

Name: _____



New York State *Testing Program*

2016 Common Core Mathematics Test Book 1

Grade **8**

April 13–15, 2016

Released Questions

Book 1



TIPS FOR TAKING THE TEST

Here are some suggestions to help you do your best:

- Read each question carefully and think about the answer before choosing your response.
- You have been provided with mathematics tools (a ruler and a protractor) and a reference sheet to use during the test. It is up to you to decide when each tool and the reference sheet will be helpful. You should use mathematics tools and the reference sheet whenever you think they will help you to answer the question.
- Plan your time.

Grade 8 Mathematics Reference Sheet

CONVERSIONS

1 inch = 2.54 centimeters	1 kilometer = 0.62 mile	1 cup = 8 fluid ounces
1 meter = 39.37 inches	1 pound = 16 ounces	1 pint = 2 cups
1 mile = 5,280 feet	1 pound = 0.454 kilogram	1 quart = 2 pints
1 mile = 1,760 yards	1 kilogram = 2.2 pounds	1 gallon = 4 quarts
1 mile = 1.609 kilometers	1 ton = 2,000 pounds	1 gallon = 3.785 liters
		1 liter = 0.264 gallon
		1 liter = 1,000 cubic centimeters

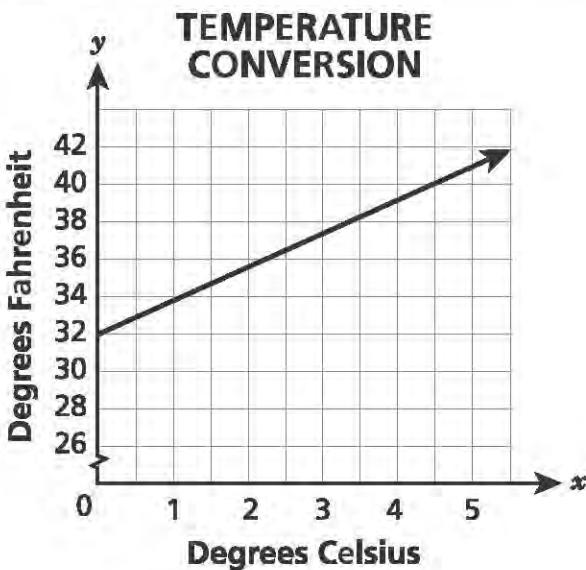
FORMULAS

Triangle	$A = \frac{1}{2}bh$
Parallelogram	$A = bh$
Circle	$A = \pi r^2$
Circle	$C = \pi d$ or $C = 2\pi r$
General Prisms	$V = Bh$
Cylinder	$V = \pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$
Cone	$V = \frac{1}{3}\pi r^2 h$
Pythagorean Theorem	$a^2 + b^2 = c^2$

1 Mr. Thomsen is buying two types of gift cards to give as prizes to employees at a company meeting. He will buy restaurant gift cards that each cost \$50. He will also buy movie theater gift cards that each cost \$20. He has \$450 to buy a total of 15 gift cards. How many of each type of gift card can Mr. Thomsen buy?

- A He can buy 5 restaurant gift cards and 10 movie theater gift cards.
- B He can buy 8 restaurant gift cards and 7 movie theater gift cards.
- C He can buy 10 restaurant gift cards and 5 movie theater gift cards.
- D He can buy 12 restaurant gift cards and 3 movie theater gift cards.

2 The relationship between temperature in degrees Fahrenheit and degrees Celsius is shown in the graph below.



What is the meaning of the y -intercept?

- A the change in degrees Fahrenheit for every change of one degree Celsius
- B the change in degrees Celsius for every change of one degree Fahrenheit
- C the temperature in degrees Fahrenheit when the temperature is zero degrees Celsius
- D the temperature in degrees Celsius when the temperature is zero degrees Fahrenheit

GO ON

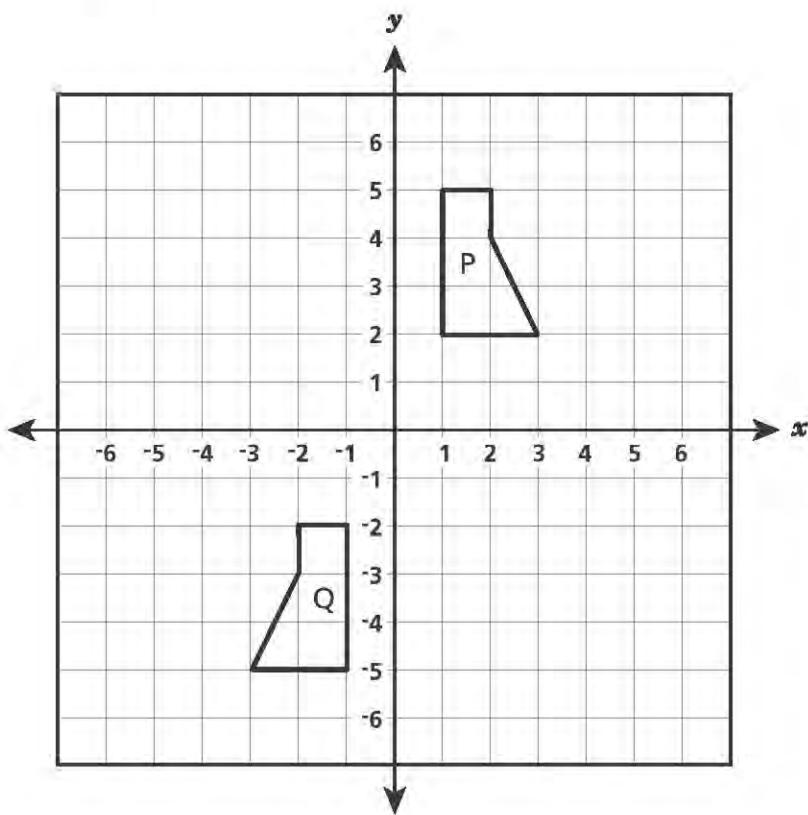
- 3** Kevin moved from a city to a small town. The population of the city is 6×10^5 , which is about 15 times as great as the small town. Which expression could represent the approximate population of the small town?

- A 4×10^3
- B 4×10^4
- C 9×10^5
- D 9×10^6

GO ON

4

Pentagon P and pentagon Q, shown below, are congruent.



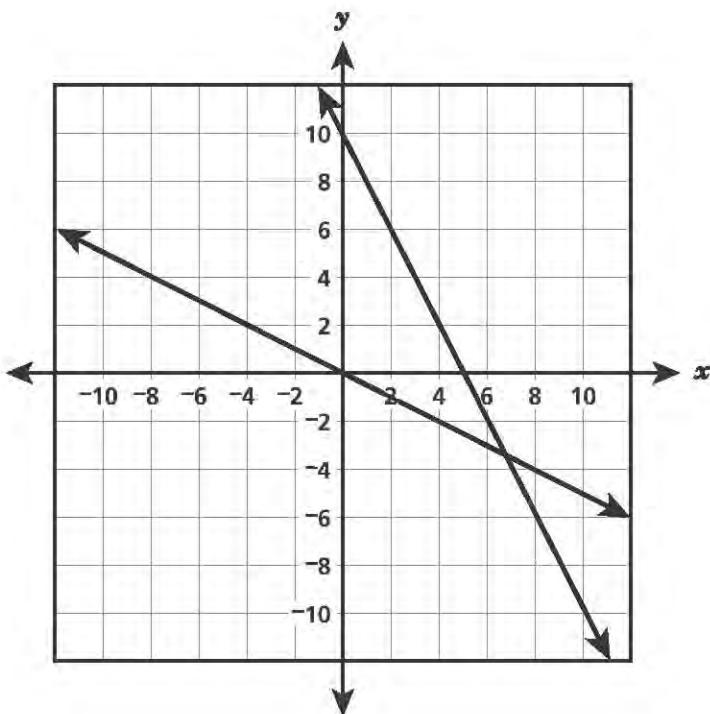
Which sequence could be used to transform pentagon P to pentagon Q?

- A a 180° clockwise rotation about the origin
- B a translation four units left and then a reflection over the x -axis
- C a reflection over the y -axis and then a translation seven units down
- D a translation seven units down and then a 90° clockwise rotation about the origin

GO ON

5

The graph of a system of equations is shown below.



What system of equations represents the graph?

$$y = -2x + 10$$

A $y = -\frac{1}{3}x$

$$y = -2x + 10$$

B $y = -\frac{1}{2}x$

$$y = -\frac{1}{2}x + 10$$

C $y = -2x$

$$y = -\frac{1}{3}x + 10$$

D $y = -2x$

GO ON

- 6** A cylinder and a cone have congruent heights and radii. What is the ratio of the volume of the cone to the volume of the cylinder?

- A 1:1
- B 1:3
- C 1:6
- D 1:9

- 7** Which of the equations listed below are linear equations?

Equation I: $C = 2\pi r$

Equation II: $A = \pi r^2$

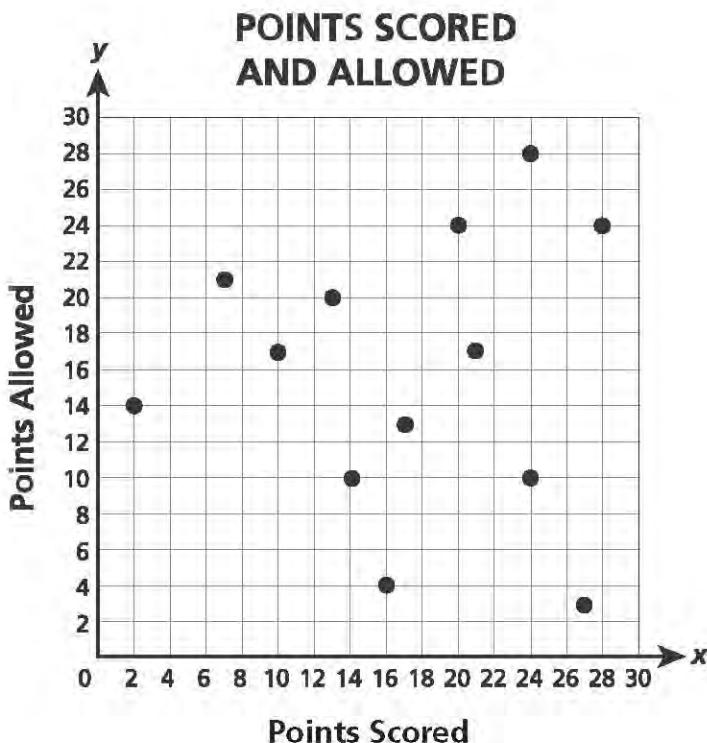
Equation III: $V = \frac{4}{3}\pi r^3$

- A equation I only
- B equation II only
- C equations I and III
- D equations II and III

GO ON

8

The scatter plot below shows the points scored and the points allowed by the Bulldogs football team for several games.



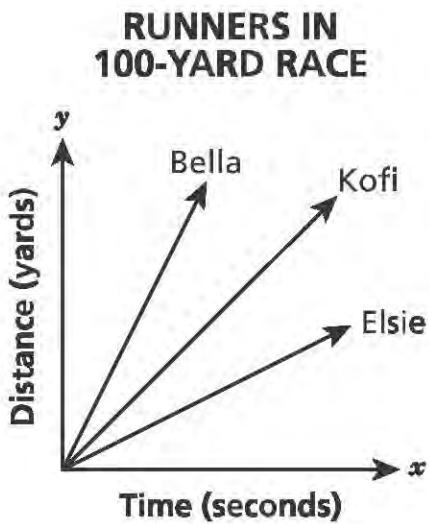
Which association (correlation) best describes the data?

- A no association (correlation)
- B positive association (correlation)
- C negative association (correlation)
- D nonlinear association (correlation)

GO ON

9

The graph below shows the relationship between the distances run and the time for three people in a 100-yard race.



The relationship between the distance run and the time for Kofi can be represented by the equation $y = 15.55x$, where he ran y yards in x seconds. Which two equations could be used to represent this relationship for Bella and Elsie?

- A Bella: $y = 15.15x$; Elsie: $y = 15.85x$
- B Bella: $y = 15.85x$; Elsie: $y = 15.65x$
- C Bella: $y = 15.45x$; Elsie: $y = 15.15x$
- D Bella: $y = 15.85x$; Elsie: $y = 15.15x$

GO ON

10

Which table of values represents a linear function?

A

x	y
0	0
1	1
4	16
9	81

C

x	y
0	0
1	2
4	8
9	18

B

x	y
0	1
1	3
4	9
9	20

D

x	y
0	0
1	2
4	4
9	6

GO ON

11

Simplify.

$$5^{-8} \times 5^4$$

A $\frac{1}{5^4}$

B $\frac{1}{5^{32}}$

C -5^2

D -5^{12}

12

What is the value of t that satisfies the equation below?

$$3(t + 4) - 2(2t + 3) = -4$$

A $-\frac{11}{3}$

B $-\frac{4}{5}$

C 10

D 11

GO ON

19

Ellentown College has approximately 3×10^3 students and Pengrove University has approximately 30,000 students. How many times as much is the number of students at Pengrove University as the number of students at Ellentown College?

- A 1
- B 10
- C 30
- D 100

20

A series of transformations on quadrilateral S resulted in quadrilateral T.

- The angle measures of quadrilateral T are congruent to those of quadrilateral S.
- The side lengths of quadrilateral T are twice as long as those of quadrilateral S.

Which transformation on quadrilateral S **must** be included to result in quadrilateral T?

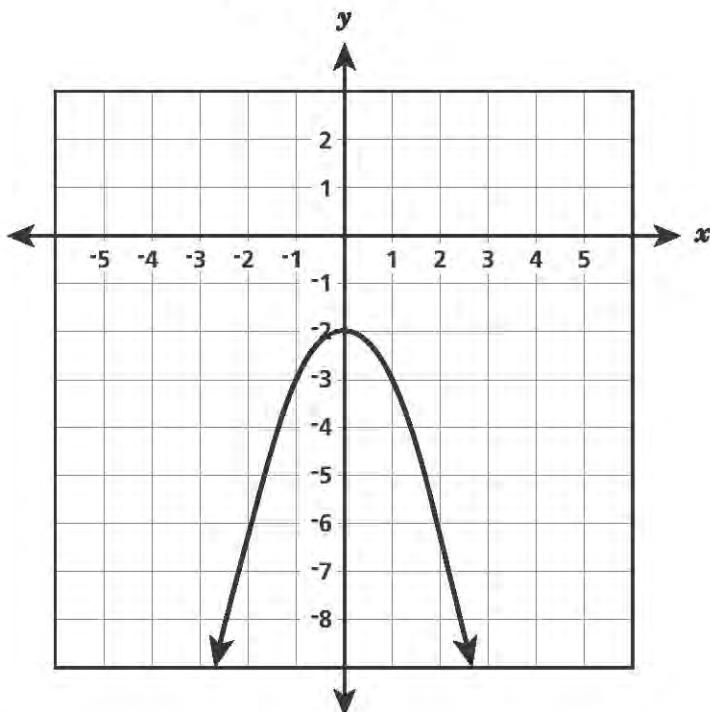
- A dilation
- B rotation
- C reflection
- D translation

GO ON

21

Function 1 is represented by the equation $y = -\frac{4}{5}x - 2$, and function 2 is represented by the graph below.

FUNCTION 2



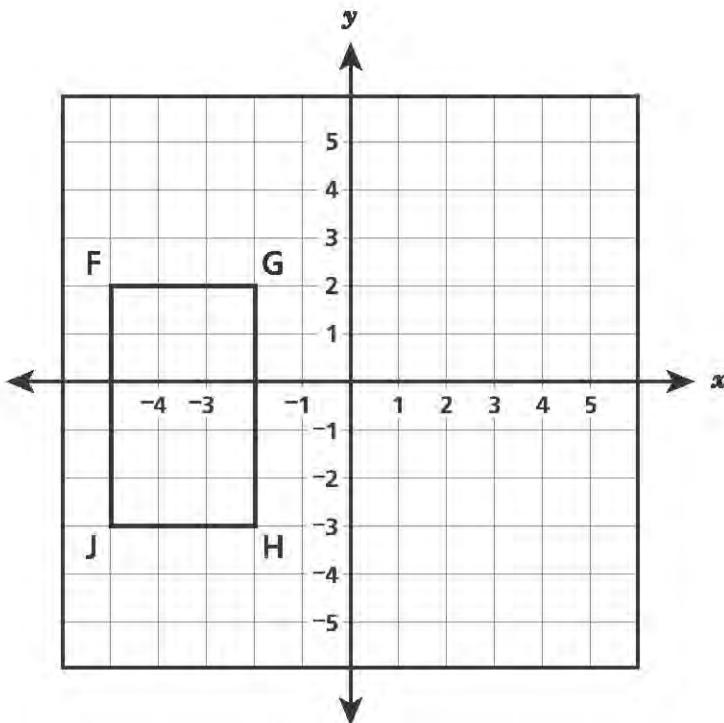
For which of the functions are all the output values less than -1 ?

- A both functions
- B only function 1
- C only function 2
- D neither function

GO ON

22

Rectangle $FGHJ$, shown below, is translated 6 units right and 1 unit up to produce rectangle $F'G'H'J'$.



Which statement about the side lengths of rectangle $F'G'H'J'$ is true?

- A $F'G' = 3$ and $G'H' = 5$
- B $F'G' = 3$ and $G'H' = 6$
- C $F'G' = 9$ and $G'H' = 5$
- D $F'G' = 9$ and $G'H' = 6$

GO ON

Book 2



TIPS FOR TAKING THE TEST

Here are some suggestions to help you do your best:

- Read each question carefully and think about the answer before choosing your response.
- You have been provided with mathematics tools (a ruler, protractor, and calculator) and a reference sheet to use during the test. It is up to you to decide when each tool and the reference sheet will be helpful. You should use mathematics tools and the reference sheet whenever you think they will help you to answer the question.
- Plan your time.

27

Solve the system of equations below.

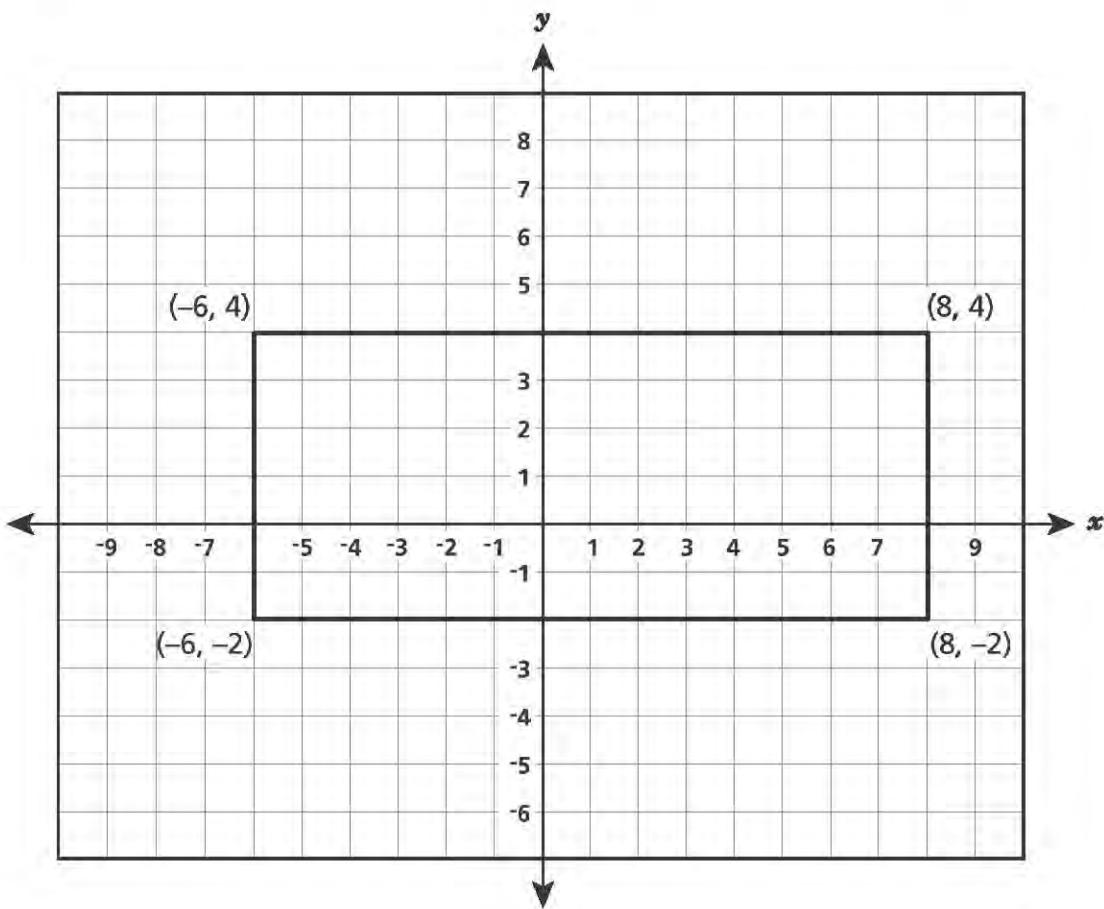
$$2x + 4y = 10$$

$$2x + 4y = -10$$

- A $x = 3, y = 1$
- B $x = 6, y = -4$
- C No solution
- D Infinitely many solutions

GO ON

Mia enlarged a plan for an outdoor stage. The original plan is shown below.



She dilated the outdoor stage by a scale factor of four with the center of dilation at the origin. Which ordered pair will be the coordinates of one of the new vertices?

- A $(2, 1)$
- B $(8, 16)$
- C $(32, 4)$
- D $(32, 16)$

29

Bianca and Nick are both musicians who sell their songs online. During the same year, Bianca sold 8×10^5 downloads of her songs and Nick sold 4×10^6 downloads of his songs. How many times as much is the number of songs that Nick sold than the number of songs that Bianca sold?

A 2

B 5

C 20

D 40

30

Which table represents a relation that is **not** a function?

A

Input	Output
1	1
2	1
3	1
4	1

C

Input	Output
-1	-7
-2	11
-3	13
-4	105

B

Input	Output
2	0
4	1
6	2
8	0

D

Input	Output
3	0
5	2
7	1
3	-4

GO ON

34

The Ecology Club was planning to take a field trip either to the seacoast or the mountains. The club president surveyed all of the members to determine the preferred trip. The results are displayed in the table below.

FIELD TRIP SURVEY

Students	Seacoast	Mountains	Total
Seventh-Grade	42	28	70
Eighth-Grade	30	50	80
Total	72	78	150

Which statement is true about the results of the survey?

- A 20% of eighth-grade students preferred the seacoast
- B 32% of seventh-grade students preferred the mountains
- C 40% of students preferred the mountains
- D 48% of students preferred the seacoast

35

A cylinder has a radius of 3 inches and a height of $4\frac{3}{4}$ inches. A sphere has a radius of 3 inches. What is the difference between the volumes, to the nearest tenth of a cubic inch, of the cylinder and the sphere?

- A 21.2
- B 51.8
- C 68.3
- D 96.6

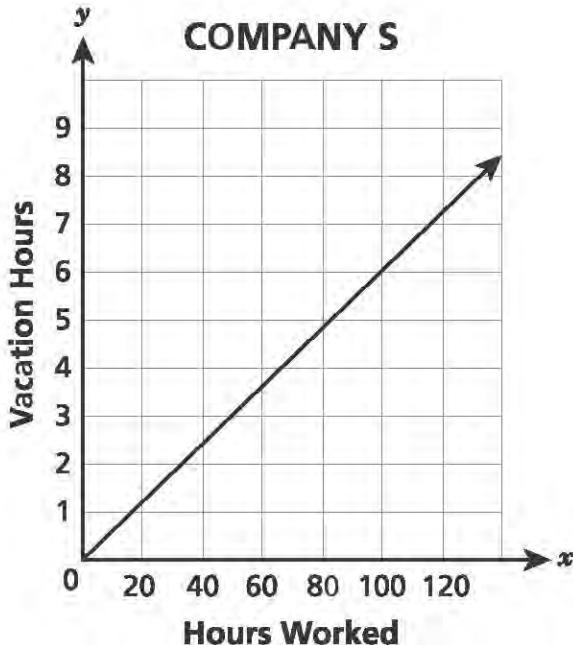
GO ON

36

Two friends work at different companies, P and S. Both companies use the number of hours that an employee works to calculate that employee's vacation hours. The relationship between the number of hours worked and the number of vacation hours for employees at each company is shown in the table and graph, respectively.

COMPANY P

Hours Worked	Vacation Hours
10	0.4
20	0.8
30	1.2
40	1.6
50	2.0



Which statement describes the difference in each friend's vacation hours if both work 2,080 hours?

- A The friend at company S will have about 42 more vacation hours than the friend at company P.
- B The friend at company S will have about 46 more vacation hours than the friend at company P.
- C The friend at company P will have about eight more vacation hours than the friend at company S.
- D The friend at company P will have about nine more vacation hours than the friend at company S.

GO ON

37 Which equation represents a nonlinear function?

A $y = -3x + 1$

B $y = x^2 + 1$

C $y = \frac{x}{2} + 1$

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

38 What is the value of the expression below?

$$\frac{(4.8 \times 10^8)}{(1.2 \times 10^4)} \times (2.2 \times 10^{-6})$$

A 0.88

B 0.088

C 0.0088

D 0.00088

39 A crane is lowering a concrete block from a height of 270 feet above the ground at a constant rate of 2.5 feet per second. Which function can be used to determine h , the height, in feet, above the ground of the concrete block after s seconds?

A $h = 270s + 2.5$

B $h = 2.5s + 270$

C $h = 270 - 2.5s$

D $h = 2.5s - 270$

GO ON

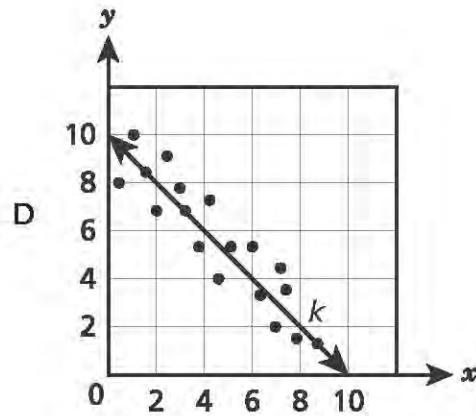
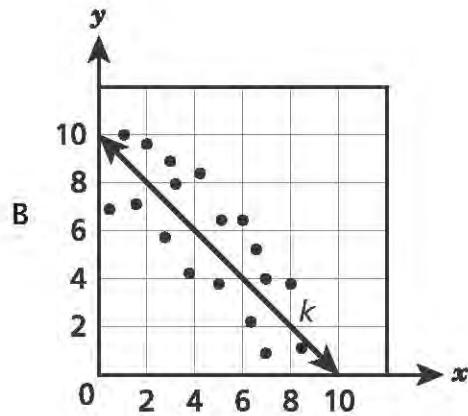
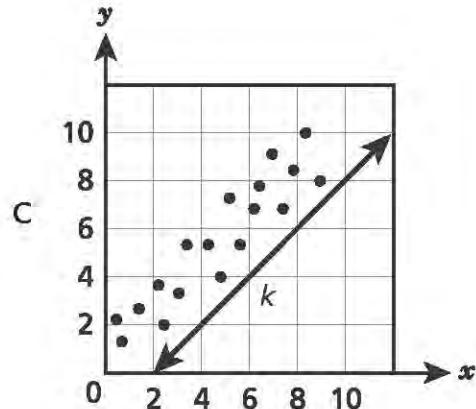
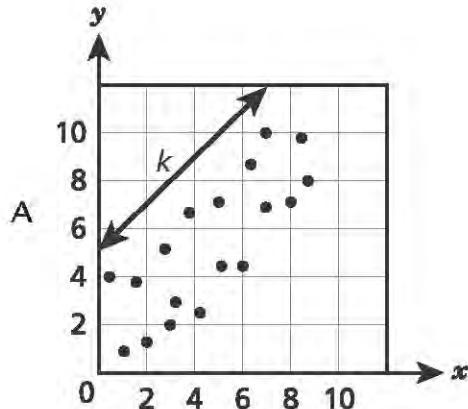
40

Function P is a linear function with a y -intercept of 5. Function Q is defined by the equation $y = -\frac{1}{3}x + 4$. Which statement **must** be true about functions P and Q?

- A Both functions have the same slope.
- B Both functions have a negative slope.
- C The functions will have the same input when $y = 0$.
- D The functions will have different outputs when $x = 0$.

41

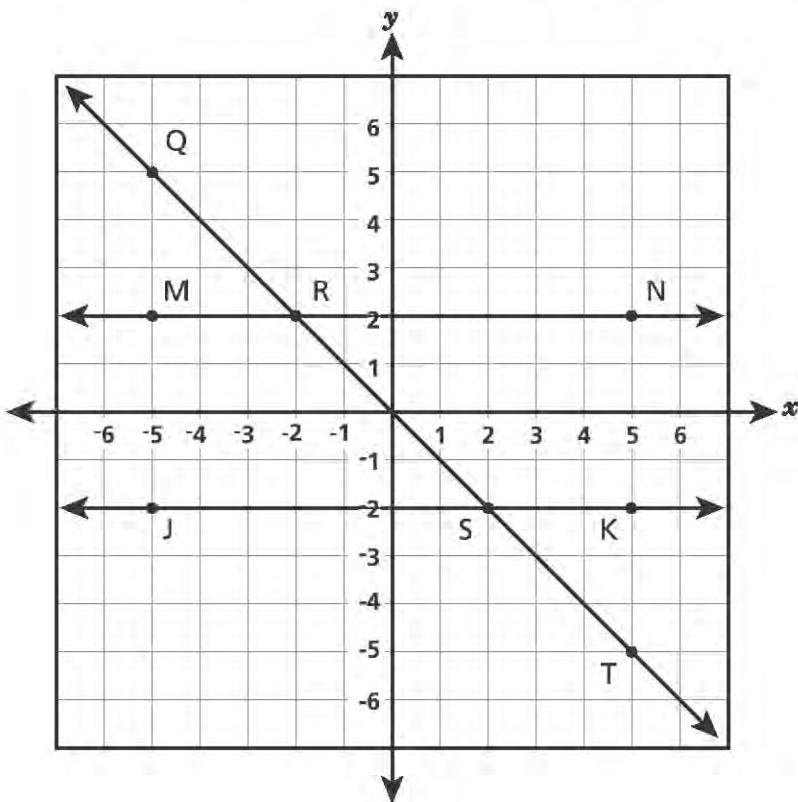
Line k is the line of best fit for a set of data on a scatter plot. The data show a strong linear association. Which scatter plot **best** represents these data and line k ?



GO ON

47

In the diagram below, lines MN and JK are parallel and are intersected by line QT.



Which transformation could be used to show that $\angle MRS$ is congruent to $\angle JST$?

- A reflect $\angle MRS$ over the x -axis
- B rotate $\angle MRS$ about the origin
- C translate $\angle MRS$ down and to the right
- D dilate $\angle MRS$ by a scale factor of two with the center at point R

GO ON

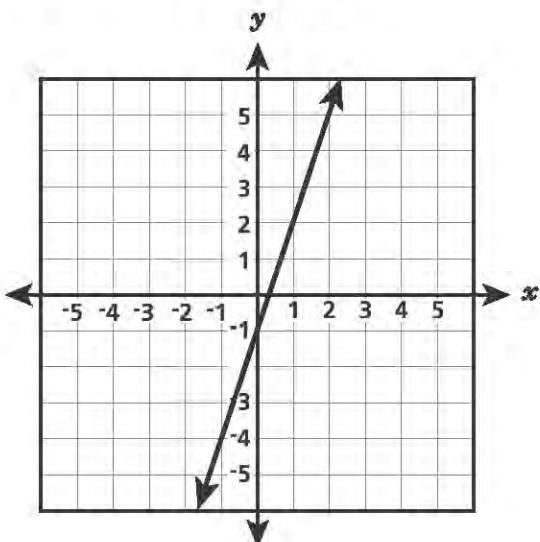
48

What is the equation of the line that passes through points $(-3, 0.5)$ and $(3, -0.5)$?

- A $y = -\frac{1}{6}x$
- B $y = -6x$
- C $y = -\frac{1}{6}x + 1$
- D $y = -6x - 17.5$

49

Function J is shown on the coordinate grid below.



If the y -intercept of Function R is $\frac{3}{2}$ greater than the y -intercept of Function J, which equation could represent Function R?

- A $y = -x + 4.5$
- B $y = 0.5x + 3$
- C $y = 3x + 0.5$
- D $y = 4.5x - 1$

GO ON

Book 3



TIPS FOR TAKING THE TEST

Here are some suggestions to help you do your best:

- Read each question carefully and think about the answer before writing your response.
- You have been provided with mathematics tools (a ruler, a protractor, and a calculator) and a reference sheet to use during the test. It is up to you to decide when each tool and the reference sheet will be helpful. You should use mathematics tools and the reference sheet whenever you think they will help you to answer the question.
- Be sure to show your work when asked.
- Plan your time.

52

Jude incorrectly simplified the expression $\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$, as shown below.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \left(\frac{1}{8}\right)^6 = \frac{1}{262,144}$$

Describe the mistake that Jude made.

Answer

Correctly simplify the expression.

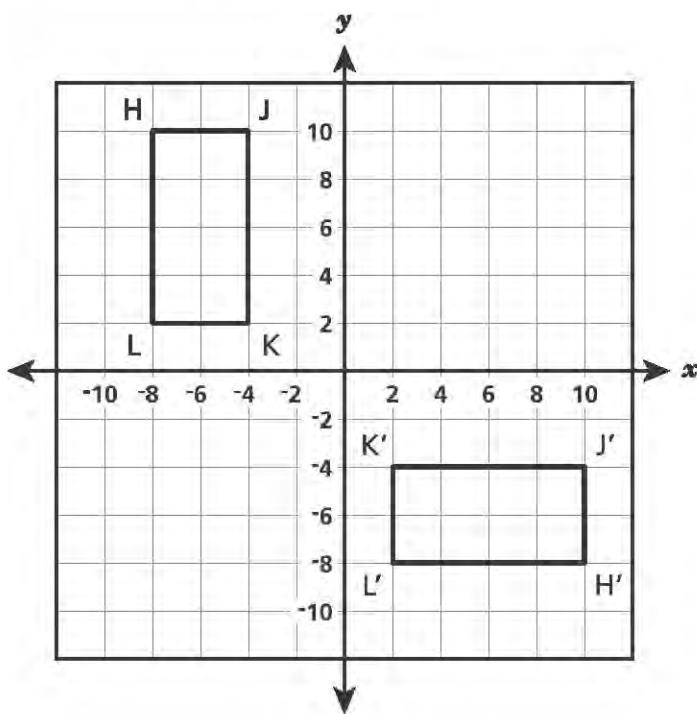
$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$$

Answer

GO ON

53

Congruent rectangles HJKL and $H'J'K'L'$ are shown on the coordinate grid below.



Describe a sequence of transformations on rectangle HJKL that would result in rectangle $H'J'K'L'$.

Answer

GO ON

54

Write an equation of a function that is not linear.

Answer _____

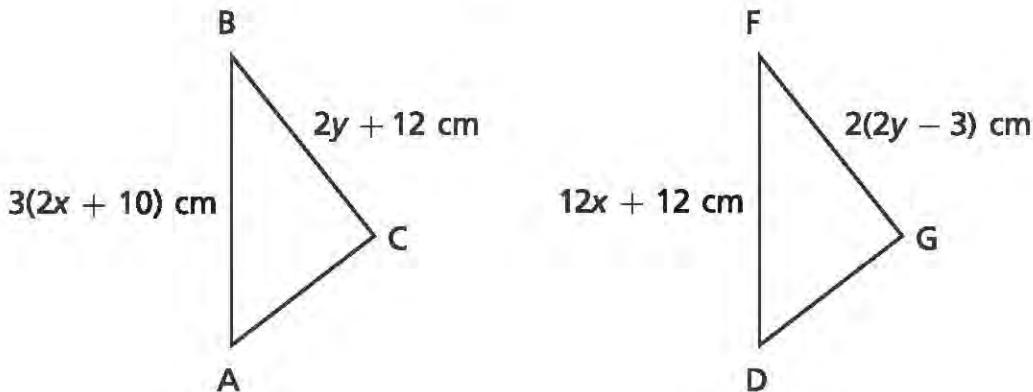
Use your equation to explain why your function is not linear.

Answer

GO ON

55

Triangle ABC is translated to create triangle DFG, as shown below.



In these triangles, side AB is congruent to side DF, and side BC is congruent to side FG. Determine the values of x and y .

Show your work.

Answer $x = \underline{\hspace{2cm}}$ and $y = \underline{\hspace{2cm}}$

GO ON

56

A reporter collected data on y , the current market value, in dollars, of a certain car for various years, x , after it had been purchased new. The equation below was fit to the data.

$$y = 16,500 - 1,500x$$

What does the slope of the graph of this equation represent?

Answer

What does the y -intercept of the graph of this equation represent?

Answer

GO ON

57

A triangle with vertices at $A(-1, 1)$, $B(-2, 1)$, and $C(-1, 4)$ is translated. The image of vertex A has coordinates at $(3, -1)$.

Determine the coordinates of either the image of vertex B or the image of vertex C.

Show your work.

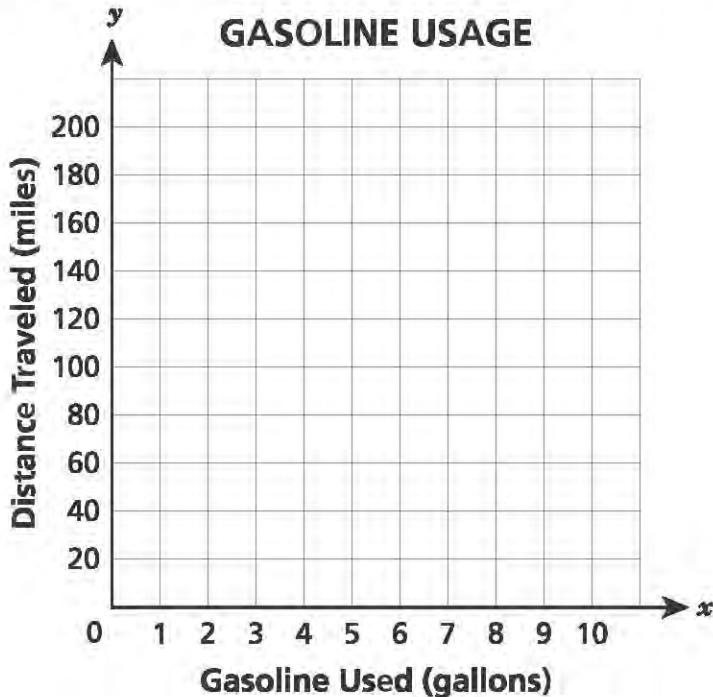
Answer _____

GO ON

Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x , and the distance traveled, y , during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.



How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

GO ON

59

Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

TOTAL AMOUNT OF MONEY FROM TICKET SALES

Number of Tickets Sold	Total Money in Box (dollars)
7	108.75
13	146.25
18	177.50

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

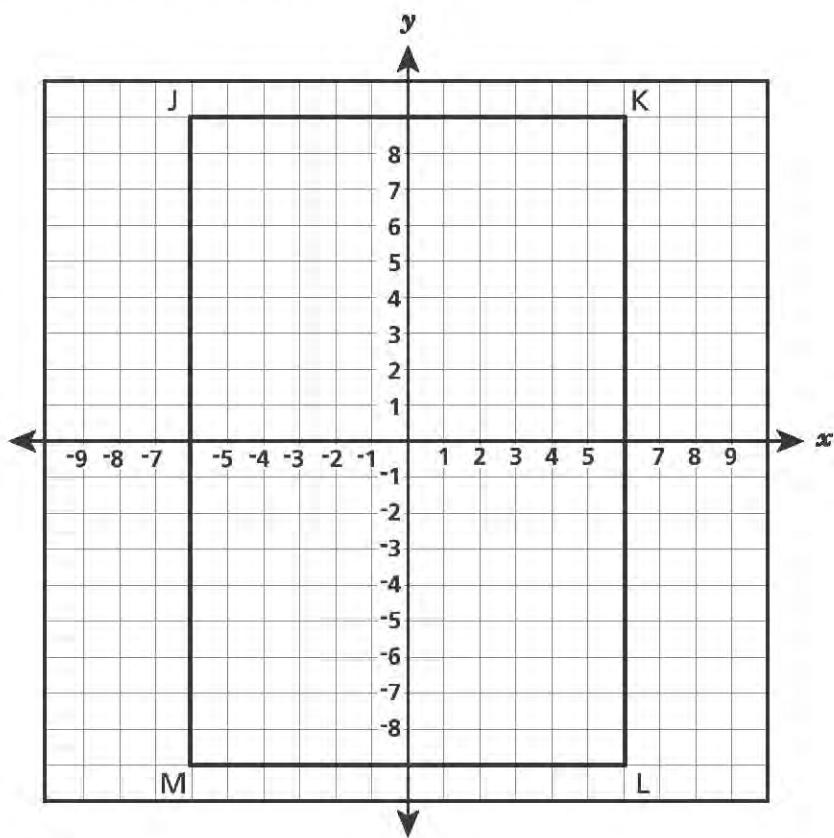
Show your work.

Answer

GO ON

60

Rectangle JKLM is shown on the coordinate grid below.



GO ON

Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are $(-3, 2)$, and the coordinates of vertex M' are $(3, -2)$.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

Show your work.

Answer

GO ON

61

Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p , the mass, in pounds, of one paperback, and t , the mass, in pounds, of one textbook.

Answer

Solve the system of equations to find the two masses.

Show your work.

Mass of one paperback _____ pound(s)

Mass of one textbook _____ pound(s)

STOP

THE STATE EDUCATION DEPARTMENT
THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234

2016 Mathematics Tests Map to the Standards

Grade 8

Released Questions Available on EngageNY

Question	Type	Key	Points	Standard	Cluster	Secondary Standard(s)	Multiple Choice Questions:		Constructed Response Questions:	
							Percentage of Students Who Answered Correctly (P-Value)	Average Points Earned	P-Value (Average Points Earned ÷ Total Possible Points)	
Book 1										
1	Multiple Choice	A	1	CCSS.Math.Content.8.EE.C.8c	Expressions and Equations		0.83			
2	Multiple Choice	C	1	CCSS.Math.Content.8.F.B.4	Functions		0.51			
3	Multiple Choice	B	1	CCSS.Math.Content.8.EE.A.3	Expressions and Equations		0.46			
4	Multiple Choice	C	1	CCSS.Math.Content.8.G.A.2	Geometry		0.61			
5	Multiple Choice	B	1	CCSS.Math.Content.8.EE.C.8b	Expressions and Equations		0.58			
6	Multiple Choice	B	1	CCSS.Math.Content.8.G.C.9	Geometry		0.51			
7	Multiple Choice	A	1	CCSS.Math.Content.8.F.A.3	Functions		0.44			
8	Multiple Choice	A	1	CCSS.Math.Content.8.SP.A.1	Statistics and Probability		0.49			
9	Multiple Choice	D	1	CCSS.Math.Content.8.EE.B.5	Expressions and Equations		0.39			
10	Multiple Choice	C	1	CCSS.Math.Content.8.F.A.3	Functions		0.55			
11	Multiple Choice	A	1	CCSS.Math.Content.8.EE.A.1	Expressions and Equations		0.57			
12	Multiple Choice	C	1	CCSS.Math.Content.8.EE.C.7b	Expressions and Equations		0.51			
19	Multiple Choice	B	1	CCSS.Math.Content.8.EE.A.3	Expressions and Equations		0.55			
20	Multiple Choice	A	1	CCSS.Math.Content.8.G.A.4	Geometry		0.72			
21	Multiple Choice	C	1	CCSS.Math.Content.8.F.A.2	Functions		0.31			
22	Multiple Choice	A	1	CCSS.Math.Content.8.G.A.1a	Geometry		0.76			
Book 2										
27	Multiple Choice	C	1	CCSS.Math.Content.8.EE.C.8b	Expressions and Equations		0.66			
28	Multiple Choice	D	1	CCSS.Math.Content.8.G.A.3	Geometry		0.52			
29	Multiple Choice	B	1	CCSS.Math.Content.8.EE.A.3	Expressions and Equations		0.58			
30	Multiple Choice	D	1	CCSS.Math.Content.8.F.A.1	Functions		0.53			
34	Multiple Choice	D	1	CCSS.Math.Content.8.SP.A.4	Statistics and Probability		0.50			
35	Multiple Choice	A	1	CCSS.Math.Content.8.G.C.9	Geometry		0.60			
36	Multiple Choice	A	1	CCSS.Math.Content.8.EE.B.5	Expressions and Equations		0.48			
37	Multiple Choice	B	1	CCSS.Math.Content.8.F.A.3	Functions		0.67			
38	Multiple Choice	B	1	CCSS.Math.Content.8.EE.A.4	Expressions and Equations		0.54			

Grade 8

Released Questions Available on EngageNY

Question	Type	Key	Points	Standard	Cluster	Secondary Standard(s)	Multiple Choice Questions:		Constructed Response Questions:	
							Percentage of Students Who Answered Correctly (P-Value)	Average Points Earned	P-Value (Average Points Earned ÷ Total Possible Points)	
39	Multiple Choice	C	1	CCSS.Math.Content.8.F.B.4	Functions		0.41			
40	Multiple Choice	D	1	CCSS.Math.Content.8.F.A.2	Functions		0.48			
41	Multiple Choice	D	1	CCSS.Math.Content.8.SP.A.2	Statistics and Probability		0.74			
47	Multiple Choice	C	1	CCSS.Math.Content.8.G.A.5	Geometry	CCSS.Math.Content.8.G.A.1	0.42			
48	Multiple Choice	A	1	CCSS.Math.Content.8.EE.B.6	Expressions and Equations		0.43			
49	Multiple Choice	C	1	CCSS.Math.Content.8.F.A.2	Functions		0.45			
Book 3										
52	Constructed Response		2	CCSS.Math.Content.8.EE.A.1	Expressions and Equations			0.80	0.40	
53	Constructed Response		2	CCSS.Math.Content.8.G.A.2	Geometry			0.74	0.37	
54	Constructed Response		2	CCSS.Math.Content.8.F.A.3	Functions			0.76	0.38	
55	Constructed Response		2	CCSS.Math.Content.8.EE.C.7a	Expressions and Equations	CCSS.Math.Content.8.G.A.1a		0.89	0.45	
56	Constructed Response		2	CCSS.Math.Content.8.SP.A.3	Statistics and Probability			0.52	0.26	
57	Constructed Response		2	CCSS.Math.Content.8.G.A.3	Geometry			0.76	0.38	
58	Constructed Response		3	CCSS.Math.Content.8.EE.B.5	Expressions and Equations			0.82	0.27	
59	Constructed Response		3	CCSS.Math.Content.8.F.B.4	Functions			0.68	0.23	
60	Constructed Response		3	CCSS.Math.Content.8.G.A.4	Geometry	CCSS.Math.Content.8.G.A.3		0.74	0.25	
61	Constructed Response		3	CCSS.Math.Content.8.EE.C.8c	Expressions and Equations			0.56	0.19	

*This item map is intended to identify the primary analytic skills necessary to successfully answer each question. However, some questions measure proficiencies described in multiple standards, including a balanced combination of procedural and conceptual understanding.

2-Point Holistic Rubric

2 Point	A two-point response includes the correct solution to the question and demonstrates a thorough understanding of the mathematical concepts and/or procedures in the task. This response <ul style="list-style-type: none">• indicates that the student has completed the task correctly, using mathematically sound procedures• contains sufficient work to demonstrate a thorough understanding of the mathematical concepts and/or procedures• may contain inconsequential errors that do not detract from the correct solution and the demonstration of a thorough understanding
1 Point	A one-point response demonstrates only a partial understanding of the mathematical concepts and/or procedures in the task. This response <ul style="list-style-type: none">• correctly addresses only some elements of the task• may contain an incorrect solution but applies a mathematically appropriate process• may contain the correct solution but required work is incomplete
0 Point*	A zero-point response is incorrect, irrelevant, incoherent, or contains a correct solution obtained using an obviously incorrect procedure. Although some elements may contain correct mathematical procedures, holistically they are not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

*Condition Code A is applied whenever a student who is present for a test session leaves an entire constructed-response question in that session completely blank (no response attempted).

3-Point Holistic Rubric

Score Points:

3 Point	A three-point response includes the correct solution(s) to the question and demonstrates a thorough understanding of the mathematical concepts and/or procedures in the task. This response <ul style="list-style-type: none">• indicates that the student has completed the task correctly, using mathematically sound procedures• contains sufficient work to demonstrate a thorough understanding of the mathematical concepts and/or procedures• may contain inconsequential errors that do not detract from the correct solution(s) and the demonstration of a thorough understanding
2 Point	A two-point response demonstrates a partial understanding of the mathematical concepts and/or procedures in the task. This response <ul style="list-style-type: none">• appropriately addresses most, but not all aspects of the task using mathematically sound procedures• may contain an incorrect solution but provides sound procedures, reasoning, and/or explanations• may reflect some minor misunderstanding of the underlying mathematical concepts and/or procedures
1 Point	A one-point response demonstrates only a limited understanding of the mathematical concepts and/or procedures in the task. This response <ul style="list-style-type: none">• may address some elements of the task correctly but reaches an inadequate solution and/or provides reasoning that is faulty or incomplete• exhibits multiple flaws related to misunderstanding of important aspects of the task, misuse of mathematical procedures, or faulty mathematical reasoning• reflects a lack of essential understanding of the underlying mathematical concepts• may contain the correct solution(s) but required work is limited
0 Point*	A zero-point response is incorrect, irrelevant, incoherent, or contains a correct solution obtained using an obviously incorrect procedure. Although some elements may contain correct mathematical procedures, holistically they are not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

*Condition Code A is applied whenever a student who is present for a test session leaves an entire constructed-response question in that session completely blank (no response attempted).

2016 2-and 3-Point Mathematics Scoring Policies

Below are the policies to be followed while scoring the mathematics tests for all grades:

1. If a student does the work in other than a designated “Show your work” area, that work should still be scored. (Additional paper is an allowable accommodation for a student with disabilities if indicated on the student’s Individual Education Program or Section 504 Accommodation Plan.)
2. If the question requires students to show their work, and the student shows appropriate work and clearly identifies a correct answer but fails to write that answer in the answer blank, the student should still receive full credit.
3. In questions that provide ruled lines for students to write an explanation of their work, mathematical work shown elsewhere on the page should be considered and scored.
4. If the student provides one legible response (and one response only), teachers should score the response, even if it has been crossed out.
5. If the student has written more than one response but has crossed some out, teachers should score only the response that has **not** been crossed out.
6. Trial-and-error responses are **not** subject to Scoring Policy #5 above, since crossing out is part of the trial-and-error process.
7. If a response shows repeated occurrences of the same conceptual error within a question, the student should **not** be penalized more than once.
8. In questions that require students to provide bar graphs,
 - in Grades 3 and 4 only, touching bars are acceptable
 - in Grades 3 and 4 only, space between bars does **not** need to be uniform
 - in all grades, widths of the bars must be consistent
 - in all grades, bars must be aligned with their labels
 - in all grades, scales must begin at 0, but the 0 does **not** need to be written
9. In questions requiring number sentences, the number sentences must be written horizontally.
10. In pictographs, the student is permitted to use a symbol other than the one in the key, provided that the symbol is used consistently in the pictograph; the student does not need to change the symbol in the key. The student may **not**, however, use multiple symbols within the chart, nor may the student change the value of the symbol in the key.
11. If students are not directed to show work, any work shown will not be scored. This applies to items that do not ask for any work and items that ask for work for one part and do not ask for work in another part.
12. Condition Code A is applied whenever a student who is present for a test session leaves an entire constructed-response question in that session completely blank (no response attempted). This is not to be confused with a score of zero wherein the student does respond to part or all of the question but that work results in a score of zero.

EXEMPLARY RESPONSE

52

Jude incorrectly simplified the expression $\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$, as shown below.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \left(\frac{1}{8}\right)^6 = \frac{1}{262,144}$$

Describe the mistake that Jude made.

Answer

Jude multiplied the fractions, irrespective of the exponents, and then added and applied
the exponents. He should have applied the law of exponents without changing the
fractions.

Correctly simplify the expression.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$$

$$\left(\frac{1}{2}\right)^6 = \frac{1}{64}$$

OR other equivalent solution

Answer

$$\frac{1}{64}$$

GUIDE PAPER 1

Additional

52

Jude incorrectly simplified the expression $\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$, as shown below.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \left(\frac{1}{8}\right)^6 = \frac{1}{262,144}$$

Describe the mistake that Jude made.

Answer

She multiplied the exponents together and the denominators.
She ~~multiplied~~ the whole thing.
She should have squared $\frac{1}{2}$ then multiplied it by $\frac{1}{2}$ then
cube $\frac{1}{2}$ and multiply it by the product.
Correctly simplify the expression.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$$

$$\frac{1}{4} \times \frac{1}{2} \times \frac{1}{8} = \frac{1}{64}$$

Answer

$$\frac{1}{64}$$

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly identifies Jude's mistake and follows a correct procedure to simplify the expression.

GUIDE PAPER 2

52

Jude incorrectly simplified the expression $\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$, as shown below.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \left(\frac{1}{8}\right)^6 = \frac{1}{262,144}$$

Describe the mistake that Jude made.

Answer

He multiplied all the fractions together then did the exponents.

Correctly simplify the expression.

$$\begin{aligned} & \left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 \\ & \frac{1}{4} \times \frac{1}{2} \times \frac{1}{8} \\ & \frac{1}{8} \times \frac{1}{8} \\ & \frac{1}{64} \end{aligned}$$

Answer

Yes

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly identifies Jude's mistake and follows a correct procedure to simplify the expression.

GUIDE PAPER 3

52

Jude incorrectly simplified the expression $\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$, as shown below.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \left(\frac{1}{8}\right)^6 = \frac{1}{262,144}$$

Describe the mistake that Jude made.

Answer

he multiplied the denominators

Correctly simplify the expression.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \frac{1}{2}^6 = 0.015625$$

Answer 0.015625

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly identifies Jude's mistake and follows a correct procedure to simplify the expression.

GUIDE PAPER 4

52

Jude incorrectly simplified the expression $\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$, as shown below.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \left(\frac{1}{8}\right)^6 = \frac{1}{262,144}$$

Describe the mistake that Jude made.

Answer

The fraction $\left(\frac{1}{2}\right)^2$ and $\left(\frac{1}{2}\right)^3$ were added incorrectly. Instead of $\left(\frac{1}{2}\right)^5$, Jude had $\left(\frac{1}{2}\right)^6$.

Correctly simplify the expression.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \left(\frac{1}{2}\right)^3 = \left(\frac{1}{2}\right)^5 = \frac{1}{32}$$

Answer $\frac{1}{32}$

Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The expression is simplified correctly; however, the explanation of Jude's mistake is incorrect. The response addresses some elements of the task correctly.

GUIDE PAPER 5

52

Jude incorrectly simplified the expression $\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$, as shown below.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \left(\frac{1}{8}\right)^6 = \frac{1}{262,144}$$

Describe the mistake that Jude made.

Answer

Jude multiplied the denominator when they should have found the answer to each one then multiplied them.

Correctly simplify the expression.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$$

$$\frac{1}{4} \times \frac{1}{2} \times \frac{1}{8} = \frac{1}{256}$$

Answer $\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \frac{1}{256}$

Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response correctly identifies Jude's mistake; however, a calculation error is made when simplifying the expression, resulting in an incorrect solution.

GUIDE PAPER 6

52

Jude incorrectly simplified the expression $\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$, as shown below.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \frac{1}{(8)} = \frac{1}{262,144}$$

Describe the mistake that Jude made.

Answer

The answer is correctly $\frac{1}{64}$
which equals $\frac{1}{8^2}$ not $\frac{1}{8^6}$ she
added the exponents $2, 1, 3$ and got
 6 .

Correctly simplify the expression.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \frac{1}{64} = \frac{1}{8^2}$$

Answer _____

Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response does not explain the mistake correctly; however, the expression is simplified correctly.

GUIDE PAPER 7

52

Jude incorrectly simplified the expression $\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$, as shown below.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \left(\frac{1}{8}\right)^6 = \frac{1}{262,144}$$

Describe the mistake that Jude made.

Answer

Jude did not multiply correctly top
for bottom. And the answer it should
~~be~~ ~~should~~ be multiplication for
the ~~and~~ ~~and~~ ~~is~~ ~~wrong~~.
Correctly simplify the expression.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$$

$$\begin{array}{r} +\frac{3}{5} \\ \hline 6 \end{array}$$

Answer $\frac{1}{8}^6 = \frac{1}{64}^6$

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in task. The response does not adequately explain Jude's mistake. Two different answers are given [$\frac{1}{64}$ and $(\frac{1}{64})^6$]; in addition, $(\frac{1}{64})^6$ is not equal to $(\frac{1}{8})^6$.

GUIDE PAPER 8

Additional

52

Jude incorrectly simplified the expression $\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$, as shown below.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3 = \left(\frac{1}{8}\right)^6 = \frac{1}{262,144}$$

Describe the mistake that Jude made.

Answer

The mistake Jude made was she multiplied the exponents 2 and 6 instead of adding them.

Correctly simplify the expression.

$$\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3$$

$\overbrace{\left(\frac{1}{2}\right)^2 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^3}^{\text{add}} \quad \left(\frac{1}{8}\right)^5$

multiply

Answer $\frac{1}{8}$

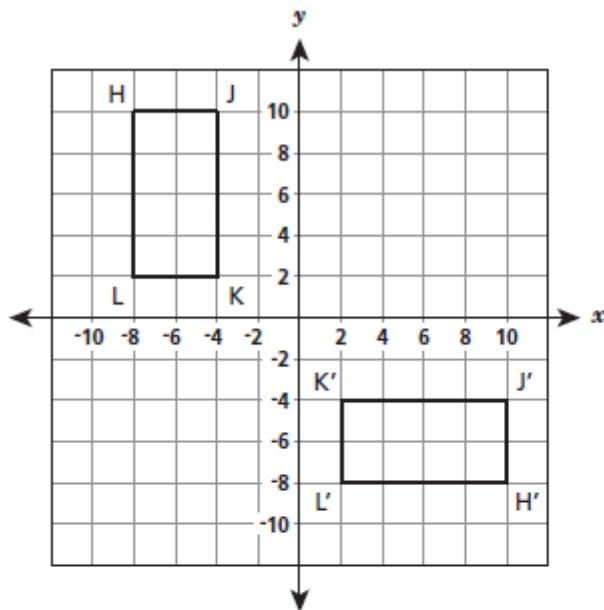
Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in task. The response does not explain the mistake correctly and the solution is incorrect.

EXEMPLARY RESPONSE

53

Congruent rectangles HJKL and H'J'K'L' are shown on the coordinate grid below.



Describe a sequence of transformations on rectangle HJKL that would result in rectangle H'J'K'L'.

Answer

Rotate 90° clockwise about the origin, then reflect over the x -axis ($y = 0$) OR

Reflect over the x -axis, then rotate 90° counterclockwise about the origin OR

Rotate 90° counterclockwise about the origin, then reflect over the y -axis ($x = 0$) OR

Reflect over the y -axis, then rotate 90° clockwise about the origin.

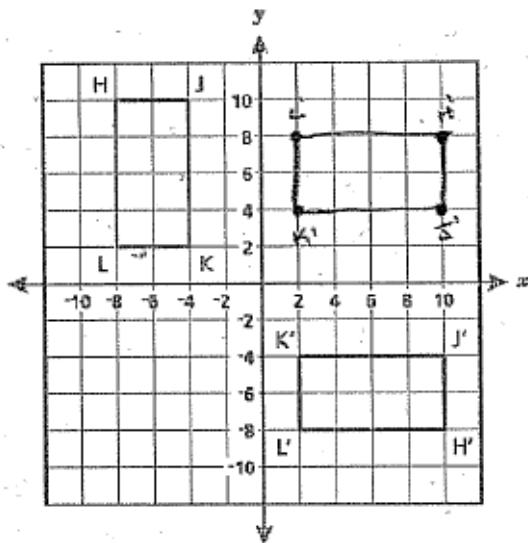
OR other valid response

GUIDE PAPER 1

Additional

53

Congruent rectangles HJKL and H'J'K'L' are shown on the coordinate grid below.



Describe a sequence of transformations on rectangle HJKL that would result in rectangle H'J'K'L'.

Answer

In order for triangle HJKL to lie
as triangle H'J'K'L', you need to make
a rotation of 90° clockwise and a
reflection over the x-axis.

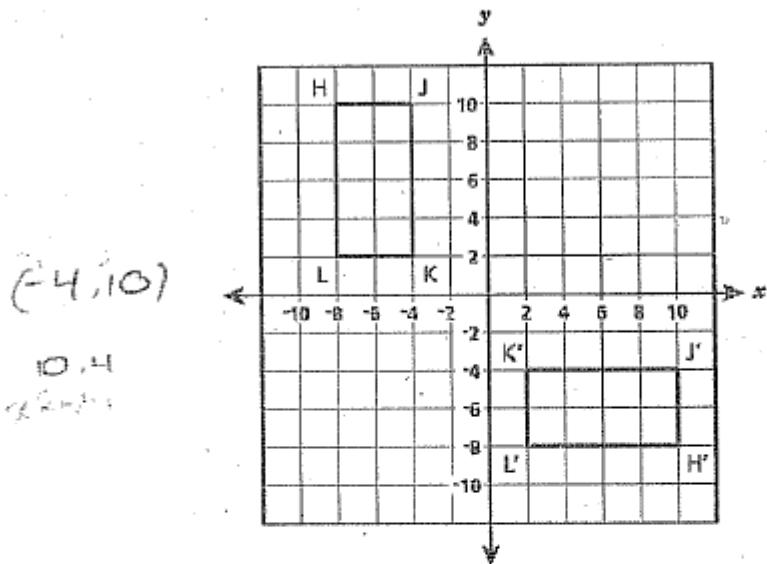
Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. A correct sequence of transformations is provided. Although the response does not indicate the center of rotation, it is implied that the rotation is done about the origin. Referring to rectangles HJKL and H'J'K'L' as triangles is considered an inconsequential that does not detract from the correct solution.

GUIDE PAPER 2

53

Congruent rectangles HJKL and $H'J'K'L'$ are shown on the coordinate grid below.



Describe a sequence of transformations on rectangle HJKL that would result in rectangle $H'J'K'L'$.

Answer

Rotate 90° counter clockwise about the origin, then reflect across the y-axis.

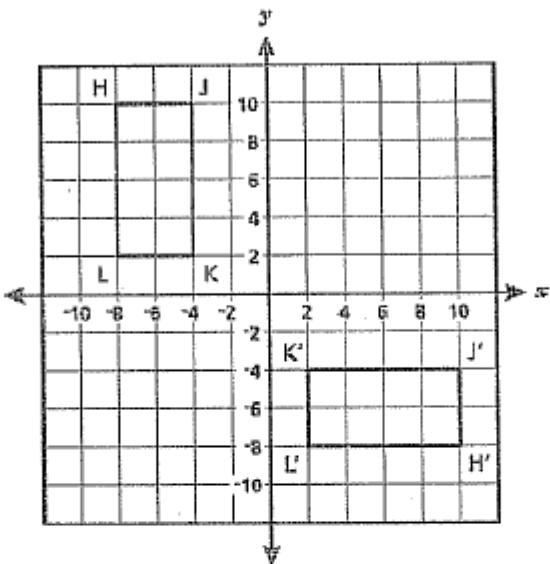
Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly describes the sequence of transformations.

GUIDE PAPER 3

53

Congruent rectangles HJKL and $H'J'K'L'$ are shown on the coordinate grid below.



Describe a sequence of transformations on rectangle HJKL that would result in rectangle $H'J'K'L'$.

Answer

Rotate 90° Clockwise, Reflect

Over the X-axis

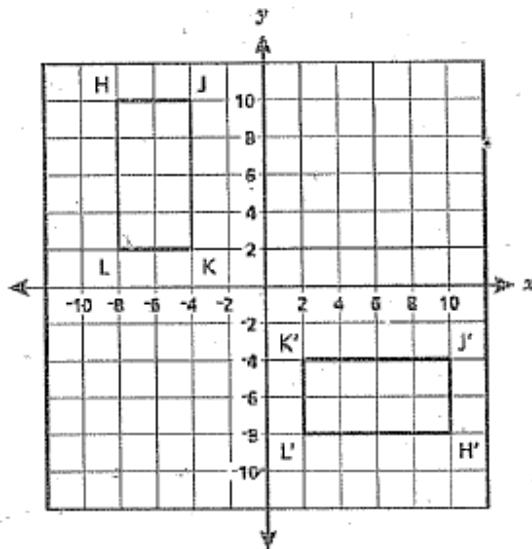
Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. A correct sequence of transformations is provided. The center of rotation about the origin is implied; its omission is an inconsequential error that does not detract from the correct solution.

GUIDE PAPER 4

53

Congruent rectangles HJKL and H'J'K'L' are shown on the coordinate grid below.



Describe a sequence of transformations on rectangle HJKL that would result in rectangle H'J'K'L'.

Answer

Reflect the rectangle about the x-axis, then rotate the image about point L counterclockwise 90° . After that, translate the image 3 units down and 10 units to the right.

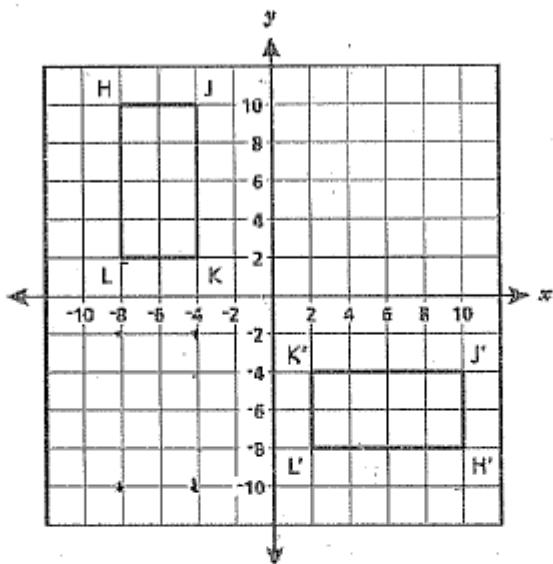
Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response correctly describes reflection over the x -axis. However, while it is possible to obtain rectangle H'J'K'L' via rotation about point L and then translating, the magnitude of the y -component of the translation is incorrect: the translation required would be 6 units down.

GUIDE PAPER 5

53

Congruent rectangles HJKL and H'J'K'L' are shown on the coordinate grid below.



Describe a sequence of transformations on rectangle HJKL that would result in rectangle H'J'K'L'.

Answer

The rectangle HJKL was reflected across the x-axis then rotated 90° clockwise around the origin

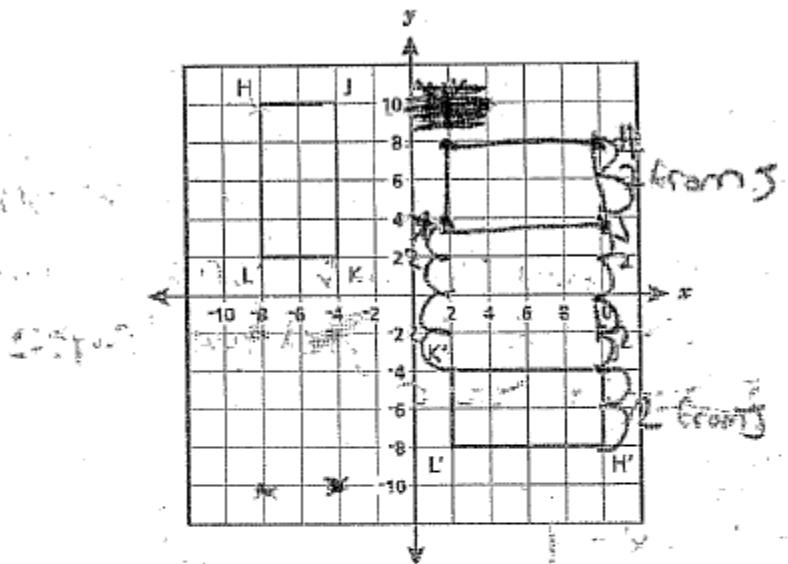
Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response correctly describes reflection over the x -axis; however, a 90° clockwise rotation is incorrect: it should have been counterclockwise about the origin.

GUIDE PAPER 6

53

Congruent rectangles HJKL and H'J'K'L' are shown on the coordinate grid below.



Describe a sequence of transformations on rectangle HJKL that would result in rectangle H'J'K'L'.

Answer

First rotate the angle then
do a reflection from the
x axis

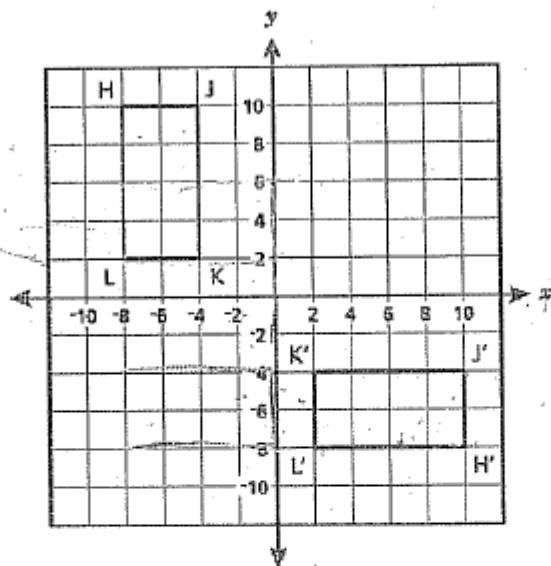
Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The statement “reflection from the x-axis” correctly refers to reflection over the x-axis; however, the description of the rotation is not specific enough to earn full credit.

GUIDE PAPER 7

53

Congruent rectangles HJKL and H'J'K'L' are shown on the coordinate grid below.



Describe a sequence of transformations on rectangle HJKL that would result in rectangle H'J'K'L'.

Answer

A rotation 90° , and a translation
5 units down and 5 units to
the right.

Score Point 0 (out of 2 points)

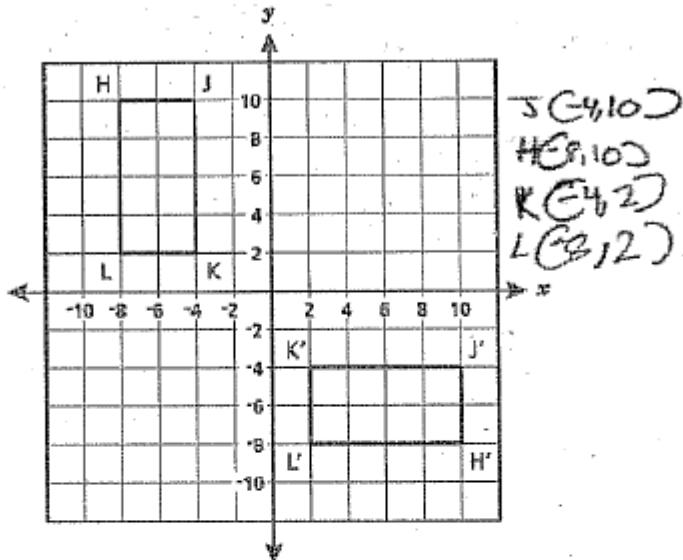
This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in task. No direction of rotation is provided and the statement about translation is incorrect.

GUIDE PAPER 8

Additional

53

Congruent rectangles HJKL and H'J'K'L' are shown on the coordinate grid below.



Describe a sequence of transformations on rectangle HJKL that would result in rectangle H'J'K'L'.

Answer

T(-4, 10) H(-8, 10) R(-4, 2) L(-8, 2)

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in task. The response provides correct coordinates of rectangle HJKL; however, this does not address the task.

EXEMPLARY RESPONSE

54

Write an equation of a function that is not linear.

Answer $y = x^2$ OR $f(x) = x^3$ OR other non-linear function

Use your equation to explain why your function is not linear.

Answer

$y = x^2$ is not a linear function because it is a parabola instead of a straight line. The points $(0, 0)$, $(2, 4)$, and $(-2, 4)$ are part of the $y = x^2$ graph and do not form a straight line.

OR other valid explanation

GUIDE PAPER 1

Additional

54

Write an equation of a function that is not linear.

Answer $y = x^2 - 10x + 12$

Use your equation to explain why your function is not linear.

Answer

It is a quadratic, therefore not being a straight line, but a curved line (like a ∇).

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. A correct example of a non-linear function is given and the explanation correctly identifies why the function is not linear.

GUIDE PAPER 2

54

Write an equation of a function that is not linear.

Answer ~~$y = 2x + 2$~~ $y = x^2 + 3x + 2$

Use your equation to explain why your function is not linear.

Answer

I^H would be a parabola.

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. A correct example of a non-linear function is given and the explanation correctly identifies why the function is not linear.

GUIDE PAPER 3

54

Write an equation of a function that is not linear.

Answer $y = x^2 + 7x - 4$

Use your equation to explain why your function is not linear.

Answer

This function is not linear
because it involves an x^2 .

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. A correct example of a non-linear function is given and the explanation correctly identifies why the function is not linear.

GUIDE PAPER 4

54

Write an equation of a function that is not linear.

Answer $x^2 + 4x + 32$

Use your equation to explain why your function is not linear.

Answer

This function is not linear because it is a quadratic that, when graphed, will form a parabola.

Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. An incorrect example of a non-linear function is given: the example is an expression, not a function. The response correctly explains why a quadratic function is not linear.

GUIDE PAPER 5

54

Write an equation of a function that is not linear.

Answer $x^2 + 2 = 18$

Use your equation to explain why your function is not linear.

Answer

This isn't a linear function because it has an x^2 .

Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. An incorrect example of a non-linear function is given; it does not contain a second variable. The response correctly explains why this equation is not linear.

GUIDE PAPER 6

54

Write an equation of a function that is not linear.

Answer $y = x^2 + 1$

Use your equation to explain why your function is not linear.

Answer

It is not linear because a linear when plotted on a grid will be a straight line.

Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. A correct example of a non-linear function is given. Although the response correctly states that a linear function is graphed as a straight line, it does not adequately explain that the graph of the given function is not straight.

GUIDE PAPER 7

54

Write an equation of a function that is not linear.

Answer $4x + 0y = 4$

Use your equation to explain why your function is not linear.

Answer

I added a zero to make it
nonlinear.

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in task. An incorrect example of a non-linear function is given and the explanation of why this function is not linear is incorrect.

GUIDE PAPER 8

Additional

54

Write an equation of a function that is not linear.

Answer $y = 3x$

Use your equation to explain why your function is not linear.

Answer

It's not linear because I wrote
it as $y = mx + b$

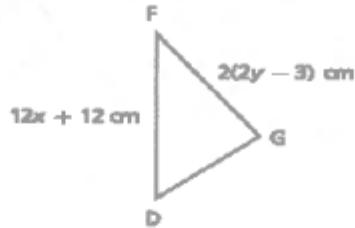
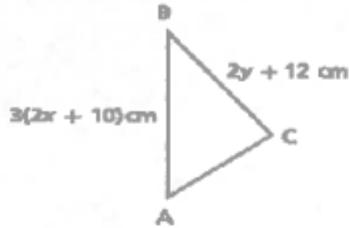
Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in task. An incorrect example of a non-linear function is given and the explanation of why this function is not linear is incorrect.

EXEMPLARY RESPONSE

55

Triangle ABC is translated to create triangle DFG, as shown below.



In these triangles, side AB is congruent to side DF, and side BC is congruent to side FG. Determine the values of x and y .

Show your work.

$$3(2x + 10) = 12x + 12$$

$$6x + 30 = 12x + 12$$

$$-6x \quad -6x$$

$$30 = 6x + 12$$

$$-12 \quad -12$$

$$18 = 6x$$

$$\div 6 \quad \div 6$$

$$3 = x$$

$$2y + 12 = 2(2y - 3)$$

$$2y + 12 = 4y - 6$$

$$-2y \quad -2y$$

$$12 = 2y - 6$$

$$+6 \quad +6$$

$$18 = 2y$$

$$\div 2 \quad \div 2$$

$$9 = y$$

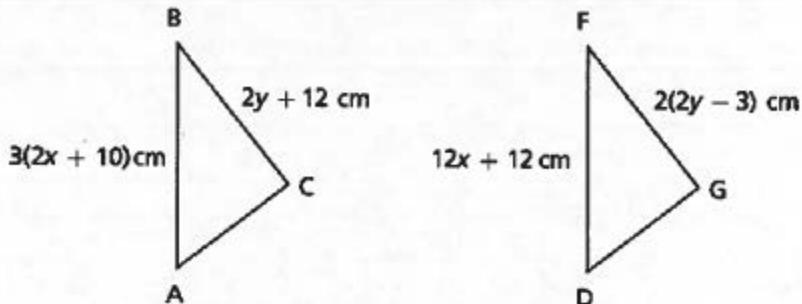
Answer $x = \underline{\hspace{2cm}} 3 \underline{\hspace{2cm}}$ and $y = \underline{\hspace{2cm}} 9 \underline{\hspace{2cm}}$

GUIDE PAPER 1

Additional

55

Triangle ABC is translated to create triangle DFG, as shown below.



In these triangles, side AB is congruent to side DF, and side BC is congruent to side FG. Determine the values of x and y .

Show your work.

$$BC = FG$$

$$AB = DF$$

$$3(2x + 10) = 12x + 12 \quad 2y + 12 = 2(2y - 3)$$

$$\begin{array}{rcl} 6x + 30 & = & 12x + 12 \\ -6x & & -6x \end{array} \quad \begin{array}{rcl} 2y + 12 & = & 4y - 6 \\ +6 & & +6 \end{array}$$

$$\begin{array}{rcl} 30 & = & 6x + 12 \\ -12 & & -12 \end{array} \quad \begin{array}{rcl} 2y + 12 & = & 4y \\ -2y & & -2y \end{array}$$

$$\frac{18}{6} = \frac{6x}{6}$$

$$x = 3$$

$$\frac{12}{2} = \frac{2y}{2}$$

$$y = 4$$

Answer $x = 3$ cm and $y = 4$ cm

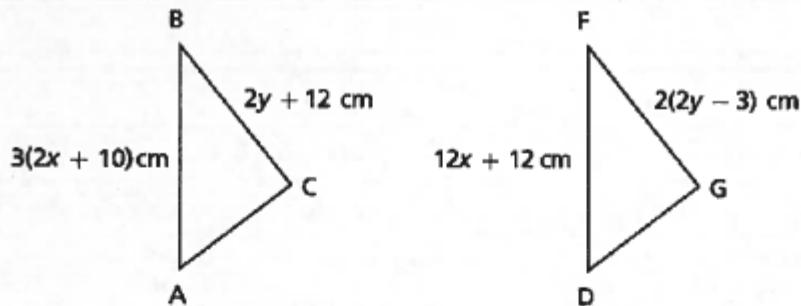
Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response follows a correct procedure to solve for the values of x and y .

GUIDE PAPER 2

55

Triangle ABC is translated to create triangle DFG, as shown below.



In these triangles, side AB is congruent to side DF, and side BC is congruent to side FG. Determine the values of x and y .

Show your work.

$$\begin{aligned} 6x + 30 &= 12x + 12 & 4y - 6 \\ -30 && -30 \\ 6x &= 12x - 18 & 2y + 12 = 4y - 6 \\ -6x &= -18 & -2y = -18 \\ 6x &= 18 & y = 9 \\ x &= 3 \end{aligned}$$

Answer $x = \underline{\hspace{2cm}} 3 \text{ cm} \underline{\hspace{2cm}}$ and $y = \underline{\hspace{2cm}} 9 \text{ cm} \underline{\hspace{2cm}}$

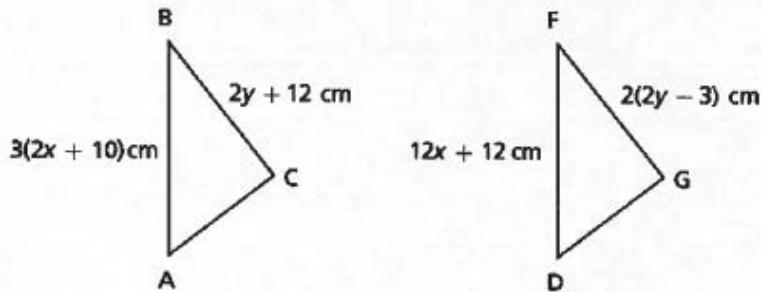
Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response follows a correct procedure to solve for the values of x and y .

GUIDE PAPER 3

55

Triangle ABC is translated to create triangle DFG, as shown below.



In these triangles, side AB is congruent to side DF, and side BC is congruent to side FG. Determine the values of x and y .

Show your work.

$$\begin{array}{l}
 \begin{aligned}
 3(2x+10) \text{ cm} &= 12x+12 \text{ cm} \\
 (6x+30) \text{ cm} &= 12x+12 \text{ cm} \\
 \cancel{6x+30} &\quad \cancel{-6x} \\
 30 \text{ cm} &= 6x+12 \\
 \underline{30 \text{ cm}} &\quad \underline{-12} \\
 18 \text{ cm} &= 6x \\
 \underline{6} &\quad \underline{6} \\
 3 &= x
 \end{aligned}
 \quad \left. \begin{aligned}
 2y+12 \text{ cm} &= 2(2y-3) \text{ cm} \\
 2y+12 \text{ cm} &= 4y-6 \text{ cm} \\
 \cancel{2y+12} &\quad \cancel{-2y} \\
 12 \text{ cm} &= 2y-6 \text{ cm} \\
 +6 \text{ cm} &\quad +6 \text{ cm} \\
 18 \text{ cm} &= 2y \\
 \underline{18 \text{ cm}} &\quad \underline{2} \\
 9 &= y
 \end{aligned} \right\}
 \end{array}$$

Check x values

$$\begin{aligned}
 x(2x+10) \text{ cm} &= 12(3)+12 \text{ cm} \\
 x(6+10) \text{ cm} &= 36+12 \text{ cm} \\
 x(16) \text{ cm} &= 48 \text{ cm} \\
 48 \text{ cm} &= 48 \text{ cm} \checkmark
 \end{aligned}$$

Check values of y

$$\begin{aligned}
 2(y)+12 \text{ cm} &= 2(2(y)-3) \text{ cm} \\
 18+12 &= 2(18-3) \\
 30 &= 2(15) \\
 30 &= 30 \checkmark
 \end{aligned}$$

Answer $x = 3$

and $y = 9$

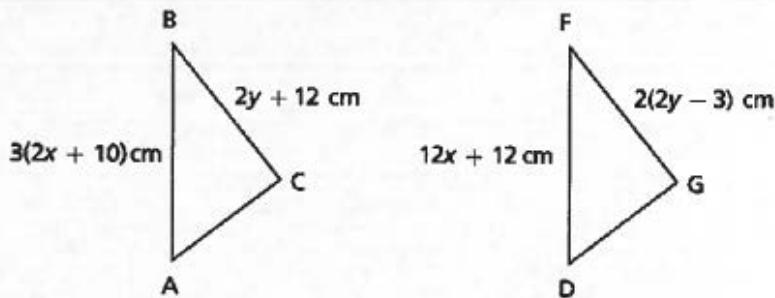
Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response follows a correct procedure to solve for the values of x and y .

GUIDE PAPER 4

55

Triangle ABC is translated to create triangle DFG, as shown below.



In these triangles, side AB is congruent to side DF, and side BC is congruent to side FG. Determine the values of x and y .

Show your work.

$$\begin{aligned} 3x(2x+10) &= 12x+12 \\ 2y+12 &= 2(2y-3) \quad 6x+30x = 12x+12 \\ -2y+12 &= 4y-6 \quad 36x = 12x+12 \\ 12 &= 2y-6 \quad \cancel{-12x} \\ \frac{18}{2} &= 2y \quad \frac{24}{24} = \frac{12}{24} \\ y &= 9 \quad x = 0.5 \end{aligned}$$

✓ Answer $x = 0.5$ and $y = 9$

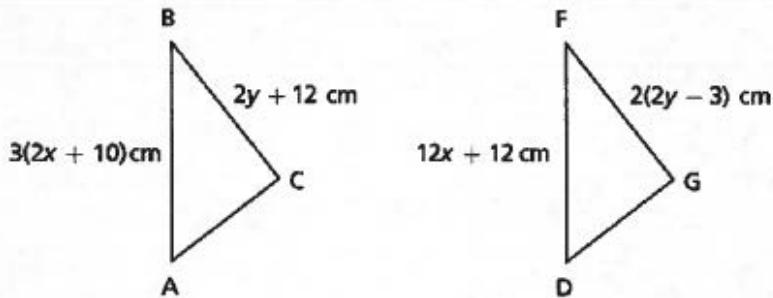
Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The work follows a correct procedure to find the value of y ; however, a calculation error (10 is multiplied by $3x$ rather than 3) results in an incorrect solution for x .

GUIDE PAPER 5

55

Triangle ABC is translated to create triangle DFG, as shown below.



In these triangles, side AB is congruent to side DF, and side BC is congruent to side FG. Determine the values of x and y .

Show your work.

$$\begin{aligned}3(2x+10) &= 12x+12 \\6x+30 &= 12x+12 \\-12 &\quad -12 \\6x+18 &= 12x \\-6x &\quad -6x \\18 &= 6x \\18 &\quad 6 \\x = 6 &\end{aligned}$$

$$\begin{aligned}2(2y-3) &= 2y+12 \\4y-6 &= 2y+12 \\4y-2y &= 12+6 \\2y &= 18 \\2y &\quad 2 \\y = 9 &\end{aligned}$$

Answer $x =$ 6 and $y =$ 9

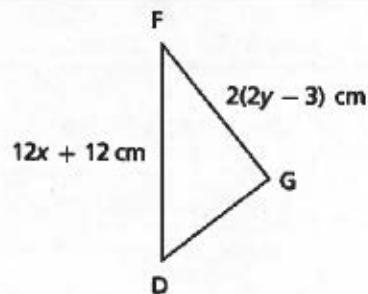
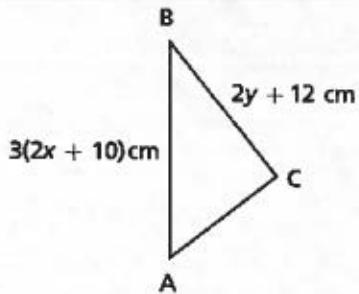
Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The work follows a correct procedure to find the value of y ; however, a calculation error ($18 \div 6 = 6$) results in an incorrect solution for x .

GUIDE PAPER 6

55

Triangle ABC is translated to create triangle DFG, as shown below.



In these triangles, side AB is congruent to side DF, and side BC is congruent to side FG. Determine the values of x and y .

Show your work.

$$\begin{aligned} 2y + 12 &= 2(2y - 3) \\ 2y + 12 &= 4y - 6 \\ 2y - 4y &= -6 - 12 \\ -2y &= -18 \\ \cancel{-2}y &= \cancel{-18} \\ y &= 9 \end{aligned}$$
$$\begin{aligned} 3(2x + 10) &= 12x + 12 \\ 5x + 30 &= 12x + 12 \\ -5x &= -18 \\ 5x &= 12x - 18 \\ -12x &= -18 \\ -7x &= -18 \\ \cancel{-7}x &= \cancel{-18} \\ x &= 2.57 \end{aligned}$$

Answer $x =$ 2.57 and $y =$ 9

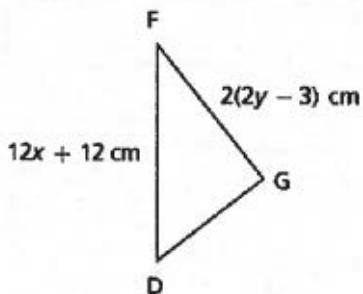
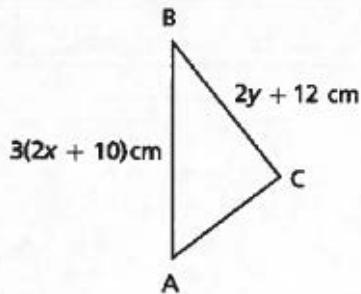
Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The work follows a correct procedure to find the value of y ; however, a calculation error ($3 \times 2x = 5x$) results in an incorrect solution for x .

GUIDE PAPER 7

55

Triangle ABC is translated to create triangle DFG, as shown below.



In these triangles, side AB is congruent to side DF, and side BC is congruent to side FG. Determine the values of x and y .

Show your work.

$$\begin{aligned} & \cancel{3(2x+10)} \quad 2y+12 \\ & \cancel{(6x+30)} \quad 2y-12 \\ \hline & (6x+18) \quad 2y \\ & \cancel{6x+36} \quad \cancel{36} \\ \hline & 6 \quad 6 \end{aligned}$$

$$\begin{aligned} & 12x+12 \quad \cancel{2(2y-3)} \\ & 12x+12 \quad \cancel{(4y-6)} \\ \hline & 12x+18 \quad 4y \\ & \cancel{3} \quad \cancel{18} \\ & 48x+72 \quad \cancel{x4} \\ \hline & 72 \end{aligned}$$

Answer $x =$ 6 and $y =$ 48

Score Point 0 (out of 2 points)

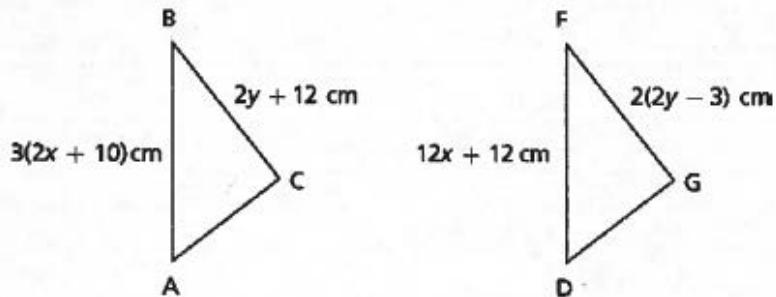
This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in task. Both answers and the work to obtain them are incorrect.

GUIDE PAPER 8

Additional

55

Triangle ABC is translated to create triangle DFG, as shown below.



In these triangles, side AB is congruent to side DF, and side BC is congruent to side FG. Determine the values of x and y .

$$y = mx + b$$

Show your work.

$$\begin{array}{l}
 \begin{array}{rcl}
 & 3(2x+10) & 2y+12 \\
 & \underline{-12} & \underline{-12} \\
 & 6x+30 &
 \end{array} \\
 \begin{array}{rcl}
 3(2x+10) = 2y+12 \\
 6x+30 = 2y+12 \\
 \underline{-2} \quad \underline{-2} \\
 6x+28 = 12 \\
 \underline{-28} \quad \underline{-28} \\
 6x = 16 \\
 \underline{\cancel{6}} \quad \underline{\cancel{16}} \\
 x = 2.6
 \end{array} \qquad \begin{array}{rcl}
 & 12x+12 & 2(2y-3) \\
 & \underline{2} & \underline{2} \\
 & 12x+12 & 4y-3 \\
 & \underline{4} \quad \underline{4} & \underline{4} \\
 12x+8 = 3 \\
 \underline{12} \quad \underline{8} \\
 8 = 3 \\
 \cancel{8} = \cancel{3} \\
 1 = 1
 \end{array}
 \end{array}$$

Answer $x =$ 2.6 and $y =$ 8

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in task. Both answers and the work to obtain them are incorrect.

EXEMPLARY RESPONSE

56

A reporter collected data on y , the current market value, in dollars, of a certain car for various years, x , after it had been purchased new. The equation below was fit to the data.

$$y = 16,500 - 1,500x$$

What does the slope of the graph of this equation represent?

Answer

The value in dollars by which the current market value of the car decreases

each year.

OR other equivalent answer

What does the y -intercept of the graph of this equation represent?

Answer

The original cost of the car.

OR other equivalent answer

GUIDE PAPER 1

Additional

56

A reporter collected data on y , the current market value, in dollars, of a certain car for various years, x , after it had been purchased new. The equation below was fit to the data.

$$y = 16,500 - 1,500x$$

Value Years

What does the slope of the graph of this equation represent?

Answer

The slope (m) represents the value that is removed per year.

What does the y -intercept of the graph of this equation represent?

Answer

The y -intercept (b) represents the starting value of the car.

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response provides a correct interpretation of the slope and y -intercept.

GUIDE PAPER 2

56

A reporter collected data on y , the current market value, in dollars, of a certain car for various years, x , after it had been purchased new. The equation below was fit to the data.

$$y = b - mx$$
$$y = 16,500 - 1,500x$$

What does the slope of the graph of this equation represent?

Answer

The slope represents how much the price decreases yearly, which is 1,500.

What does the y -intercept of the graph of this equation represent?

Answer

It represents the starting price of the car when it first came out.

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response provides a correct interpretation of the slope and y -intercept.

GUIDE PAPER 3

56

A reporter collected data on y , the current market value, in dollars, of a certain car for various years, x , after it had been purchased new. The equation below was fit to the data.

$$y = 16,500 - 1,500x$$

What does the slope of the graph of this equation represent?

Answer

The slope represents that the car is \$1,500 less than the year before.

What does the y -intercept of the graph of this equation represent?

Answer

The y -intercept is what the car's original starting price was.

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response provides a correct interpretation of the slope and y -intercept.

GUIDE PAPER 4

56

A reporter collected data on y , the current market value, in dollars, of a certain car for various years, x , after it had been purchased new. The equation below was fit to the data.

$$y = 16,500 - 1,500x$$

1500^{1/2}

What does the slope of the graph of this equation represent?

Answer

The change in value^{of the car} over a certain amount of time (years)

What does the y -intercept of the graph of this equation represent?

Answer

The initial value of the car

Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. A correct interpretation of the y -intercept is provided; however, the interpretation of the slope is incomplete: the response does not indicate that the value of the car is decreasing as opposed to increasing.

GUIDE PAPER 5

56

A reporter collected data on y , the current market value, in dollars, of a certain car for various years, x , after it had been purchased new. The equation below was fit to the data.

$$y = 16,500 - 1,500x$$

What does the slope of the graph of this equation represent?

Answer

The slope of the graph of this equation represents how much the market value of a car decreased.

What does the y -intercept of the graph of this equation represent?

Answer

The y -intercept of the graph of this equation represents the amount of dollars it started off with at 0 years.

Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response provides an incomplete interpretation of the slope: it does not indicate the change as occurring over time. A correct interpretation of the y -intercept is provided.

GUIDE PAPER 6

56

A reporter collected data on y , the current market value, in dollars, of a certain car for various years, x , after it had been purchased new. The equation below was fit to the data.

$$y = 16,500 - 1,500x \quad y = mx + b$$

What does the slope of the graph of this equation represent?

Answer

The amount of money the car loses value each year

What does the y -intercept of the graph of this equation represent?

Answer

The value of the car on the current market value

Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response provides a correct interpretation of the slope; however, the y -intercept is incorrectly interpreted as the current market value of the car.

GUIDE PAPER 7

56

A reporter collected data on y , the current market value, in dollars, of a certain car for various years, x , after it had been purchased new. The equation below was fit to the data.

$$y = 16,500 - 1,500x$$

What does the slope of the graph of this equation represent?

Answer

The slope represents how much money the car costs a year

What does the y -intercept of the graph of this equation represent?

Answer

The y -intercept represents how much the car is worth

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in task. The interpretations of the slope and the y -intercept are incorrect.

GUIDE PAPER 8

Additional

56

A reporter collected data on y , the current market value, in dollars, of a certain car for various years, x , after it had been purchased new. The equation below was fit to the data.

$$y = 16,500 - 1,500x$$

What does the slope of the graph of this equation represent?

Answer

The Slope represents how much
it went down

What does the y -intercept of the graph of this equation represent?

Answer

The y -intercept of the graph represents
where it intercepts on the y axis

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in task. An incomplete explanation of the slope is provided: it does not specify that the change occurs over time and the word “it” is not specific. In addition, the response does not explain what the y -intercept represents.

EXEMPLARY RESPONSE

57

A triangle with vertices at $A(-1, 1)$, $B(-2, 1)$, and $C(-1, 4)$ is translated. The image of vertex A has coordinates at $(3, -1)$.

Determine the coordinates of either the image of vertex B or the image of vertex C.

Show your work.

Vertex A

$$(-1, 1) + (4, -2) = (3, -1)$$

OR

Translation Matrix

$$(3, -1) - (-1, 1) = (4, -2)$$

THEN use this to solve for either:

Vertex B

$$(-2, 1) + (4, -2) = (2, -1)$$

OR

Vertex C

$$(-1, 4) + (4, -2) = (3, 2)$$

OR other valid process

Answer Vertex B'(2, -1) OR Vertex C'(3, 2)

GUIDE PAPER 1

Additional

57

A triangle with vertices at $A(-1, 1)$, $B(-2, 1)$, and $C(-1, 4)$ is translated. The image of vertex A has coordinates at $(3, -1)$.

Determine the coordinates of either the image of vertex B or the image of vertex C.

Show your work.

$(-1, 1) \rightarrow (3, -1)$
4 over to the right
down 2 units

$$B = (-2, 1)$$

$$-2 + 4 = (2, -1)$$

$$C = (-1, 4)$$

$$(3, 2)$$

Answer $B'(2, -1)$, $C'(3, 2)$

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response follows a correct procedure $[(x + 4, y - 2)]$ to translate vertices B and C and provides correct coordinates for vertices B' and C' .

GUIDE PAPER 2

57

A triangle with vertices at $A(-1, 1)$, $B(-2, 1)$, and $C(-1, 4)$ is translated. The image of vertex A has coordinates at $(3, -1)$.

Determine the coordinates of either the image of vertex B or the image of vertex C.

Show your work.

$$\begin{array}{ccc} \text{triangle} & \rightarrow & \text{translated} \\ A(-1, 1) & & A'(3, -1) \\ B(-2, 1) & & B'(2, -1) \\ C(-1, 4) & & C'(3, 2) \end{array} \quad T_{(x+4)(y-2)}$$

Answer $C'(3, 2)$

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response follows a correct procedure $[(x + 4, y - 2)]$ to translate vertices B and C and provides correct coordinates for vertex C' .

GUIDE PAPER 3

57

A triangle with vertices at $A(-1, 1)$, $B(-2, 1)$, and $C(-1, 4)$ is translated. The image of vertex A has coordinates at $(3, -1)$.

Determine the coordinates of either the image of vertex B or the image of vertex C.

Show your work.

$$\begin{array}{ll} +4 \quad -2 & \\ A(-1, 1) & A'(3, -1) \\ +4 \quad -2 & \\ B(-2, 1) & B'(-8, -1) \\ +4 \quad -2 & \\ C(-1, 4) & C'(3, 2) \end{array}$$

Answer $C'(3, 2)$

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response follows a correct procedure $[(x + 4, y - 2)]$ to translate vertices B and C and provides correct coordinates for vertex C' . Although a calculation error is made when solving for the coordinates of vertex B' , a solution is only required for one of the vertices.

GUIDE PAPER 4

57

A triangle with vertices at $A(-1, 1)$, $B(-2, 1)$, and $C(-1, 4)$ is translated. The image of vertex A has coordinates at $(3, -1)$.

Determine the coordinates of either the image of vertex B or the image of vertex C.

Show your work.

$$A = (-1, 1) \quad A' = (3, -1)$$

$$-1 - 3 = -4$$

$$\underline{-1 - (-4) = 3}$$

$$1 - (-1) = 2$$

$$1 - 2 = -1$$

$$B = (-2, 1) \quad B' = (2, 2)$$

$$-2 - (-4) = 2$$

$$\underline{-2 - 2 = -4}$$

$$1 - (-1) = 2$$

$$1 - 2 = -1$$

$$C = (-1, 4) \quad C' = (3, 2)$$

$$\underline{-1 - (-4) = 3}$$

$$\underline{-1 - 3 = -4}$$

$$\underline{4 - 2 = 2}$$

$$4 - 2 = 2$$

Answer $B' = (2, 2)$
 $C' = (3, 2)$

Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response follows a correct procedure $[(x + 4, y - 2)]$ to translate vertices B and C and provides correct coordinates for vertex C' ; however, incorrect coordinates for vertex B' are also circled and explicitly included as part of the solution.

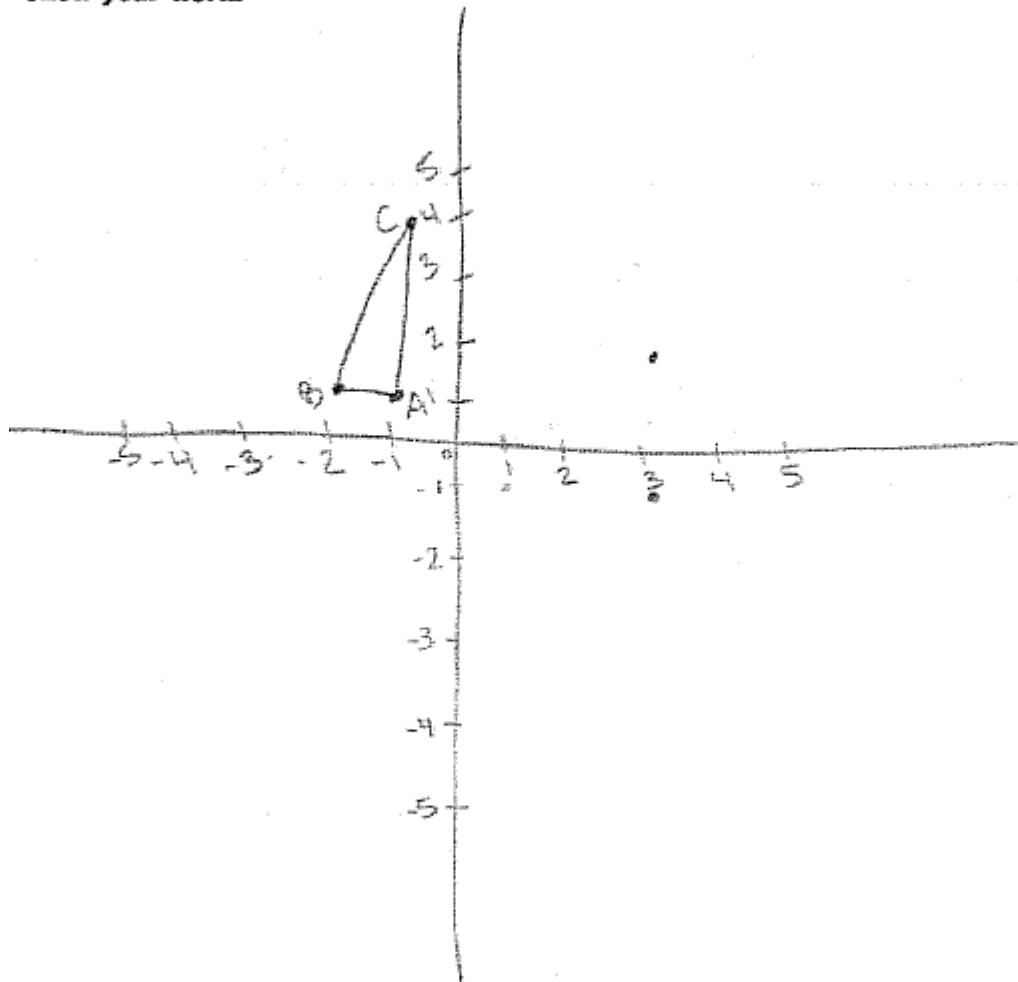
GUIDE PAPER 5

57

A triangle with vertices at $A(-1, 1)$, $B(-2, 1)$, and $C(-1, 4)$ is translated. The image of vertex A has coordinates at $(3, -1)$.

Determine the coordinates of either the image of vertex B or the image of vertex C.

Show your work.



Answer

$$C(3, 2)$$

Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. Vertices A' and C' are correctly plotted on a graph—although they are unlabeled—and correct coordinates are provided for vertex C' . Holistically, the graph provided is not sufficient to count as complete work.

GUIDE PAPER 6

57

A triangle with vertices at $A(-1, 1)$, $B(-2, 1)$, and $C(-1, 4)$ is translated. The image of vertex A has coordinates at $(3, -1)$.

Determine the coordinates of either the image of vertex B or the image of vertex C.

Show your work.

$$\begin{aligned}A(-1, 1) &\rightarrow A(3, -1) \\B(-2, 1) &\rightarrow B(1, -1) \\C(-1, 4) &\rightarrow C(3, 2)\end{aligned}$$

Answer $(1, -2)$

Score Point 1 (out of 2 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response follows a correct procedure $[(x + 4, y - 2)]$ to translate vertices B and C; however, the transformation matrix is chosen as the solution rather than any of the vertices.

GUIDE PAPER 7

57

A triangle with vertices at A(-1, 1), B(-2, 1), and C(-1, 4) is translated. The image of vertex A has coordinates at (3, -1).

Determine the coordinates of either the image of vertex B or the image of vertex C.

Show your work.

Answer $B' = (-2, -1)$, $C' = (3, 2)$

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although the coordinates of B' and C' are correct, no work is provided to support the solution.

GUIDE PAPER 8

Additional

57

A triangle with vertices at $A(-1, 1)$, $B(-2, 1)$, and $C(-1, 4)$ is translated. The image of vertex A has coordinates at $(3, -1)$.

Determine the coordinates of either the image of vertex B or the image of vertex C.

Show your work.

$$A(-1, 1) \rightarrow (3, -1)$$

$$B(-2, 1) \rightarrow (4, -2)$$

Answer $B(4, -2)$

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. The transformation matrix is incorrectly taken to be the coordinates of B' .

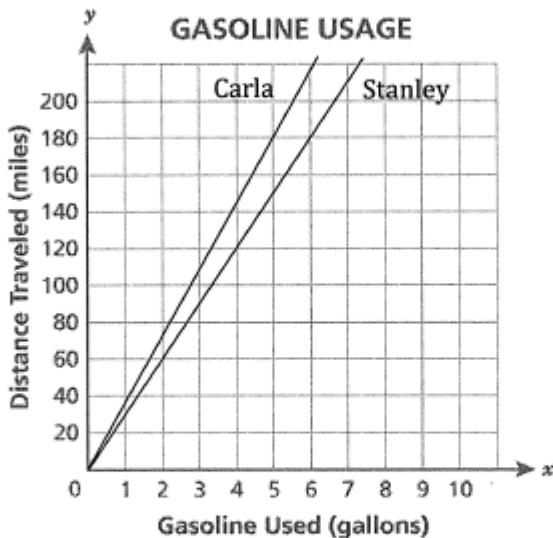
EXEMPLARY RESPONSE

58

Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x , and the distance traveled, y , during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.



How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

Carla's slope is steeper than Stanley's. For every gallon of gas used, Carla travels 36 miles while Stanley travels 30 miles.

OR other equivalent explanation

GUIDE PAPER 1

Additional

58

Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

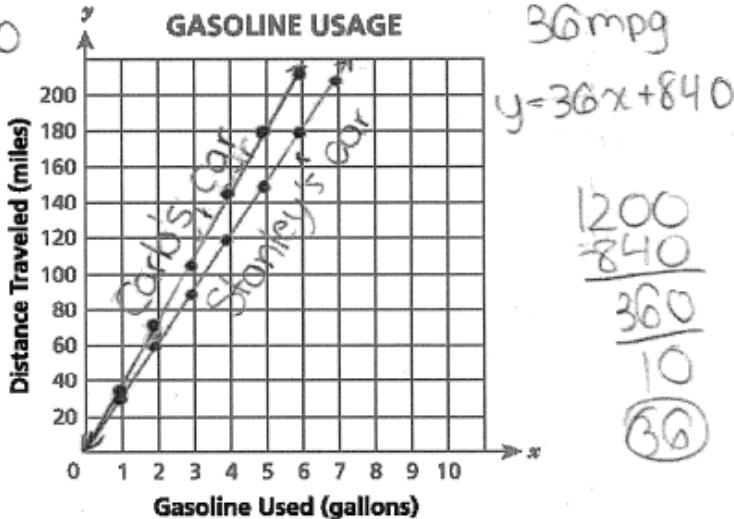
Draw a graph on the grid below to show the relationship between gasoline used, x , and the distance traveled, y , during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.

$$y = 30x + 840$$

↑
Stanley
30 mpg

1200
840
360
12
30



Carla
36 mpg

$$y = 36x + 1200$$

1200
840
360
10
36

How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

Carla's car travels 36 mpg. Stanley's car only travels 30 mpg. Carla's car's slope is steeper than Stanley's and her car travels farther per gallon than Stanley's.

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. Both graphs are correct and the unit rates are appropriately compared.

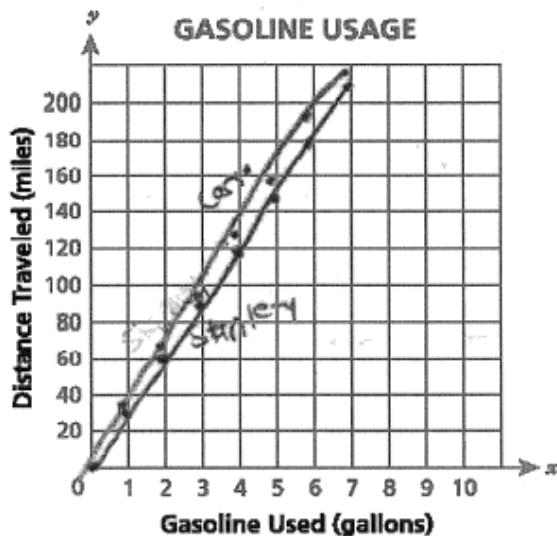
GUIDE PAPER 2

58

Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x , and the distance traveled, y , during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.



How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

Carla got better gas mileage than Stanley because she got 36 miles per gallon while he only got 30 miles per gallon.

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. Both graphs are correct and the unit rates are appropriately compared.

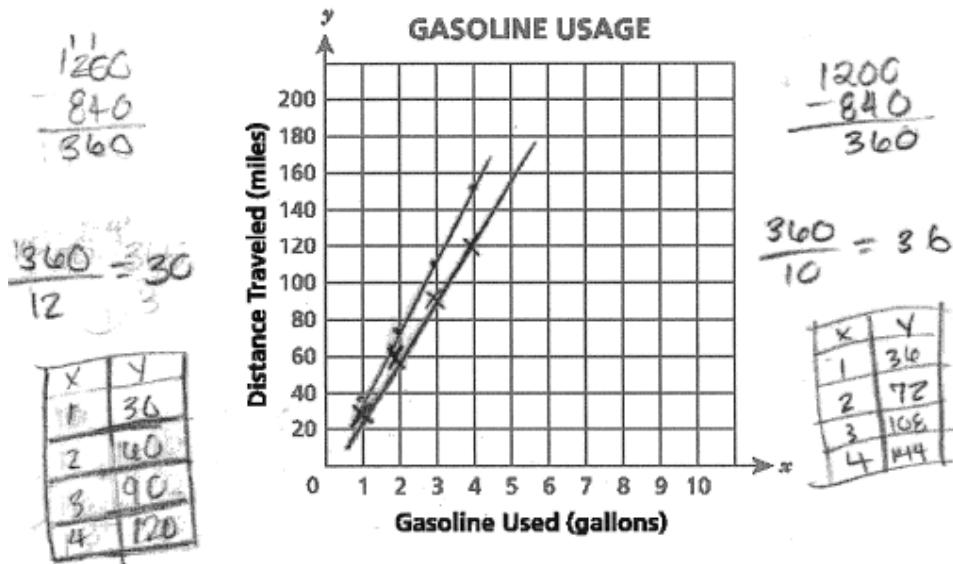
GUIDE PAPER 3

58

Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x , and the distance traveled, y , during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.



How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

The slope is greater for Carla's car because she has a higher rate of miles per gallon.

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. Both graphs are correct and the unit rates are appropriately compared.

GUIDE PAPER 4

58

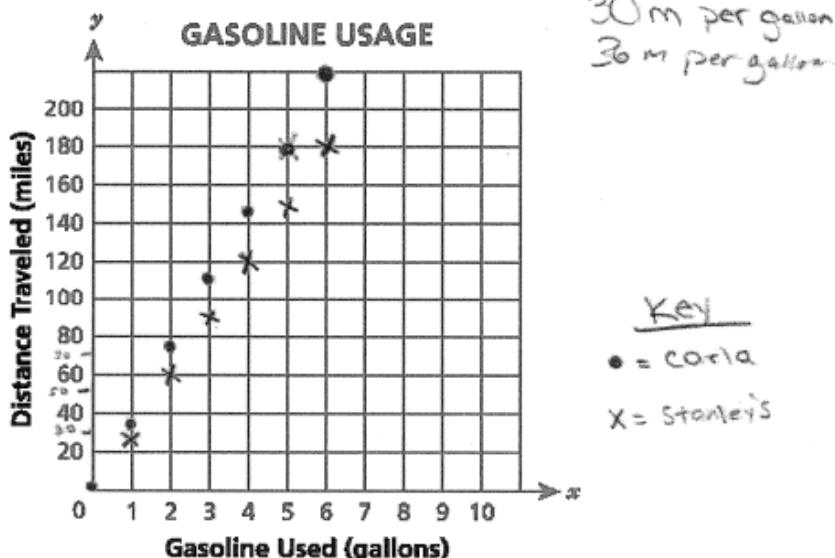
Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x , and the distance traveled, y , during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.

Stanley =
30 miles per
gallon

Carla =
36 miles per
gallon



How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

In terms of unit rate Carla could go 36 miles per gallon while Stanley could only go 30 to the gallon.

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. Although the points are plotted correctly, they are not connected with lines. The comparison of the unit rates is correct. The response addresses most, but not all aspects of the task.

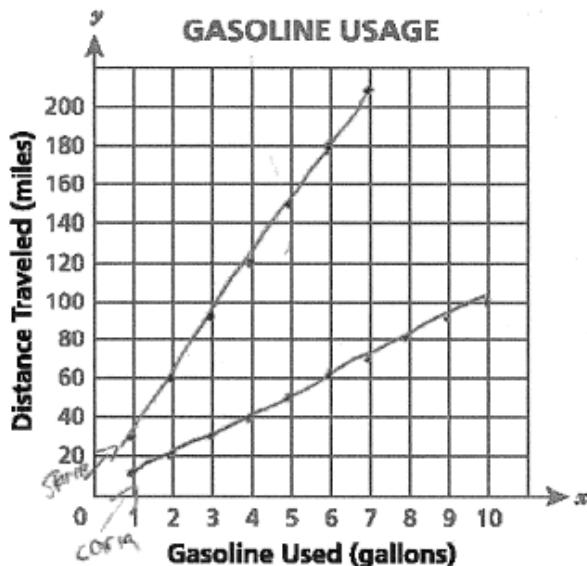
GUIDE PAPER 5

58

Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x , and the distance traveled, y , during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.



How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

Carla's car get 3G m.p.h
and Stanley's get 30 m.p.h

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. Only one line is plotted correctly; however, the comparison of the unit rates is correct. Although correct unit rates are provided, the units (miles per hour rather than miles per gallon) are incorrect. The response addresses most elements of the task correctly.

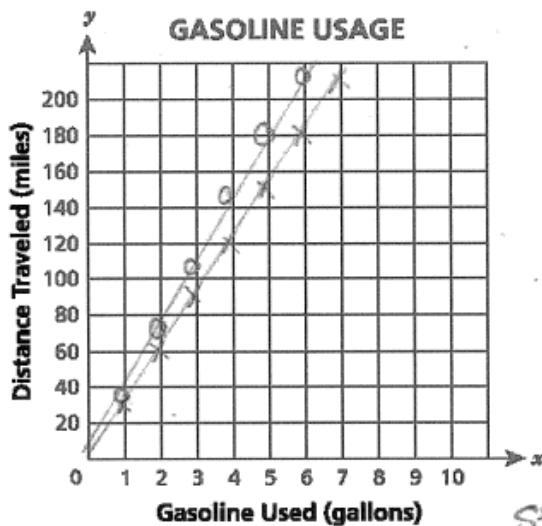
GUIDE PAPER 6

58

Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x , and the distance traveled, y , during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.



Stanley = x
Carla = b

How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

The slope for Carla is more positive than the slope for Stanley because she traveled to the end point quicker than Stanley with less gas.

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. Both graphs are correct; however, the comparison of the slopes does not adequately reference the unit rates. The response addresses most, but not all aspects of the task.

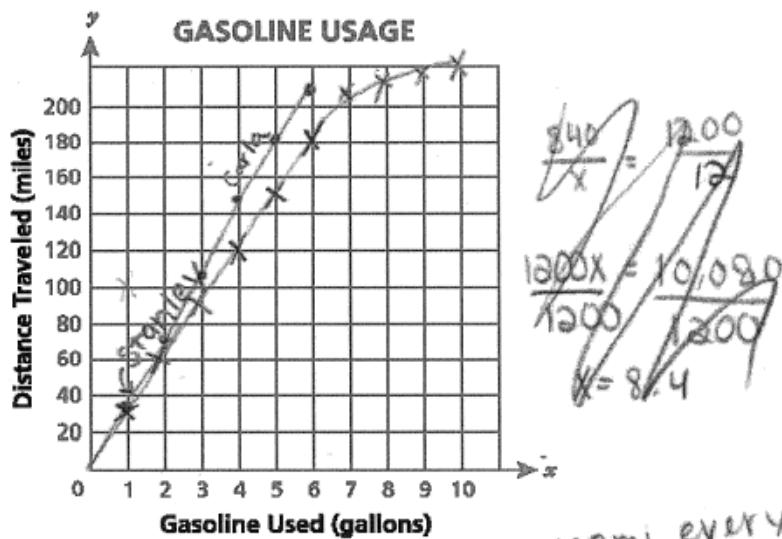
GUIDE PAPER 7

58

Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x , and the distance traveled, y , during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.



How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

Carla - 1 gallon : 36 miles

Stanley - 1 gallon : 30 miles

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. One graph is correct while the other graph is partially correct: it curves at the top. Although correct unit rates are calculated, a contradictory statement appears in the work (100 miles every gallon). The response addresses some elements of the task correctly but reflects a lack of essential understanding.

GUIDE PAPER 8

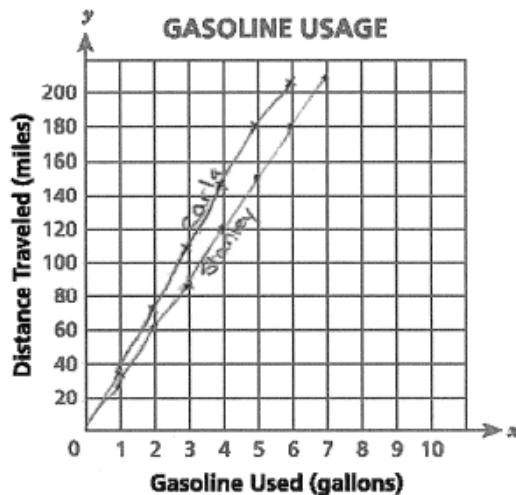
Additional

58

Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x , and the distance traveled, y , during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.



How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

The slope for Stanley is $\frac{3}{2}$ and Carla's slope is $\frac{9}{5}$. As you can see on the grid, Carla goes faster than Stanley and Carla doesn't use a lot of gasoline.

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. Both graphs are correct; however, the unit rates are calculated incorrectly and are not adequately compared. The response addresses some elements of the task correctly but reflects a lack of essential understanding.

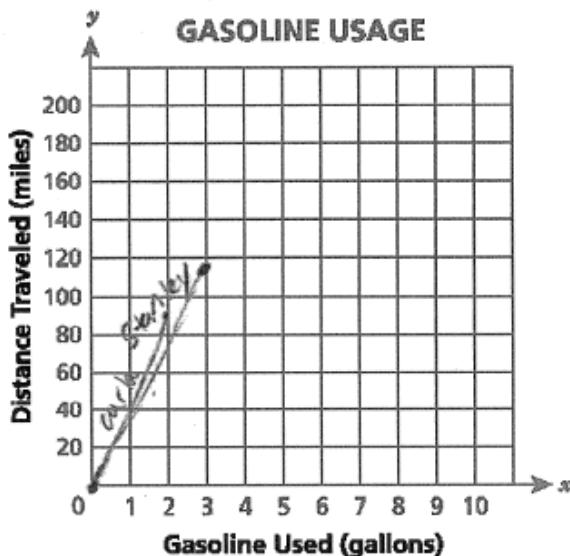
GUIDE PAPER 9

58

Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x , and the distance traveled, y , during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.



How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

carla's slope was more because her car goes more miles per gallon than stanley's

Score Point 1 (out of 3 points)

This response demonstrates a limited understanding of the mathematical concepts in the task. The response correctly compares the slopes; however, the unit rates are not sufficiently addressed and both graphs are plotted incorrectly. The response addresses some elements of the task correctly but reflects a lack of essential understanding.

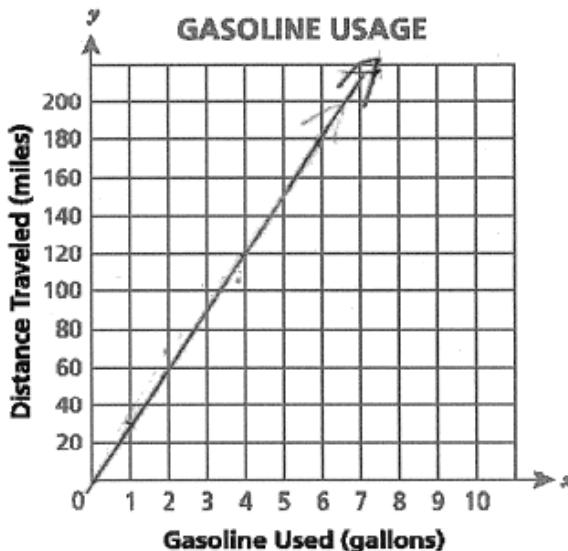
GUIDE PAPER 10

58

Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x , and the distance traveled, y , during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.



How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

Carla's slope is less steep because
it only goes up by 30 miles/gallon

Score Point 0 (out of 3 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in task. Only one correct line is plotted and the unit rate provided for Carla's car is incorrect. In addition, the comparison to Stanley's car is incorrect.

GUIDE PAPER 11

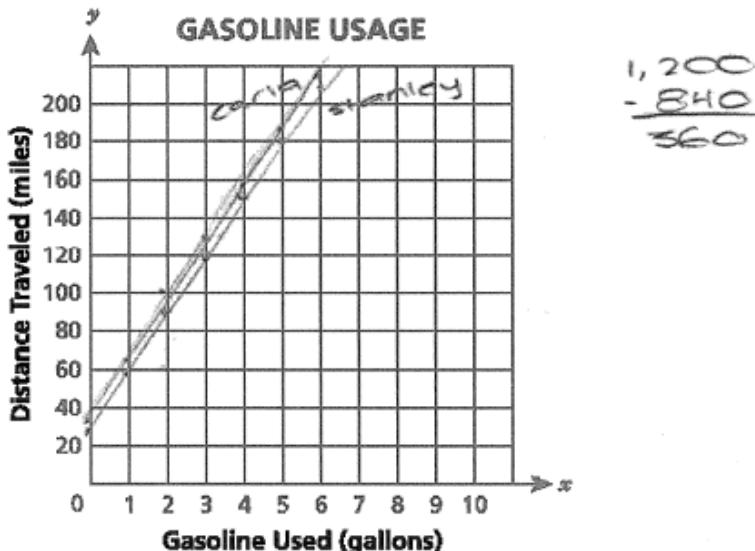
Additional

58

Stanley drove his car on a business trip. When he left, the mileage was 840 miles, and when he returned, the mileage was 1,200 miles. The car used 12 gallons of gasoline for this trip.

Draw a graph on the grid below to show the relationship between gasoline used, x , and the distance traveled, y , during Stanley's trip.

Carla made the same trip as Stanley, but her car used only 10 gallons of gasoline. Graph the gasoline usage of Carla's car on the same grid as Stanley's car.



How do the slopes for Stanley's and Carla's cars compare?

Explain your answer in terms of the unit rate.

Answer

Carla drives 36 miles each hour
while Stanley drives 30 miles each hour

Score Point 0 (out of 3 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Both lines are incorrect: they do not start at the origin. Although correct unit rates are calculated, there is no work to support the answer and the interpretation of the unit rates is faulty.

EXEMPLARY RESPONSE

59

Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

**TOTAL AMOUNT OF MONEY
FROM TICKET SALES**

Number of Tickets Sold	Total Money in Box (Dollars)
7	108.75
13	146.25
18	177.50

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

Show your work.

$$\begin{array}{lll} \$177.50 - \$146.25 = \$31.25 & \$6.25t + b = M & \$6.25(13) + b = \$146.25 \\ \text{for } 18 - 13 \text{ tickets} & t = \text{number of tickets} & \$81.25 + b = \$146.25 \\ \$31.25 \text{ for } 5 \text{ tickets} & b = \text{money to start} & b = \$146.25 - \$81.25 \\ \$31.25 \div 5 = \$6.25 \text{ per ticket} & M = \text{money now in box} & b = \$65 \end{array}$$

Answer:

$$M = \$6.25t + \$65$$

The money in the box to begin with is like the y-intercept of the equation, \$65. The slope of the equation, \$6.25, is the price of the ticket. When $t=0$, or when there have been no ticket sales, the equation gives \$65 as the amount of money originally in the box.

GUIDE PAPER 1

Additional

59

Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

TOTAL AMOUNT OF MONEY FROM TICKET SALES

Number of Tickets Sold	Total Money in Box (dollars)
7	108.75
13	146.25
18	177.50

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

Show your work.

$$\begin{aligned}y &= 6.25x + b \\108.75 &= 6.25(7) + b \\108.75 &= 43.75 + b \\b &= 65\end{aligned}$$

Answer

By using the slope intercept formula, you can see that your equation is $y = 6.25x + 65$ where your slope (6.25) is the price per ticket and your y -intercept (65) is the money Tim put in before selling any tickets.

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. A correct equation is written and used to correctly determine the money originally in the box and the price of each ticket.

GUIDE PAPER 2

59

Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

TOTAL AMOUNT OF MONEY FROM TICKET SALES

Number of Tickets Sold	Total Money in Box (dollars)
7	108.75
13	146.25
18	177.50

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

Show your work.

$$y = 6.25x + b$$

$$\begin{aligned} \frac{146.25 - 108.75}{13 - 7} &= \frac{37.5}{6} = 6.25 \\ y &= 6.25x + b \\ 108.75 &= 6.25(7) + b \\ 108.75 &= 43.75 + b \\ 108.75 - 43.75 &= b \\ 65 &= b \end{aligned}$$

Answer

In this equation the y-intercept is the money

that was in the box before tickets were sold and

the slope is the price per ticket

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. A correct equation is written and used to correctly determine the money originally in the box and the price of each ticket.

GUIDE PAPER 3

59

Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

TOTAL AMOUNT OF MONEY
FROM TICKET SALES

Number of Tickets Sold	Total Money in Box (dollars)
7	108.75
13	146.25
18	177.50

$$\begin{array}{r} 177.5 \\ - 146.25 \\ \hline 31.25 \end{array}$$

$$31.25 - 6.25 = 25$$

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

Show your work.

$$y = 6.25x + 65$$

6	102.5
5	96.25
4	90
3	83.75
2	77.5
1	71.25
0	65

Answer

The data shows that each ticket is worth \$6.25 and there was originally \$65 in the box. My equation represents the table because \$6.25 is my rate of change and \$65 is my initial value.

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. A correct equation is written and used to correctly determine the money originally in the box and the price of each ticket.

GUIDE PAPER 4

59

Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

TOTAL AMOUNT OF MONEY FROM TICKET SALES

Number of Tickets Sold	Total Money in Box (dollars)
7	108.75
13	146.25
18	177.50

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

Show your work.

$$\begin{array}{r} 108.75 - 146.25 \\ \hline 7 - 13 \\ -37+5 \\ \hline -6 = 6.25 \end{array}$$

Answer

$$\begin{aligned} y &= mx+b \\ y &= 6.25(x) + b \\ 108.75 &= 6(25)(7) + b \\ 108.75 &= 43.75 + b \\ 108.75 - 43.75 &= b \\ 65 &= b \end{aligned}$$

The slope of change is 6.25 which is the price of each ticket and initial value 65 is the amount of money originally in the box.

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The slope and y -intercept are correctly calculated and interpreted as the price of each ticket and the money originally in the box; however, a complete equation combining the two is never written. The response addresses most, but not all aspects of the task.

GUIDE PAPER 5

59

Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

TOTAL AMOUNT OF MONEY FROM TICKET SALES

Number of Tickets Sold	Total Money in Box (dollars)
7	108.75
13	146.25
18	177.50

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

Show your work.

$$\begin{aligned}108.75 &= 15.53 \\146.25 &= 11.75 \\177.50 &= 18.96\end{aligned}$$

$$\begin{array}{r} 37.50 \\ + 6.25 \\ \hline 43.75 \end{array}$$

extra money

6.25
Price
 $y = 6.25x + 43.75$
equation

Answer

After doing my work I found the price of each ticket was \$6.25 and the extra money he put was \$43.75.

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The price of each ticket is correctly calculated; however, the original amount of money is incorrectly solved for by adding the price of one ticket to 37.50, resulting in an incorrect y -intercept in the written equation. The response correctly addresses most, but not all aspects of the task.

GUIDE PAPER 6

59

Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

65

TOTAL AMOUNT OF MONEY FROM TICKET SALES		
Number of Tickets Sold	Total Money in Box (dollars)	
1	71.25	
2	77.5	
3	83.75	
4	90	
5	96.25	
6	102.5	
7	108.75	

$\begin{array}{r} 7-13 \\ \hline 108.75 - 146.25 \\ \hline -6 \\ \hline -375 \end{array}$

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

Show your work.

*Per ticket started
 $(6.25x + 65) = D$ total!*

Answer

I used the equation $6.25x + 65 = D$
because 37.5 dollars was made selling
7-13 tickets and 31.25 was made selling
13-18 I subtracted and got 6.25 as my
total for ticket I kept subtracting and got
65 as I started,

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The price of each ticket and money originally in the box are correctly calculated and a correct equation is written; however, the response does not adequately explain how to use the equation to solve for these values. The response addresses most, but not all aspects of the task.

GUIDE PAPER 7

59

Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

TOTAL AMOUNT OF MONEY FROM TICKET SALES

Number of Tickets Sold	Total Money in Box (dollars)
7	108.75
13	146.25
18	177.50

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

Show your work.

$$177.50 - 108.75 = \frac{68.75}{11} = 6.25 \text{ dollars}$$

$$18 - 7$$

$$b = 71.25$$

$$y = 6.25x + b$$

$$y = 6.25x + 71.25$$

Answer

You can use the equation because

all you need to know is how many
tickets were sold.

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The price of each ticket is correctly calculated and an appropriate equation is written; however, the original amount of money is incorrect with no work shown to support how it was obtained. In addition, the response does not demonstrate how the equation is used to determine these values.

GUIDE PAPER 8

Additional

59

Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

TOTAL AMOUNT OF MONEY FROM TICKET SALES

Number of Tickets Sold	Total Money in Box (dollars)
7	108.75
13	146.25
18	177.50

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

Show your work.

$$\begin{aligned}Bx - 7x &= 146.25 - 108.75 \\6x &= 37.50 \\x &= \$6.25 \\6.25 \times 7 &= 43.75 \\108.75 - 43.75 &= 65\end{aligned}$$

Answer

By using the equation, $Bx - 7x = 146.25 - 108.75$, finding x will give you the price of each ticket which is $\$6.25$. If you multiply 6.25 by 7 , the result is $\$43.75$. When you subtract 43.75 from 108.75 , you get 65 , which is the amount of money originally in the box.

Score Point 1 (out of 3 points)

This response demonstrates a limited understanding of the mathematical concepts in the task. The price of each ticket and money originally in the box are correctly calculated; however, no general equation is provided and the answer does not adequately explain how the equation is used to determine the ticket price and the original amount of money.

GUIDE PAPER 9

59

Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

TOTAL AMOUNT OF MONEY FROM TICKET SALES

Number of Tickets Sold	Total Money in Box (dollars)
7	108.75
13	146.25
18	177.50

> 37.5
> 31.25

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

Show your work.

$$y = \frac{37.5}{6}x + 31.25$$

Answer

One ticket cost \$6.25. I wrote the equation $y = \frac{37.5}{6}x$, so I divided 37.5 ÷ 6 and got 6.25.

Score Point 1 (out of 3 points)

This response demonstrates a limited understanding of the mathematical concepts in the task. The price of each ticket is correctly calculated and interpreted as a slope in the equation; however, no attempt is made to solve for the original amount of money, resulting in no y -intercept in the equation. The response addresses some elements of the task correctly but reflects a lack of essential understanding.

GUIDE PAPER 10

59

Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

TOTAL AMOUNT OF MONEY FROM TICKET SALES

Number of Tickets Sold	Total Money in Box (dollars)
7	108.75
13	146.25
18	177.50

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

Show your work.

$$\frac{108.75}{7} = X \quad [15.5 = X]$$

Answer

each ticket was \$15.5.

Score Point 0 (out of 3 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in task. The work shows an incorrect procedure to find the price per ticket. There is no work to find the original amount of money and there is no final equation.

GUIDE PAPER 11

Additional

59

Tim is selling tickets to a school sporting event to raise money for his club. He put some extra money in his box before he began. As he sells tickets, he records the number of tickets he has sold and the total amount of money in the box. Some of his data are shown below.

TOTAL AMOUNT OF MONEY FROM TICKET SALES

Number of Tickets Sold	Total Money in Box (dollars)
7	108.75
13	146.25
18	177.50

Assuming all the tickets are the same price, write an equation that represents the situation in the table. Explain how to use your equation to determine the amount of money originally in the box before any tickets were sold and the price of each ticket.

Show your work.

$$432.50 \div 38 =$$

Answer

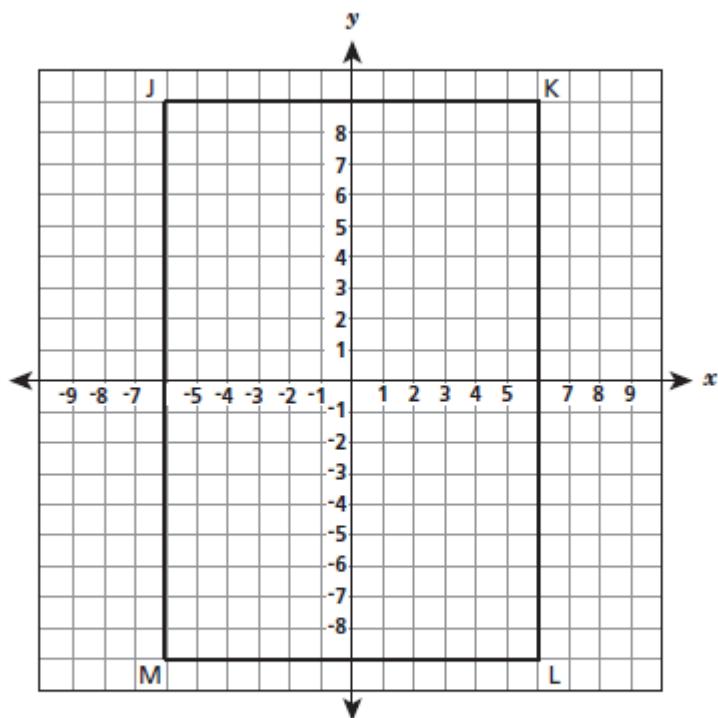
You can use my equation by adding
all numbers up and then divide it to get
the amount of money for each ticket.

Score Point 0 (out of 3 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. The work shows an incorrect procedure to find the price per ticket. There is no work to find the original amount of money. The interpretation of the equation is incorrect.

60

Rectangle JKLM is shown on the coordinate grid below.



EXEMPLARY RESPONSE

60

Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are $(-3, 2)$, and the coordinates of vertex M' are $(3, -2)$.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

Show your work.

$$KL(s) = K'L'$$

$$18(s) = 6$$

$$s = 1/3$$

$$K'(6 \times 1/3 = 2, 9 \times 1/3 = 3) \text{ so } K'(2, 3)$$

$$M'(-6 \times 1/3 = -2, -9 \times 1/3 = -3) \text{ so } M'(-2, -3)$$

Clockwise rotation: $(x, y) \rightarrow (-y, x)$

$$K'(2, 3) \rightarrow K'(-3, 2)$$

$$M'(-2, -3) \rightarrow M'(3, -2)$$

Answer

Dilation of a scale factor $1/3$ centered at the origin,
then a 90° clockwise rotation about the origin (or 270° clockwise rotation).

OR a 90° counterclockwise rotation about the origin, then a dilation
of a scale factor $1/3$ centered at the origin

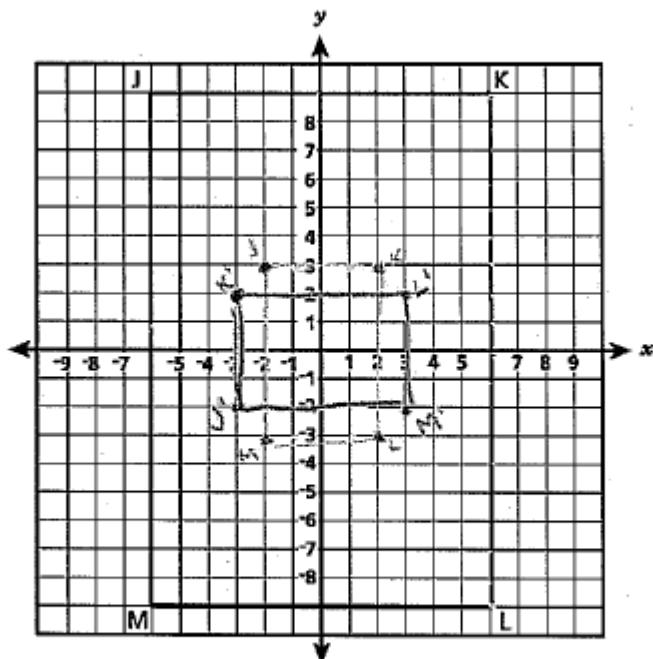
OR other valid response

GUIDE PAPER 1a

Additional

60

Rectangle JKLM is shown on the coordinate grid below.



GUIDE PAPER 1b

Additional

60

Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are $(-3, 2)$, and the coordinates of vertex M' are $(3, -2)$.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

Show your work.

$$KL = 18 \text{ units}$$

$$K'L' = 6 \text{ units}$$

$$\frac{6}{18} = \frac{1}{3}$$

$K(2, 3) \rightarrow$ rotation 90° counter clockwise about $(-3, 2)$
 $(-y, x)$

$M(-2, 3) \rightarrow (3, -2)$

$J(-2, 3) \rightarrow (-3, -2)$

$L(2, -3) \rightarrow (3, 2)$

Answer

A dilation by a scale factor of $\frac{1}{3}$, followed by

a rotation 90° counter clockwise about

the origin.

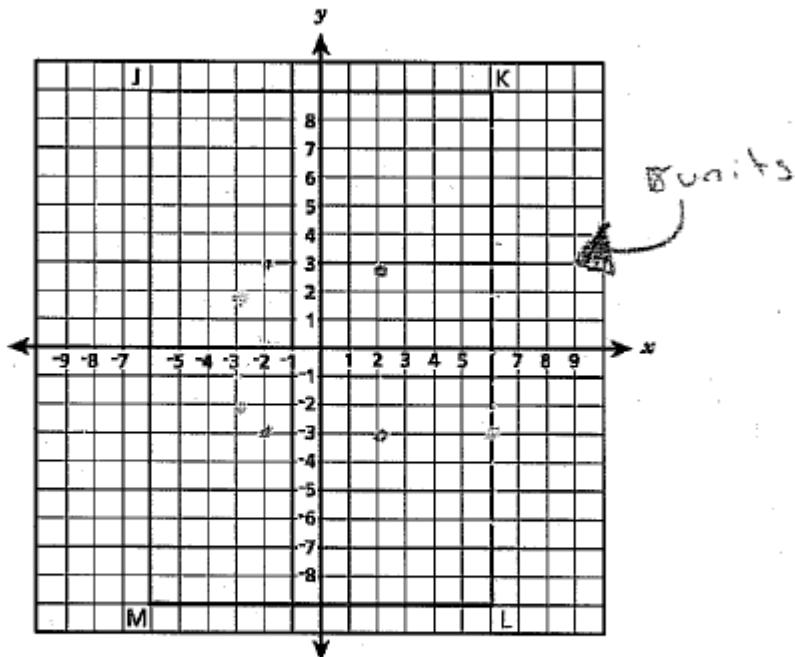
Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The sequence of transformations is correct and supported by the work.

GUIDE PAPER 2a

60

Rectangle JKLM is shown on the coordinate grid below.



GUIDE PAPER 2b

60

Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are $(-3, 2)$, and the coordinates of vertex M' are $(3, -2)$.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

Show your work.

Rotate 90° counter clockwise

$$\begin{aligned}K(6, 9) \div 3 &= K(2, 3) = K'(-3, 2) \\L(6, -9) \div 3 &= L(2, -3) = L'(-3, -3) \\J(6, 9) \div 3 &= J(-2, 3) = J(-3, -3) \\M(-6, -9) \div 3 &= M(-2, -3) = M'(3, -2)\end{aligned}$$

Answer

First the shape was dilated by $1/3$ then it was rotated 90° counterclockwise.

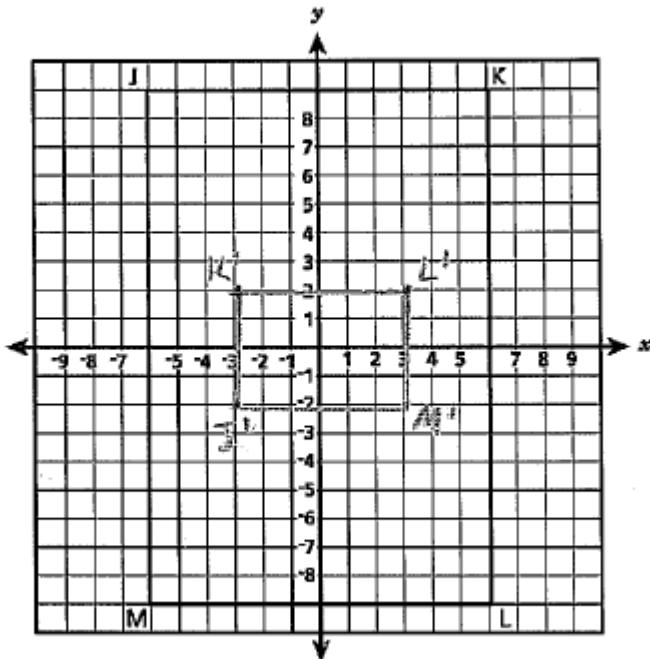
Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The sequence of transformations is correct and supported by the work. The center of rotation is not specified; however, it is implied that rotation is done about the origin.

GUIDE PAPER 3a

60

Rectangle JKLM is shown on the coordinate grid below.



GUIDE PAPER 3b

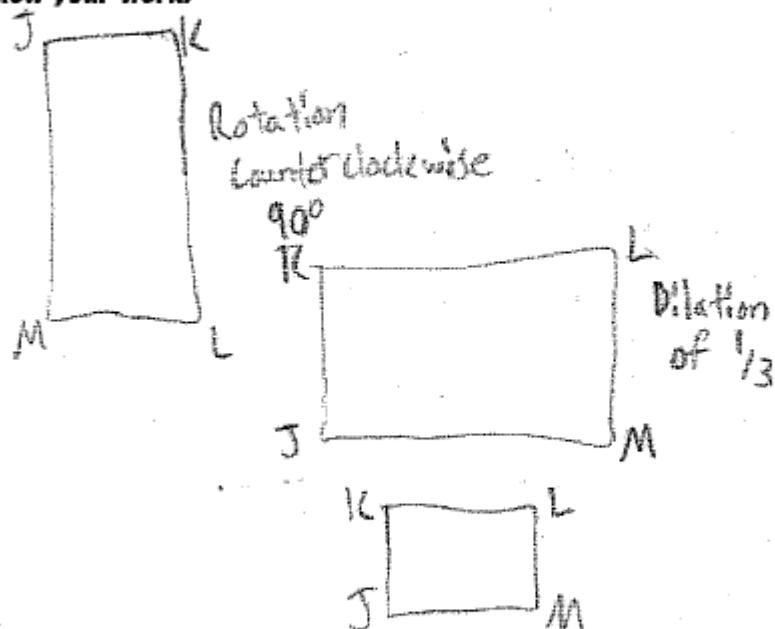
60

Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are $(-3, 2)$, and the coordinates of vertex M' are $(3, -2)$.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

Show your work.



Answer

- Rotation Counter clockwise 90°
- Dilation of $\frac{1}{3}$

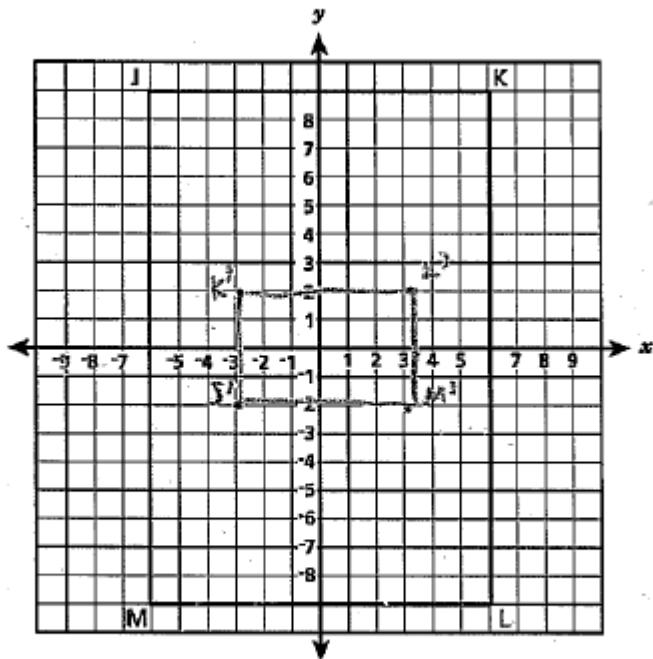
Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The sequence of transformations is correct and supported by the work. The center of rotation is not specified; however, it is implied that rotation is done about the origin.

GUIDE PAPER 4a

60

Rectangle JKLM is shown on the coordinate grid below.



GUIDE PAPER 4b

60

Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are $(-3, 2)$, and the coordinates of vertex M' are $(3, -2)$.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

$$J(-6, 9) \rightarrow (-3, -2)$$

Show your work.

$$K(6, 9) \rightarrow (-3, 2)$$

$$L(6, -9) \rightarrow (3, 2)$$

$$M(-6, -9) \rightarrow (3, -2)$$

$$J(-6, 9) \xrightarrow{90^\circ \text{ c.f.}} (-9, 6) \xrightarrow{\text{Dilation: } \frac{1}{2}} (-3, 2)$$

$$K(6, 9) \xrightarrow{90^\circ \text{ Counter clockwise}} (-9, 6) \xrightarrow{\text{Dilation: } \frac{1}{2}} K'(-3, 2)$$

$$L(6, -9) \xrightarrow{90^\circ \text{ c.f.}} (9, -6) \xrightarrow{\text{Dilation: } \frac{1}{2}} L'(3, -2)$$

$$M(-6, -9) \xrightarrow{90^\circ \text{ Counter clockwise}} (9, -6) \xrightarrow{\text{Dilation: } \frac{1}{2}} M'(3, -2)$$

Answer

All coordinates of the rectangle JKLM undergo rotation and dilation. All coordinates undergo a rotation 90° counter-clockwise and are dilated by a scale factor of $\frac{1}{2}$.

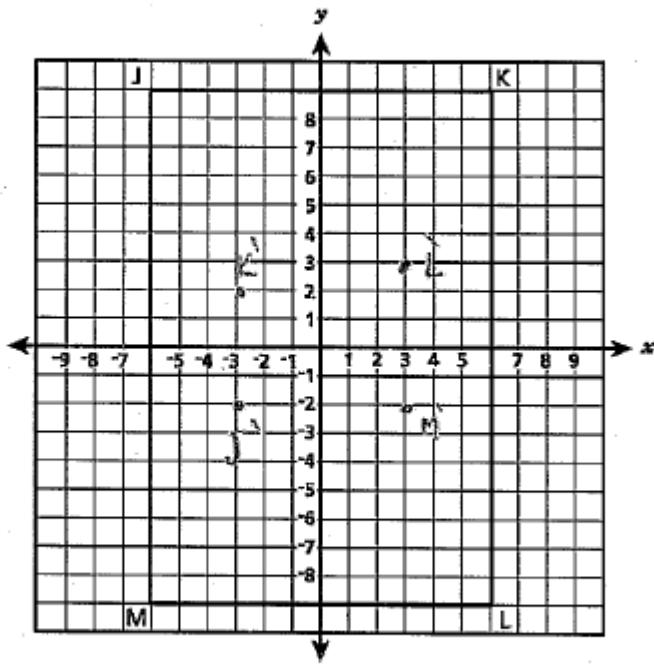
Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. A 90° counterclockwise rotation is a correct statement to describe one part of the sequence of the transformations; however, the scale factor of the dilation is incorrect. The response addresses most, but not all elements of the task correctly.

GUIDE PAPER 5a

60

Rectangle JKLM is shown on the coordinate grid below.



GUIDE PAPER 5b

60

Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are $(-3, 2)$, and the coordinates of vertex M' are $(3, -2)$.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

Show your work.

Answer

This rectangle went through a dilation of

$\frac{1}{3}$ this rectangle also went through

rotation 90 clockwise

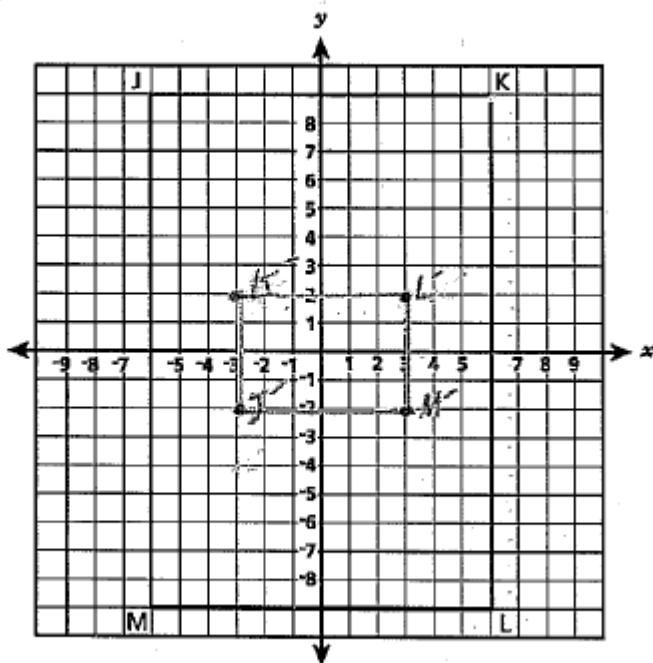
Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. Rotation and dilation are correctly described as parts of the sequence of transformations; however, the direction of rotation is incorrect. The response correctly addresses most, but not all aspects of the task.

GUIDE PAPER 6a

60

Rectangle JKLM is shown on the coordinate grid below.



GUIDE PAPER 6b

60

Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are $(-3, 2)$, and the coordinates of vertex M' are $(3, -2)$.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

Show your work.

$$K = (6, 2) \div 3 = (2, 2)$$

$$(2, 2) \text{ rotation } 90^\circ (-3, 2) = K'$$

Answer

Dilation of $\frac{1}{3}$, then a rotation of 90°

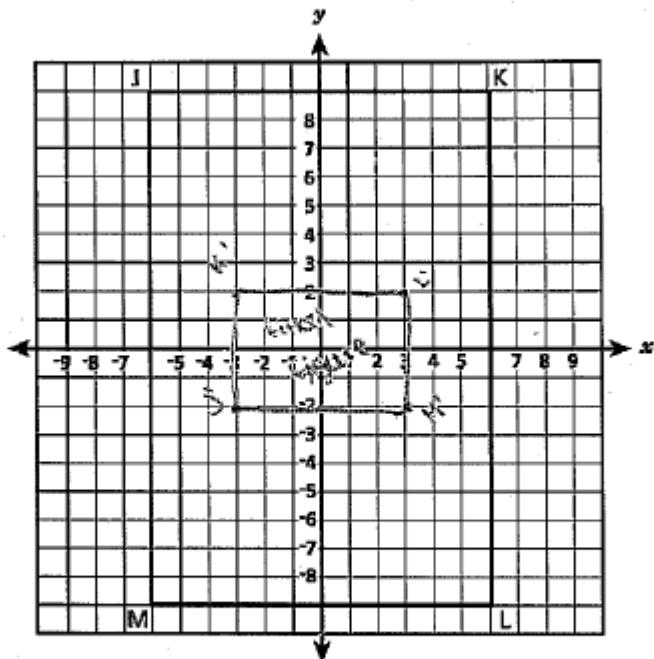
Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. Rotation and dilation are correctly described as parts of the sequence of transformations; however, the direction of rotation is not specified. The response correctly addresses most, but not all aspects of the task.

GUIDE PAPER 7a

60

Rectangle JKLM is shown on the coordinate grid below.



GUIDE PAPER 7b

60

Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are $(-3, 2)$, and the coordinates of vertex M' are $(3, -2)$.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

Show your work.

$$K = (-6, 2)$$

$$K' = (-3, 2)$$

$$M = (6, 2)$$

$$M' = (3, -2)$$

Answer

A rotation of 90° , and a dilation of -2 ,
counter clockwise

Score Point 1 (out of 3 points)

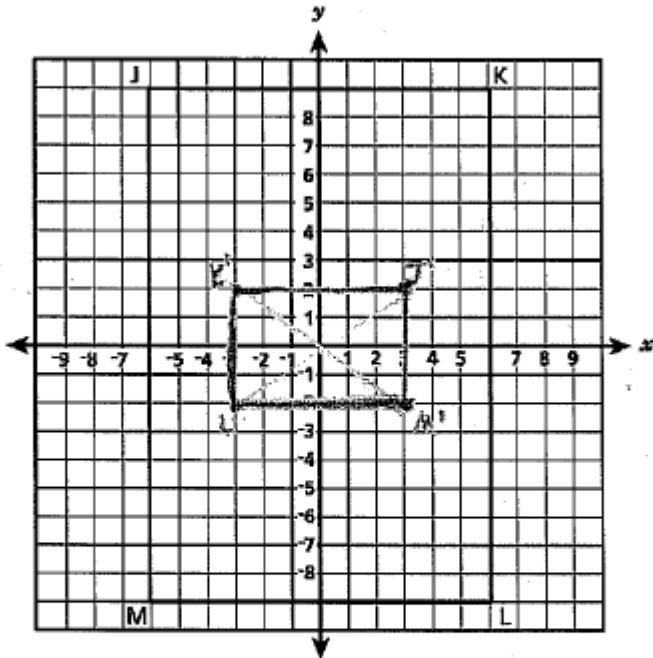
This response demonstrates only a limited understanding of the mathematical concepts in the task. A 90° counterclockwise rotation is a correct description of one transformation. There is no work shown to find the dilation scale factor, and the dilation factor of -2 is incorrect. Although the response recognizes rotation and dilation are parts of the sequence of transformations, the negative value for the dilation scale factor reflects a lack of essential understanding.

GUIDE PAPER 8a

Additional

60

Rectangle JKLM is shown on the coordinate grid below.



$$K = (-3, 2)$$

$$M' = (3, -2)$$

$$K'L' = 6 \text{ units}$$

GUIDE PAPER 8b

Additional

60

Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are $(-3, 2)$, and the coordinates of vertex M' are $(3, -2)$.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

Show your work.

$$\begin{array}{ll} M = (-6, -9) & M' = (3, -2) \\ J = (-6, 9) & J' = (3, 2) \\ K = (6, 9) & K' = (-3, 2) \\ L = (6, -9) & L' = (-3, -2) \end{array}$$

Answer

A dilation of $\frac{1}{3}$ and a rotation 180°
clockwise

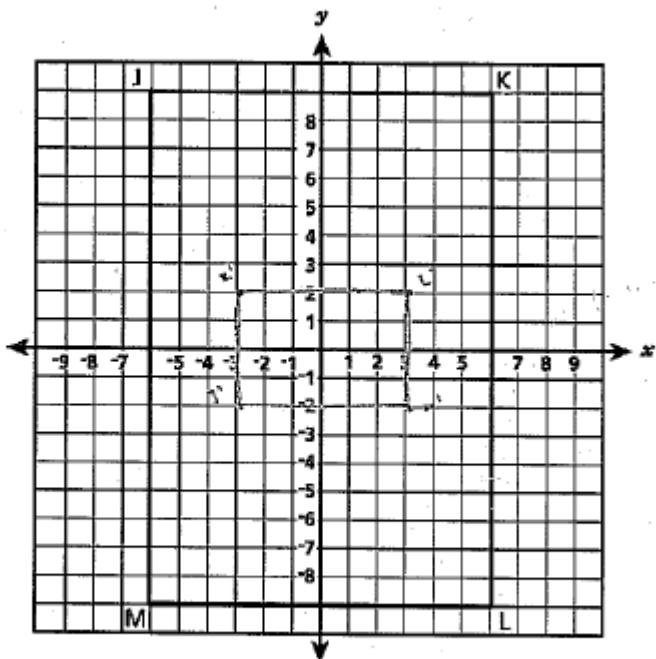
Score Point 1 (out of 3 points)

This response demonstrates a limited understanding of the mathematical concepts in the task. A correct dilation factor is given; however, the direction and degree of rotation is incorrect. The response correctly addresses some elements of the task, but reflects a lack of essential understanding.

GUIDE PAPER 9a

60

Rectangle JKLM is shown on the coordinate grid below.



GUIDE PAPER 9b

60

Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are $(-3, 2)$, and the coordinates of vertex M' are $(3, -2)$.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

Show your work.

Answer

A sequence of transformation in rectangle JKLM that would result in rectangle J'K'L'M' would be a dilation of 3 on a rotation of 270° .

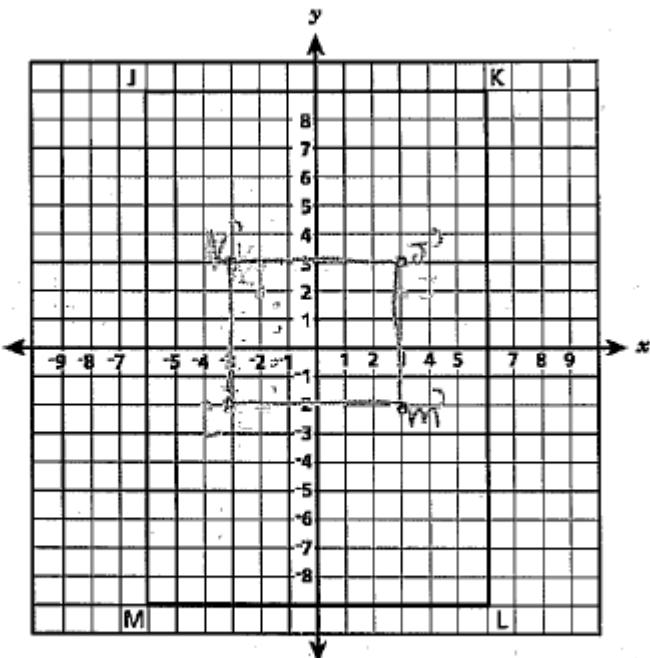
Score Point 1 (out of 3 points)

This response demonstrates a limited understanding of the mathematical concepts in the task. The dilation scale factor of 3 is incorrect and the direction of rotation is not specified: it must be clockwise for the given magnitude of 270° . The response correctly addresses some elements of the task, but reflects a lack of essential understanding.

GUIDE PAPER 10a

60

Rectangle JKLM is shown on the coordinate grid below.



GUIDE PAPER 10b

60

Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are $(-3, 2)$, and the coordinates of vertex M' are $(3, -2)$.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

Show your work.

a reflection and a dilation
by -2

Answer

A reflection and a dilation by -2
make J'K'L'M' from JKLM.

Score Point 0 (out of 3 points)

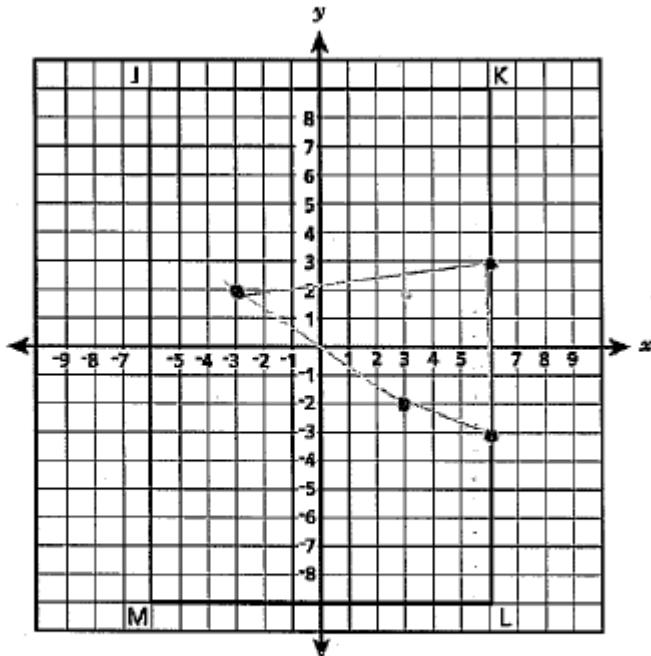
This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. The dilation factor of -2 is incorrect, and reflection is not a correct transformation. Although the response recognizes dilation is one part of the sequence of transformations, the negative value for dilation scale factor reflects no overall understanding.

GUIDE PAPER 11a

Additional

60

Rectangle JKLM is shown on the coordinate grid below.



GUIDE PAPER 11b

Additional

60

Rectangle JKLM undergoes a sequence of transformations, resulting in rectangle J'K'L'M'.

The length of side K'L' is 6 units. The coordinates of vertex K' are $(-3, 2)$, and the coordinates of vertex M' are $(3, -2)$.

Describe a sequence of transformations to rectangle JKLM that would result in rectangle J'K'L'M'.

Show your work.

Answer

the sequence of transformations to
rectangle J'K'L'M' is that it shaped
like a triangle.

Score Point 0 (out of 3 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in task. The response is irrelevant and shows no understanding of the necessary transformations.

EXEMPLARY RESPONSE

61

Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p , the mass, in pounds, of one paperback, and t , the mass, in pounds, of one textbook.

Answer

$$20p + 9t = 44.4$$

OR other valid systems

$$25p + 10t = 51$$

Solve the system of equations to find the two masses.

Show your work.

$$20p + 9t = 44.4$$

$$20p = 44.4 - 9t$$

$$p = 2.22 - 0.45t$$

$$25(2.22 - 0.45t) + 10t = 51$$

$$55.5 - 11.25t + 10t = 51$$

$$55.5 - 1.25t = 51$$

$$-1.25t = -4.5$$

$$t = 3.6$$

$$20p + 9(3.6) = 44.4$$

$$20p + 32.4 = 44.4$$

$$20p = 12$$

$$p = 0.6$$

OR other valid process

Mass of one paperback 0.6 pound(s)

Mass of one textbook 3.6 pound(s)

GUIDE PAPER 1

Additional

61

Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p , the mass, in pounds, of one paperback, and t , the mass, in pounds, of one textbook.

Answer

$$\begin{aligned} 20p + 9t &= 44.4 \\ + 25p + 10t &= 51 \end{aligned}$$

Solve the system of equations to find the two masses.

Show your work.

$$\begin{aligned} -1.25(20p + 9t = 44.4) \\ + 25p + 10t = 51 \\ \hline -25p - 11.25t = -55.5 \\ + 25p + 10t = 51 \\ \hline -11.25t = -4.5 \\ \hline t = 3.6 \end{aligned}$$

$$\begin{aligned} 20p + 9t &= 44.4 \\ 20p + 9(3.6) &= 44.4 \\ 20p + 32.4 &= 44.4 \\ \hline -32.4 &- 32.4 \\ 20p &= 12 \\ \hline p &= 0.6 \end{aligned}$$

Mass of one paperback 0.6 pound(s)

Mass of one textbook 3.6 pound(s)

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response provides a correct system of equations to solve for the values p and t and the system is solved correctly.

GUIDE PAPER 2

61

Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p , the mass, in pounds, of one paperback, and t , the mass, in pounds, of one textbook.

Answer

$$20p + 9t = 44.4$$

$$p = -2t + 1.32$$

Solve the system of equations to find the two masses.

Show your work.

$$20(-2t + 1.32) + 9t = 44.4$$

$$-40t + 26.4 + 9t = 44.4$$

$$\begin{array}{rcl} 13t + 26.4 & = & 44.4 \\ -26.4 & & -26.4 \end{array}$$

$$\frac{5t}{5} = \frac{18}{5}$$

$$t = 3.6$$

$$\begin{array}{rcl} 5p + t & = & 6.6 \\ -1p & & -1p \end{array}$$

$$\frac{5p}{5} = \frac{-1t + 6.6}{5}$$

$$p = -2t + 1.3$$

$$p = -2(3.6) + 1.32$$

$$p = -7.2 + 1.32$$

$$p = .6$$

Mass of one paperback .6 pound(s)

Mass of one textbook 3.6 pound(s)

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response provides a correct system of equations to solve for the values of p and t ; the second equation is equivalent to $5p + t = 6.6$ and is a correct equation describing the mass of 5 paperbacks and 1 textbook. The system of equations is solved correctly.

GUIDE PAPER 3

61

Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p , the mass, in pounds, of one paperback, and t , the mass, in pounds, of one textbook.

Answer

$$\begin{array}{l} \cancel{20x + 9y = 44.4} \\ \cancel{35x + 10y = 51.2} \\ \hline 5x + 2y = 10.2 \end{array} \quad p =$$

Solve the system of equations to find the two masses.

Show your work.

$$\begin{array}{ll} 5x + 2y = 10.2 & 20x + 9(-2.5x + 5.1) = 44.4 \\ 2y = -5x + 10.2 & 20x + -22.5x + 45.9 = 44.4 \\ \frac{2y}{2} = \frac{-5x + 10.2}{2} & -2.5x + 45.9 = 44.4 \\ y = -2.5x + 5.1 & -2.5x = -1.5 \\ & x = .6 \end{array}$$

$$\begin{array}{l} 20(.6) + 9y = 44.4 \\ 12 + 9y = 44.4 \\ 9y = 32.4 \end{array}$$

Mass of one paperback .6 pound(s)

Mass of one textbook 3.6 pound(s)

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response provides a correct system of equations to solve for the values of p and t . Although the system of equations is crossed out in the answer blank, correct equations are rewritten in the work below and the system is solved correctly.

GUIDE PAPER 4

61

Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p , the mass, in pounds, of one paperback, and t , the mass, in pounds, of one textbook.

Answer

$$20p + 9t = 44.4 \quad 25p + 10t = 51$$

Solve the system of equations to find the two masses.

Show your work.

$$\begin{aligned} & \left. \begin{aligned} & 5(20p + 9t = 44.4) \\ & - 4(25p + 10t = 51) \end{aligned} \right. \\ & \quad - 100p + 45t = 222 \\ & \quad - 100p + 40t = 204 \end{aligned}$$

$$5t = 18$$

Mass of one paperback 3.6 pound(s)

Mass of one textbook 3.6 pound(s)

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response provides a correct system of equations to solve for the values p and t and solves it correctly; however, the required work is incomplete.

GUIDE PAPER 5

61

Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p , the mass, in pounds, of one paperback, and t , the mass, in pounds, of one textbook.

Answer

$$20p + 9t = 44.4$$

(9) $5p + t = 51.0$

Solve the system of equations to find the two masses.

Show your work.

$$\begin{array}{r} 20p + 9t = 44.4 \\ -45p - 9t = -459.0 \\ \hline -25p = -414.6 \\ \hline p = 16.58 \end{array}$$
$$\begin{array}{r} 5(16.6) + t = 51 \\ -83 + t = 51 \\ \hline t = 32 \end{array}$$

Mass of one paperback 16.58 pound(s)

Mass of one textbook 32 pound(s)

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response has only one correct equation: the second equation has incorrect coefficients of p and t . This incorrect system is then correctly solved. The solution is missing a negative sign by 32 (it should be negative 32), suggesting an understanding that mass must be positive. The response correctly addresses most, but not all elements of the task.

GUIDE PAPER 6

61

Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p , the mass, in pounds, of one paperback, and t , the mass, in pounds, of one textbook.

Answer

$$\begin{aligned}20p + 9t &= 44.4 \\25p + 10t &= 51\end{aligned}$$

Solve the system of equations to find the two masses.

Show your work.

$$\begin{aligned}10(20p + 9t) &= 44.4 \quad | \text{ Divide by } 10 \\200p + 90t &= 44.4 \\9(25p + 10t) &= 51 \quad | \text{ Divide by } 9 \\225p + 90t &= 51 \\225p &= 51 - 90t \\225p &= 51 - 90t \\p &= 8.6 \text{ pounds}\end{aligned}$$

Mass of one paperback 6 pound(s)

Mass of one textbook 5 pound(s)

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The response provides a correct system of equations to solve for the values of p and t and correctly solves for the value of p . However, there is no work solving for t , and the solution of 5 is incorrect. The response correctly addresses most, but not all elements of the task.

GUIDE PAPER 7

61

Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p , the mass, in pounds, of one paperback, and t , the mass, in pounds, of one textbook.

Answer

$$20t + 9p = 44.4 \text{ lbs.}$$

$$21t + 14p = 51 \text{ lbs.}$$

Solve the system of equations to find the two masses. $\therefore p =$

Show your work.

$$\cancel{20t} + 9p = 44.4 \text{ lbs.}$$

$$\cancel{21t} + \cancel{14p} = 51 \text{ lbs.}$$

$$144 = 51 + 21x$$

$$\frac{144}{14} = \frac{-21p}{14} + \frac{51}{14}$$

$$t = -1.5p + 3.6$$

$$t = -1.5(0.35) + 3.6$$

$$t = 4.265$$

$$\begin{array}{r} 20x + 9y = 44.4 \\ - 20t \end{array} \quad \begin{array}{l} \\ -20p \end{array}$$

$$9t = 44.4 + 20p$$

$$\frac{9t}{9} = \frac{-20p + 44.4}{9}$$

$$t = -2.2p + 4.93$$

$$\begin{array}{r} 1.5p + 3.6 = -2.2p + 4.93 \\ + 2.2p \end{array} \quad \begin{array}{l} \\ + 2.2p \end{array}$$

$$3.7p + 3.6 = 4.93$$

$$\text{Mass of one paperback } 0.351 \text{ pound(s)}$$

$$\text{Mass of one textbook } 4.265 \text{ pound(s)}$$

$$\begin{array}{r} 3.7p = 1.3 \\ 3.7 \end{array}$$

$$p = 0.351$$

Score Point 1 (out of 3 points)

This response demonstrates a limited understanding of the mathematical concepts in the task. The response has only one correct equation: the second equation has incorrect coefficients of p and t . The system is then solved incorrectly, even accounting for the prior error in the coefficients. The response addresses some elements of the task correctly but exhibits multiple flaws in reasoning.

GUIDE PAPER 8

Additional

61

Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p , the mass, in pounds, of one paperback, and t , the mass, in pounds, of one textbook.

Answer

$$20p + 9t = 44.4$$

$$+ 1 \cdot 5p = 6.6$$

Solve the system of equations to find the two masses.

Show your work.

$$t + 5p = 6.6 \quad 20(6) + 9(3) = 44.4$$

$$3.3 + 5 \cdot 6 = 6.6 \quad 12 + 29.7 = 44.4$$

$$6.6 = 6.6 \checkmark \quad 44.4 = 44.4 \checkmark$$

Mass of one paperback 6 pound(s)

Mass of one textbook 3.3 pound(s)

Score Point 1 (out of 3 points)

This response demonstrates a limited understanding of the mathematical concepts in the task. The response provides a correct system of equations to solve for the values of p and t . One correct and one incorrect solution are provided via trial-and-error: there is no work for formally solving the system of equations. The response addresses some elements of the task correctly, but reflects a lack of essential understanding of how to solve a system of equations.

GUIDE PAPER 9

61

Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p , the mass, in pounds, of one paperback, and t , the mass, in pounds, of one textbook.

Answer

$$44.4 = 20p + 9t$$

Solve the system of equations to find the two masses.

Show your work:

20 paperbacks
9 textbooks

$$51 = 25p + 10t$$

$$44.4 = 20p + \cancel{9t}$$

Mass of one paperback 1.1 pound(s)

Mass of one textbook 2 pound(s)

Score Point 1 (out of 3 points)

This response demonstrates a limited understanding of the mathematical concepts in the task. The response provides a correct system of equations to solve for the values of p and t ; however, the solution is incorrect and there is no work provided.

GUIDE PAPER 10

61

Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p , the mass, in pounds, of one paperback, and t , the mass, in pounds, of one textbook.

Answer

$$y = 1.53p + 0.1$$

Solve the system of equations to find the two masses.

Show your work.

$$\frac{44.4}{29} = 1.53$$

Mass of one paperback 1.53 pound(s)

Mass of one textbook 1.53 pound(s)

Score Point 0 (out of 3 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. The equation, work, and solution provided are incorrect.

GUIDE PAPER 11

Additional

61

Oliver works at a bookstore. He packed 20 identical paperbacks and 9 identical textbooks in a box. The total mass of the books was 44.4 pounds. After he put 1 more textbook and 5 more paperbacks in the box, the total mass of the books was 51 pounds.

Write a system of equations that can be used to determine p , the mass, in pounds, of one paperback, and t , the mass, in pounds, of one textbook.

Answer

$$20p + 9t = 44.4 \text{ lbs}$$

Solve the system of equations to find the two masses.

Show your work.

$$20(.60) + 9(3.6)$$

5

3
+
—

Mass of one paperback .60 pound(s)

Mass of one textbook 3.60 pound(s)

Score Point 0 (out of 3 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. The work does not contain a system of equations: only one correct equation is provided. Although the solution is correct, there is no work to support how they were obtained.