RS}{SP} = \dfrac{LM}{MK}$

C $\dfrac{ML}{LK} = \dfrac{SR}{RP}$

D $\dfrac{PS}{PR} = \dfrac{KM}{KL}$

lead4ward®

STAAR Released Item	Inline Choice

8.4(A) 2019 item 18
[Slope]

Triangle *HJK* and triangle *PMK* are similar right triangles. The coordinates of all the vertices are integers.
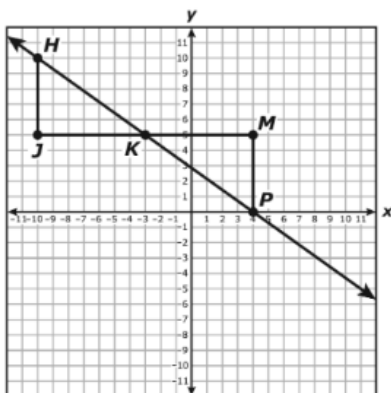

Which statement is true about the slope of $\overline{HK}$ and the slope of $\overline{PK}$?

F The slope of $\overline{HK}$ is less than the slope of $\overline{PK}$, because the ratio of the change in *y*-values of the endpoints to the change in *x*-values of the endpoints is less for $\overline{HK}$ than it is for $\overline{PK}$.

G The slope of $\overline{HK}$ is equal to the slope of $\overline{PK}$, because the ratio of the change in *y*-values of the endpoints to the change in *x*-values of the endpoints is the same for $\overline{HK}$ as it is for $\overline{PK}$.

H The slope of $\overline{HK}$ is greater than the slope of $\overline{PK}$, because the ratio of the change in *y*-values of the endpoints to the change in *x*-values of the endpoints is greater for $\overline{HK}$ than it is for $\overline{PK}$.

J The relationship between the slope of $\overline{HK}$ and the slope of $\overline{PK}$ cannot be determined, because the triangles are congruent.

Triangle *HJK* and triangle *PMK* are similar right triangles. The coordinates of all the vertices are integers.

The slope of $\overline{HK}$ is [Choose...] the slope of $\overline{PK}$, because the ratio of the change in *y*-values of

less than
greater than
equal to

the endpoints to the change in *x*-values of the endpoints is [Choose...] for $\overline{HK}$ than it is for $\overline{PK}$.

less
greater
the same
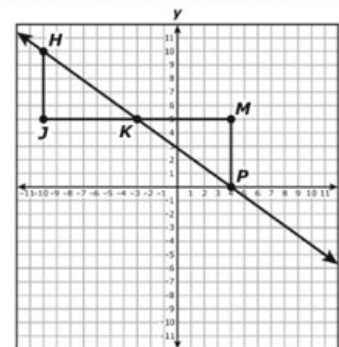
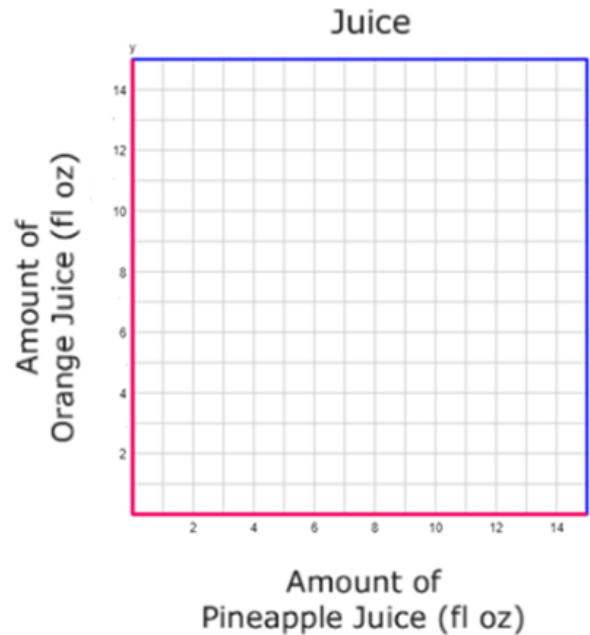| STAAR Released Item	Graphing

8.4(B) 2019 item 20
[Slope]

A bottle contains 30 fluid ounces of orange juice and 18 fluid ounces of pineapple juice. Which graph has a slope that best represents the ratio of orange juice to pineapple juice in this bottle?
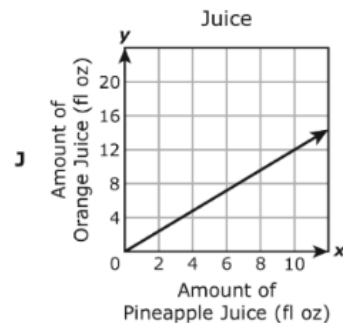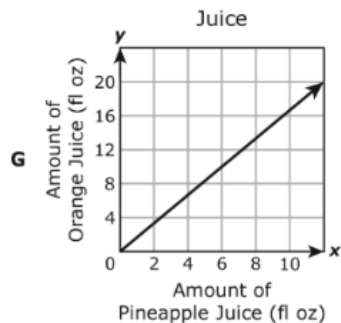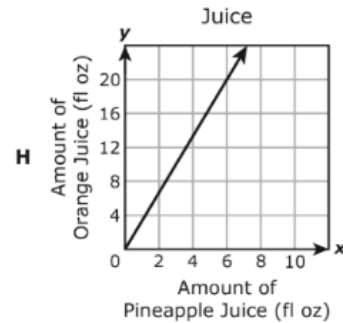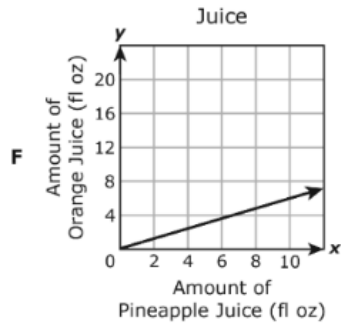
A bottle contains 30 fluid ounces of orange juice and 18 fluid ounces of pineapple juice.

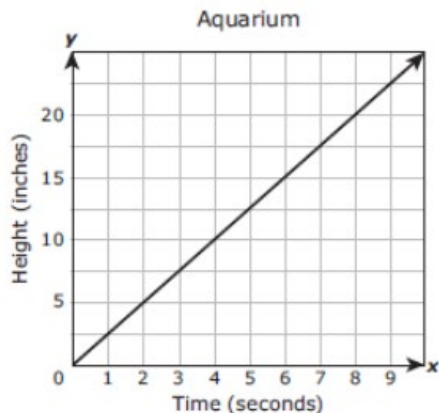Create a graph that has a slope that represents the ratio of orange juice to pineapple juice in this bottle.

Select two points on the coordinate grid. A line will connect the points.

STAAR Released Item	Drag and Drop

8.4(B) 2016 item 5
[Slope]

An aquarium is being filled with water. The graph shows the height of the water over time as the aquarium is being filled.
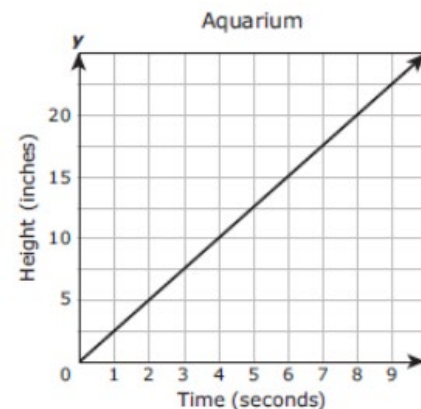
Aquarium

Which statement best describes the rate of change for this situation?

A   The height of the water increases 20 inches per second.

B   The height of the water increases 1 inch per second.

C   The height of the water increases 5 inches per second.

D   The height of the water increases 2.5 inches per second.

An aquarium is being filled with water. The graph shows the height of the water over time as the aquarium is being filled.

Aquarium

Move the correct answer to the box to complete the statement that best describes the rate of change for this situation.

| 20 | 5 | 2.5 | 1 |

The height of the water increases [   ] per second.

STAAR Released Item	Inline Choice

8.4(C) 2018 item 18
[Non-Proportional Reasoning]

A gym charges a membership fee plus an additional fee per yoga class. The table shows the linear relationship between the number of yoga classes taken and the total cost including the membership fee.

Yoga Classes

Number of Yoga Classes	Total Cost
6	$67.50
8	$75.00
10	$82.50
14	$97.50
20	$120.00

Which statement is true?

F   The additional fee per yoga class is $3.75.

G   The additional fee per yoga class is $8.25.

H   The membership fee is $35.00.

J   The membership fee is $42.50.

A gym charges a membership fee plus an additional fee per yoga class. The table shows the linear relationship between the number of yoga classes taken and the total cost including the membership fee.

Yoga Classes

Number of Yoga Classes	Total Cost
6	$67.50
8	$75.00
10	$82.50
14	$97.50
20	$120.00

The [Choose...] fee per yoga class is [Choose...].

additional
membership

$3.75
$8.25
$35.00
$42.50.

STAAR Released Item	Equation Editor/Text Entry

8.4(C) 2018 item 38
[Non-Proportional Reasoning]

A company sells bottles of vitamin capsules. The graph and table show the linear relationship between the cost per capsule in cents and the number of bottles ordered.
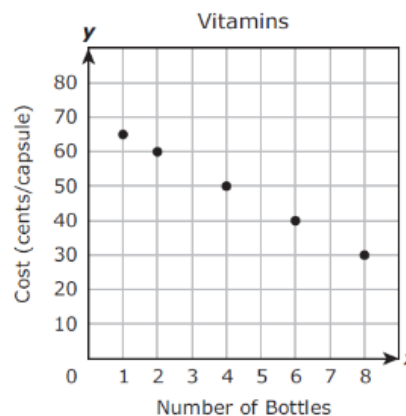
Vitamins

Vitamins
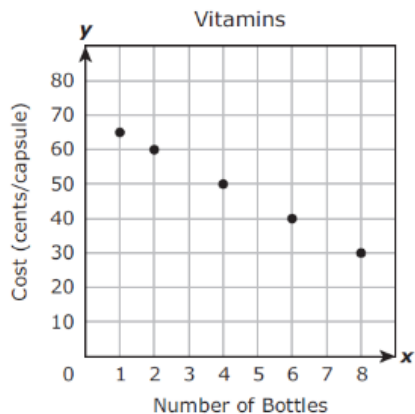
Number of Bottles, x	Cost, y (cents/capsule)
1	65
2	60
4	50
6	40
8	30

What is the slope of the line that models this situation?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

A company sells bottles of vitamin capsules. The graph and table show the linear relationship between the cost per capsule in cents and the number of bottles ordered.

Vitamins

Vitamins

Number of Bottles, x	Cost, y (cents/capsule)
1	65
2	60
4	50
6	40
8	30

What is the slope of the line that models this situation?

Enter your answer in the space below.

STAAR Released Item	Drag and Drop

8.4(C) 2017 item 6
[Non-Proportional Reasoning]

The table shows the number of gallons of gasoline in a car's gas tank after the car has been driven x miles.

Gasoline Usage

Miles Driven, x	Gallons of Gasoline in Tank, y
0	15
10	14.6
20	14.2
35	13.6
60	12.6
75	12

When these data are graphed on a coordinate grid, the points all lie on the same line. What are the slope and y-intercept of this line?

F Slope $= \dfrac{1}{25}$, y-intercept $= 375$

G Slope $= -\dfrac{1}{25}$, y-intercept $= 15$

H Slope $= 25$, y-intercept $= 375$

J Slope $= -25$, y-intercept $= 15$

The table shows the number of gallons of gasoline in a car's gas tank after the car has been driven x miles.

Gasoline Usage

Miles Driven, x	Gallons of Gasoline in Tank, y
0	15
10	14.6
20	14.2
35	13.6
60	12.6
75	12

When these data are graphed on a coordinate grid, the points all lie on the same line.

Move the correct answer to identify the slope and y-intercept of the line.

| $\dfrac{1}{25}$ | $-\dfrac{1}{25}$ | 15 | -25 | 25 | 375 |

Slope = [　]　　　　y-intercept = [　]

STAAR Released Item	Equation Editor/Text Entry

8.5(A) 2018 item 14
[Proportional Reasoning]

A hot-air balloon is released at ground level, and it rises into the air at a constant rate. After 5 seconds the height of the balloon is 20 feet. The balloon continues to rise at the same rate.

Which table shows the relationship between the time in seconds, x, and the height of the balloon in feet, y?

F Balloon

Time, x (sec)	Height, y (ft)
10	2.5
20	5.0
30	7.5
40	10.0
50	12.5

H Balloon

Time, x (sec)	Height, y (ft)
10	40
20	60
30	80
40	100
50	120

G Balloon

Time, x (sec)	Height, y (ft)
10	25
20	35
30	45
40	55
50	65

J Balloon

Time, x (sec)	Height, y (ft)
10	40
20	80
30	120
40	160
50	200

A hot-air balloon is released at ground level, and it rises into the air at a constant rate. After 5 seconds the height of the balloon is 20 feet. The balloon continues to rise at the same rate.

Complete the table to show the relationship between the time in seconds, x, and the height of the balloon in feet, y.

Balloon

Time, x (sec)	Height, y (ft)
10	40
20	
30	120
	160
50	

STAAR Released Item	Multiselect

8.5(B) 2018 item 6
[Non-Proportional Reasoning]

Rudolfo has 15 toys in his toy box, and he adds 2 new toys every month. Based on this information, which representation best shows this relationship between the number of toys Rudolfo has in his toy box, y, and the number of months that have passed, x?

Rudolfo's Toys

F

x	y
4	8
6	12
11	22
13	26

Rudolfo's Toys

H

x	y
1	17
4	68
7	119
11	187

G

Rudolfo's Toys

J

Rudolfo's Toys

Rudolfo has 15 toys in his toy box, and he adds 2 new toys every month. Based on this information, which **TWO** representations best shows this relationship between the number of toys Rudolfo has in his toy box, y, and the number of months that have passed, x?

Rudolfo's Toys

☐

x	y
4	8
6	12
11	22
13	26

Rudolfo's Toys

☐

x	y
1	17
4	23
7	29
11	47

☐

Rudolfo's Toys

☐

Rudolfo's Toys

STAAR Released Item	Inline Choice
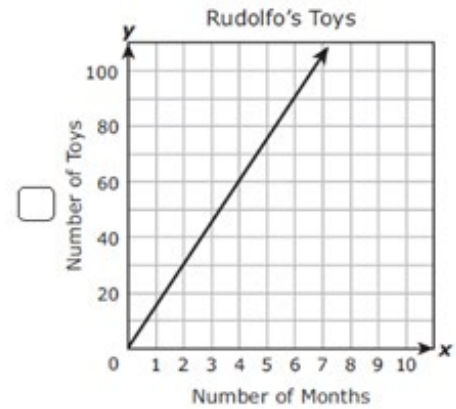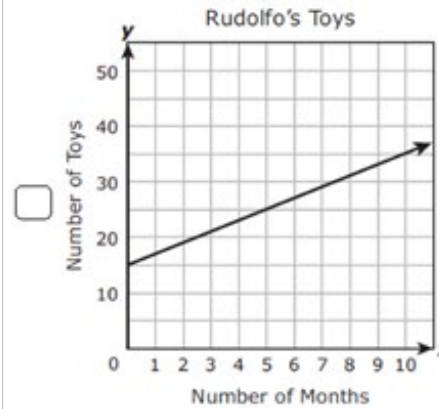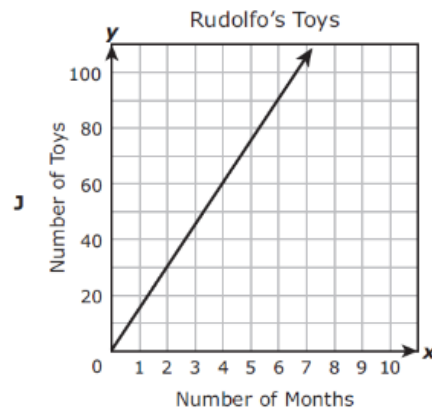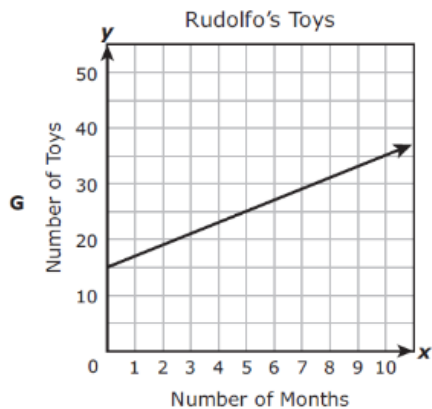
8.5(F) 2021 item 37
[Proportional and Non-Proportional Recognition]

The graph shows a relationship between x and y.
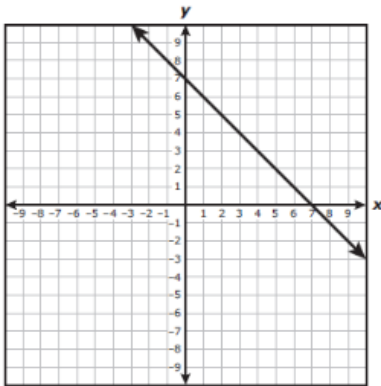
Which statement is true?

A The graph shows a non-proportional relationship because the graph has a negative slope.

B The graph shows a non-proportional relationship because the graph does not contain the origin.

C The graph shows a proportional relationship because the x and y intercepts both contain 7.

D The graph shows a proportional relationship because the graph passes through 3 different quadrants.

The graph shows a relationship between x and y.
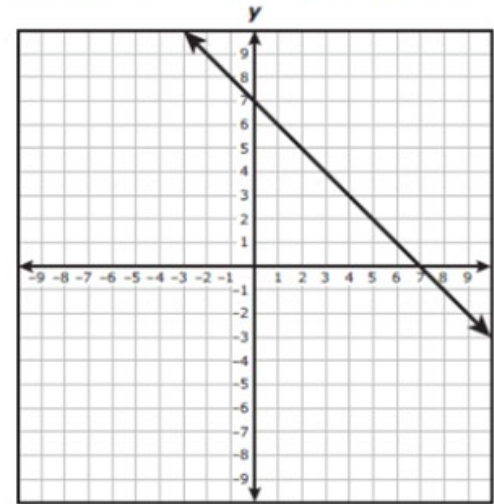
The graph shows a [Choose...] relationship because

proportional
non-proportional

the graph [Choose...]

has a negative slope.
the x and y intercepts both contain 7.
passes through 3 different quadrants.

STAAR Released Item	Table Match Grid

8.5(G) 2019 item 5
[Function Identification]

Which graph represents *y* as a function of *x*?

A

B

C

D

Which graph represents *y* as a function of *x*?
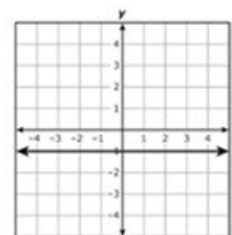
Select the correct answer in each row.

Function	Not a Function
☐	☐
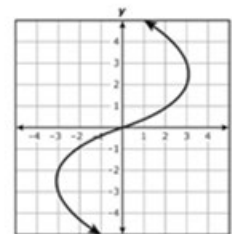
Function	Not a Function
☐	☐
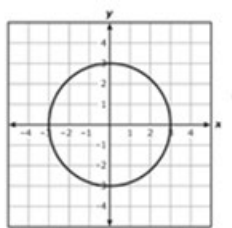
Function	Not a Function
☐	☐
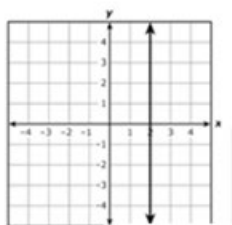
Function	Not a Function
☐	☐

STAAR Released Item

8.5(G) 2017 item 11
[Function Identification]

Which graph does NOT represent y as a function of x?
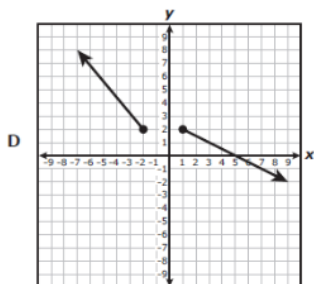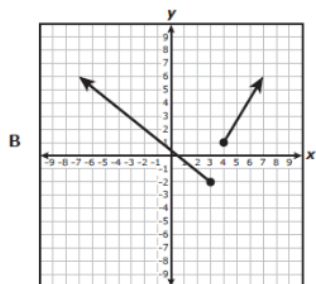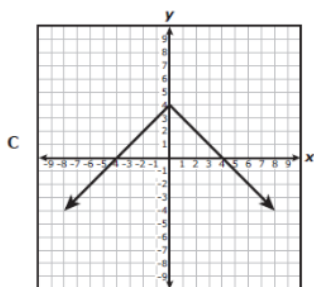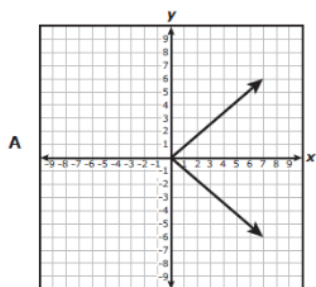
Multiselect

Which graphs represent y as a function of x?

Select **THREE** correct answers.
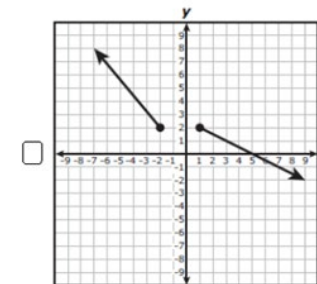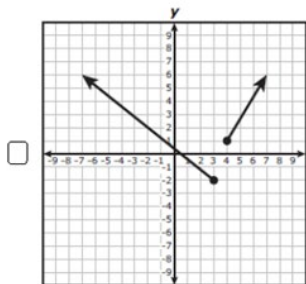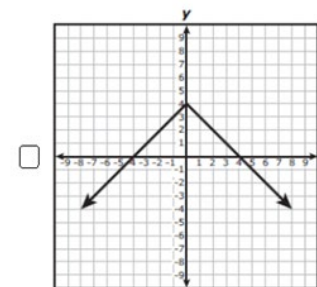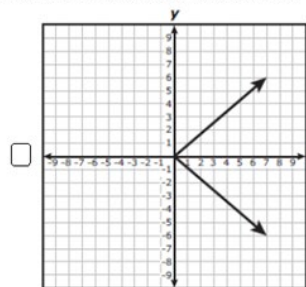
STAAR Released Item

8.5(G) 2017 item 25
[Function Identification]

Which set of ordered pairs represents y as a function of x?

A $\{(2, 5), (3, 1), (2, 1), (4, 7)\}$

B $\{(3, 2), (4, 3), (5, 2), (2, 6)\}$

C $\{(1, 3), (3, 5), (2, 5), (1, 6)\}$

D $\{(4, 7), (4, 6), (4, 4), (4, 1)\}$

Table Match Grid

Which set ordered pairs represents y as a function of x?

Select the correct answer in each row.

	Function	Not a Function
$\{(2, 5), (3, 1), (2, 1), (4, 7)\}$	☐	☐
$\{(3, 2), (4, 3), (5, 2), (2, 6)\}$	☐	☐
$\{(1, 3), (3, 5), (2, 5), (1, 6)\}$	☐	☐
$\{(4, 7), (4, 6), (4, 4), (4, 1)\}$	☐	☐

STAAR Released Item	Table Match Grid

8.5(H) 2016 item 20
[Proportional and Non-Proportional Recognition]

Which situation represents a proportional relationship?

F The cost of purchasing a basket of oranges for $1.30 per pound plus $5.00 for the basket

G The cost of purchasing peaches for $7.00 per box of peaches with a delivery charge of $3.00

H The cost of purchasing grapefruit for $1.80 per pound with a coupon for $1.00 off the total cost

J The cost of purchasing apples for $1.75 per pound plus a shipping fee of $0.16 per pound

Which situation represents a proportional relationship?

Select the correct answer in each row.

	Proportional	Non-Proportional
The cost of purchasing a basket of oranges for $1.30 per pound plus $5.00 for the basket	☐	☐
The cost of purchasing peaches for $7.00 per box of peaches with a delivery charge of $3.00	☐	☐
The cost of purchasing grapefruit for $1.80 per pound with a coupon for $1.00 off the total cost	☐	☐
The cost of purchasing apples for $1.75 per pound plus a shipping fee of $0.16 per pound	☐	☐

STAAR Released Item	Equation Editor/Text Entry

8.5(I) 2021 item 10
[Non-Proportional Reasoning]

A water tank currently contains 275 gallons of water. The amount of water in the tank will decrease at a constant rate of 15 gallons per week.

Which function can be used to find t, the total number of gallons of water in the tank after w weeks?

F $t = 15w - 275$

G $t = -15w + 275$

H $t = 275w - 15$

J $t = -275w + 15$

A water tank currently contains 275 gallons of water. The amount of water in the tank will decrease at a constant rate of 15 gallons per week.

Write a function that can be used to find t, the total number of gallons of water in the tank after w weeks?

Enter your answer in the space provided.

STAAR Released Item	Equation Editor/Text Entry

8.5(I) 2021 item 21
[Non-Proportional Reasoning]

The graph of a linear function passes through the points $(-1, -\frac{1}{4})$ and $(1, -\frac{3}{4})$.
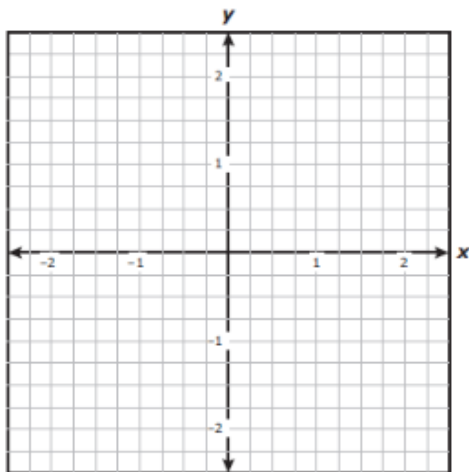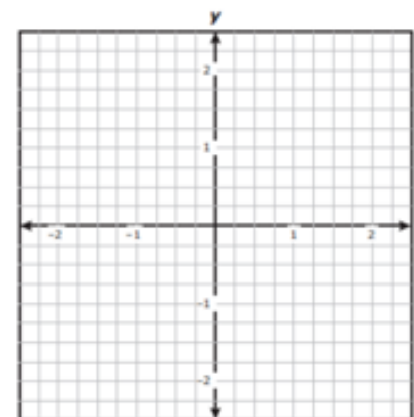
Which equation represents the function?

A $y = -\frac{1}{2}x - \frac{1}{4}$

B $y = \frac{1}{2}x + \frac{1}{4}$

C $y = -\frac{1}{4}x - \frac{1}{2}$

D $y = \frac{1}{4}x + \frac{1}{2}$

The graph of a linear function passes through the points $(-1, -\frac{1}{4})$ and $(1, -\frac{3}{4})$.

Write an equation to represent the function.

Enter your answer in the space provided.

Grade 8

Geometry and Measurement – Two-Dimensional

STAAR Released Item	Drag and Drop

8.3(A) 2018 item 36
[Dilations]

Figure I and Figure II are similar quadrilaterals.
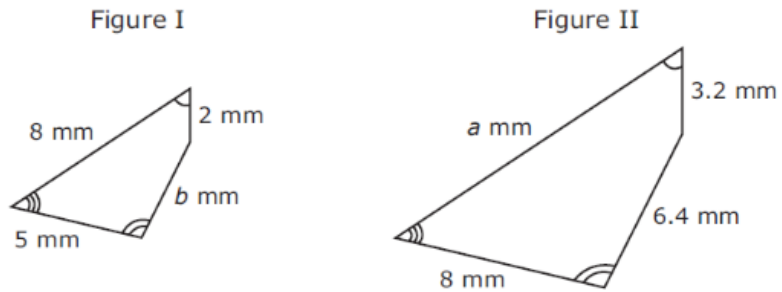
Which proportion must be true?

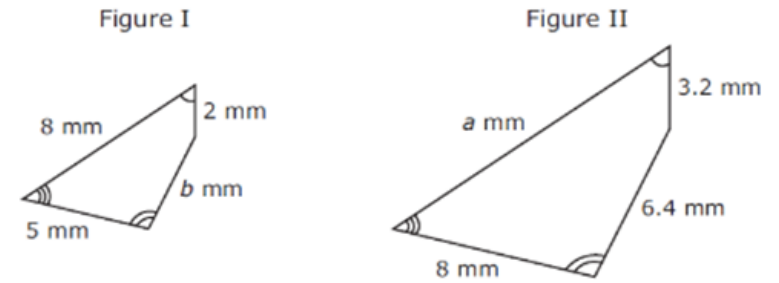**F** $\dfrac{a}{b} = \dfrac{8}{2}$

G $\dfrac{3.2}{2} = \dfrac{a}{8}$

H $\dfrac{b}{6.4} = \dfrac{8}{5}$

J $\dfrac{2}{3.2} = \dfrac{b}{a}$

Figure I and Figure II are similar quadrilaterals.

Complete the proportion for the similar quadrilaterals.

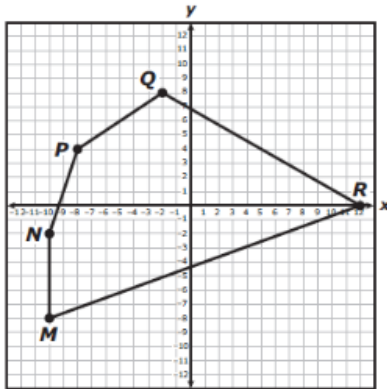Move the correct answer to each box. Not all answers will be used.

$$\dfrac{3.2}{\Box} = \dfrac{a}{\Box}$$

| 2 | 3.2 | 5 | 6.4 | 8 |

STAAR Released Item	Inline Choice

8.3(B) 2017 item 20
[Dilations]

Pentagon *MNPQR* is shown on the coordinate grid. Pentagon *MNPQR* is dilated with the origin

as the center of dilation using the rule $(x, y) \rightarrow (\frac{1}{4}x, \frac{1}{4}y)$ to create pentagon *M'N'P'Q'R'*.

Which statement is true?

F Pentagon *M'N'P'Q'R'* is larger than pentagon *MNPQR*, because the scale factor is greater than 1.

G Pentagon *M'N'P'Q'R'* is smaller than pentagon *MNPQR*, because the scale factor is less than 1.

H Pentagon *M'N'P'Q'R'* is smaller than pentagon *MNPQR*, because the scale factor is greater than 1.

J Pentagon *M'N'P'Q'R'* is larger than pentagon *MNPQR*, because the scale factor is less than 1.

Pentagon *MNPQR* is shown on the coordinate grid. Pentagon *MNPQR* is dilated with the origin

as the center of dilation using the rule $(x, y) \rightarrow (\frac{1}{4}x, \frac{1}{4}y)$ to create pentagon *M'N'P'Q'R'*.
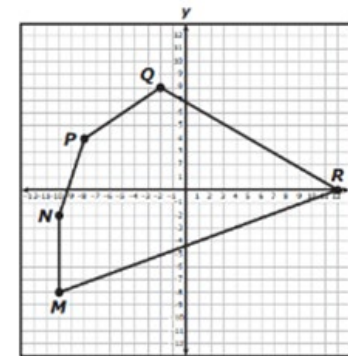

Choose the correct answer from each dropdown menu to complete the statement.

Pentagon *M'N'P'Q'R'* is [Choose... ▼] than pentagon *MNPQR*,
　　　　　　　　　　　larger
　　　　　　　　　　　smaller

because the scale factor is [Choose... ▼] .
　　　　　　　　　　　　　less than 1
　　　　　　　　　　　　　greater than 1

STAAR Released Item	Inline Choice
8.3(C) 2019 item 24 [Dilations] A polygon is graphed on a coordinate grid with (x, y) representing the location of a certain point on the polygon. The polygon is transformed using the rule $(x, y) \rightarrow (ax, ay)$. Which statement must be true? **F** If a is greater than 1, the image of the polygon is congruent to the polygon. **G** If a is between 0 and 1, the image of the polygon is congruent to the polygon. **H** If a is greater than 1, the image of the polygon is smaller than the polygon. **J** If a is between 0 and 1, the image of the polygon is smaller than the polygon.	A polygon is graphed on a coordinate grid with (x, y) representing the location of a certain point on the polygon. The polygon is transformed using the rule $(x, y) \rightarrow (ax, ay)$. Choose the correct answer from each drop-down menu to complete the statement. If a is [Choose...] , the image of the polygon between 0 and 1 greater than 1 is [Choose...] than the polygon. smaller congruent

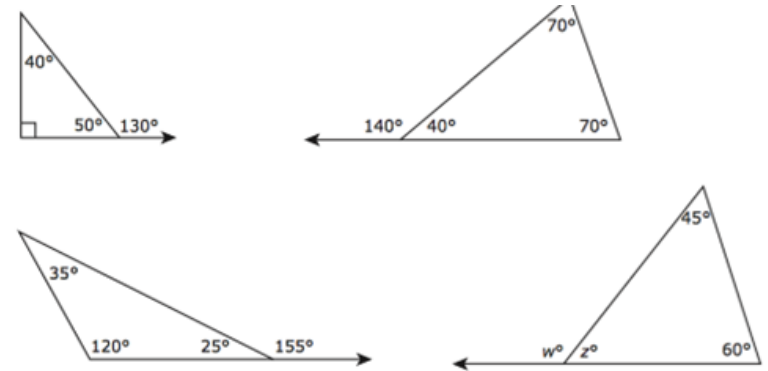| STAAR Released Item	Equation Editor/Text Entry

8.8(D) 2016 item 24
[Triangles and Transversals]

Four triangles are shown.
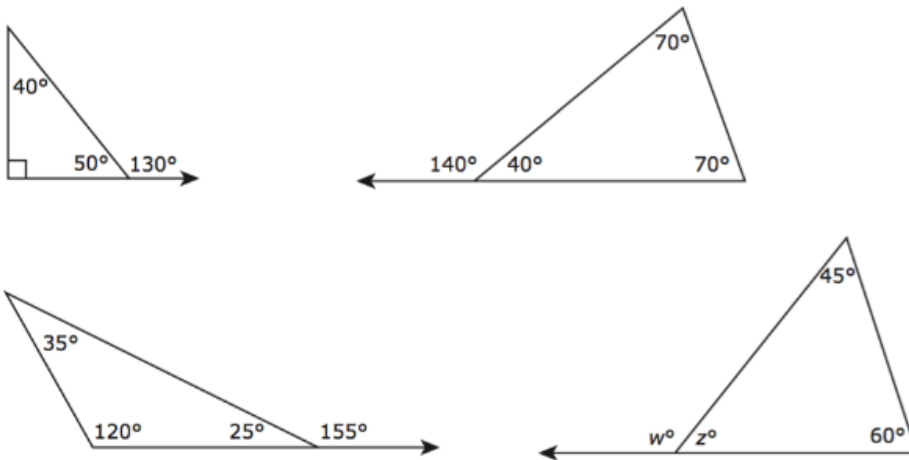
Based on these triangles, which statement is true?

F $w = 75°$, because $45 + 60 = 105$ and $180 - 105 = 75$

G $w = 105°$, because $180 - (45 + 60) = 75$ and $180 - 75 = 105$

H $w = 285°$, because $45 + 60 = 105$ and $105 + 180 = 285$

J $w = 165°$, because $180 - 60 = 120$ and $120 + 45 = 165$

What is the measure of angle w?

Enter your answer in the space provided.

STAAR Released Item	Multiselect

8.10(B) 2021 item 12
[Transformations]

A transformation is applied to a figure to create a new figure on a coordinate grid. Which transformation does NOT preserve congruence?

F   A rotation of 270° counterclockwise

G   A reflection across the y-axis

H   A dilation by a scale factor of 1.5

J   A translation of 50 units down

A transformation is applied to a figure to create a new figure on a coordinate grid. Which transformation preserves congruence?

Select **THREE** correct answers.

☐ A rotation of 270° counterclockwise

☐ A reflection across the y-axis

☐ A dilation by a scale factor of 1.5

☐ A translation of 50 units down

STAAR Released Item	Table Match Grid

8.10(B) 2016 item 33
[Transformations]

Which representation of a transformation on a coordinate grid does **not** preserve congruence?

A $(x, y) \rightarrow (\frac{1}{7}x, \frac{1}{7}y)$

B $(x, y) \rightarrow (x + 7, y + 7)$

C $(x, y) \rightarrow (x, -y)$

D $(x, y) \rightarrow (y, -x)$

Which of the following transformations preserves congruence?

Select the correct answer in each row.

Transformation	Perserves Congruence	Does Not Perserve Congruence
$(x, y) \rightarrow (\frac{1}{7}x, \frac{1}{7}y)$	☐	☐
$(x, y) \rightarrow (x + 7, y + 7)$	☐	☐
$(x, y) \rightarrow (x, -y)$	☐	☐
$(x, y) \rightarrow (y, -x)$	☐	☐

STAAR Released Item	Inline Choice

8.10(C) 2018 item 31
[Transformations]

Triangle *RST* is translated 6 units to the left and 4 units up to create triangle *R'S'T'*.
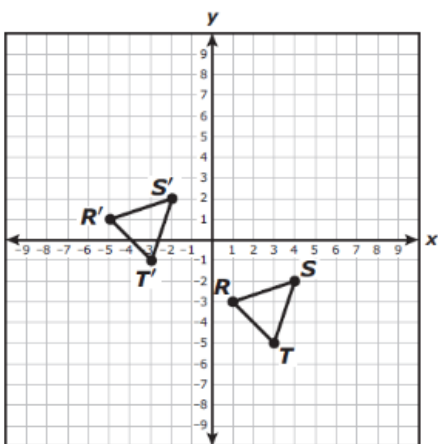
Which rule best describes this transformation?

A $(x, y) \rightarrow (6x, -4y)$

B $(x, y) \rightarrow (-6x, 4y)$

C $(x, y) \rightarrow (x + 6, y - 4)$

D $(x, y) \rightarrow (x - 6, y + 4)$

Triangle *RST* is translated 6 units to the left and 4 units up to create triangle *R'S'T'*.
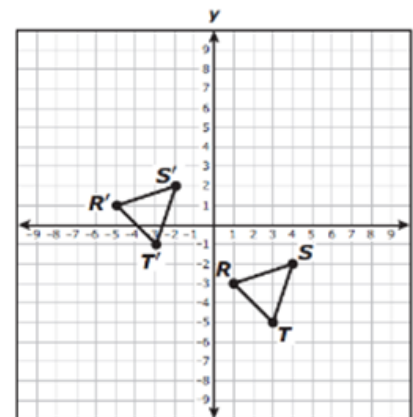
Choose the correct answer from each drop-down menu to complete the rule that describes this transformation.

$(x, y) \rightarrow ($ [Choose...] , [Choose...] $)$

$x + 6$	$y + 4$
$x - 6$	$y - 4$
$6x$	$4y$
$-6x$	$-4y$

Grade 8

Geometry and Measurement – Three-Dimensional

| STAAR Released Item	Inline Choice
8.6(A) 2021 item 14 [Volume] The diameter of a cylinder is 2.5 inches, and the height is 7.5 inches. Which equation can be used to find V, the volume of the cylinder in cubic inches? **F** $V = \pi(2.5)^2(7.5)$ **G** $V = \pi(7.5)^2(2.5)$ **H** $V = \pi(1.25)^2(7.5)$ **J** $V = \pi(3.75)^2(2.5)$	The diameter of a cylinder is 2.5 inches, and the height is 7.5 inches. Complete the equation that can be used to find V, the volume of the cylinder in cubic inches. Choose the correct answer from each drop-down menu to complete the equation. $V = \pi ($ [Choose...] $)^2 ($ [Choose...] $)$ 2.5 2.5 7.5 7.5 1.25 3.75

STAAR Released Item	Inline Choice

8.7(A) 2018 item 25
[Volume]

Snacks at a county fair are sold in containers shaped like a cone or a cylinder. The dimensions of each container are shown in the drawing.
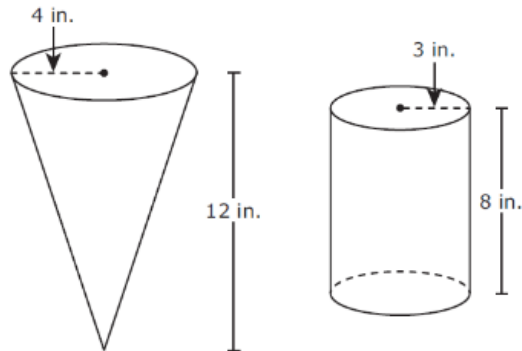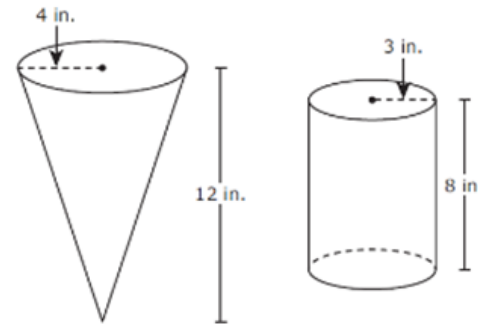

Which statement about the volumes of the cone and the cylinder is true?

A The volume of the cylinder is about 377 cubic inches greater than the volume of the cone.

B The volume of the cylinder is about 377 cubic inches less than the volume of the cone.

C The volume of the cylinder is about 25 cubic inches greater than the volume of the cone.

D The volume of the cylinder is about 25 cubic inches less than the volume of the cone.

Snacks at a county fair are sold in containers shaped like a cone or a cylinder. The dimensions of each container are shown in the drawing.

Complete the statement about the volumes of the cone and the cylinder.

Choose the correct answer from each drop-down menu to complete the statement.
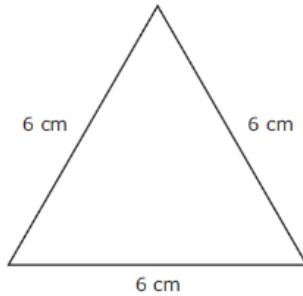
The volume of the cylinder is about [Choose...] cubic inches
25
377

[Choose...] the volume of the cone.
less than
greater than

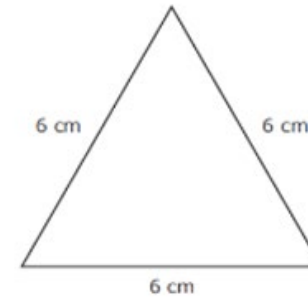| STAAR Released Item	Equation Editor/Text Entry
8.7(B) 2018 item 9 [Surface Area] A container is shaped like a triangular prism. Each base of the container is an equilateral triangle with the dimensions shown. 6 cm 6 cm 6 cm The container has a height of 15 centimeters. What is the lateral surface area of the container in square centimeters? Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.	A container is shaped like a triangular prism. Each base of the container is an equilateral triangle with the dimensions shown. 6 cm 6 cm 6 cm The container has a height of 15 centimeters. What is the lateral surface area of the container in square centimeters? Enter your answer in the space provided.