

Name: _____



New York State *Testing Program*

2023 Mathematics Test Session 1

Grade **6**

May 2–4, 2023

RELEASED QUESTIONS

Session 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 making your choice.
- 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.

Grade 6 Mathematics Reference Sheet

CONVERSIONS

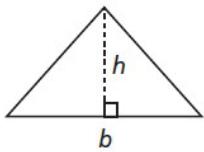
1 yard = 3 feet
1 mile = 5,280 feet

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 liter = 1,000 milliliters

1 pound = 16 ounces
1 ton = 2,000 pounds
1 kilogram = 1,000 grams

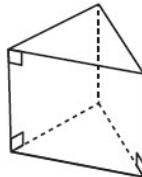
FORMULAS AND FIGURES

Triangle

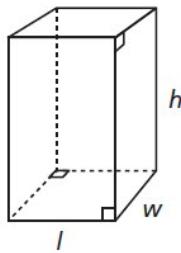


$$A = \frac{1}{2}bh$$

Right Triangular Prism

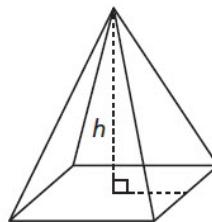


Right Rectangular Prism



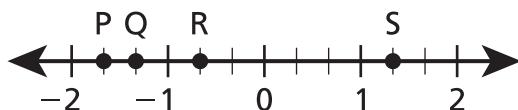
$$V = lwh$$
$$V = Bh$$

Right Rectangular Pyramid



2

Points P, Q, R, and S are plotted on the number line shown below.



What point represents the location of the value $-1\frac{1}{3}$?

- A** point P
- B** point Q
- C** point R
- D** point S

3

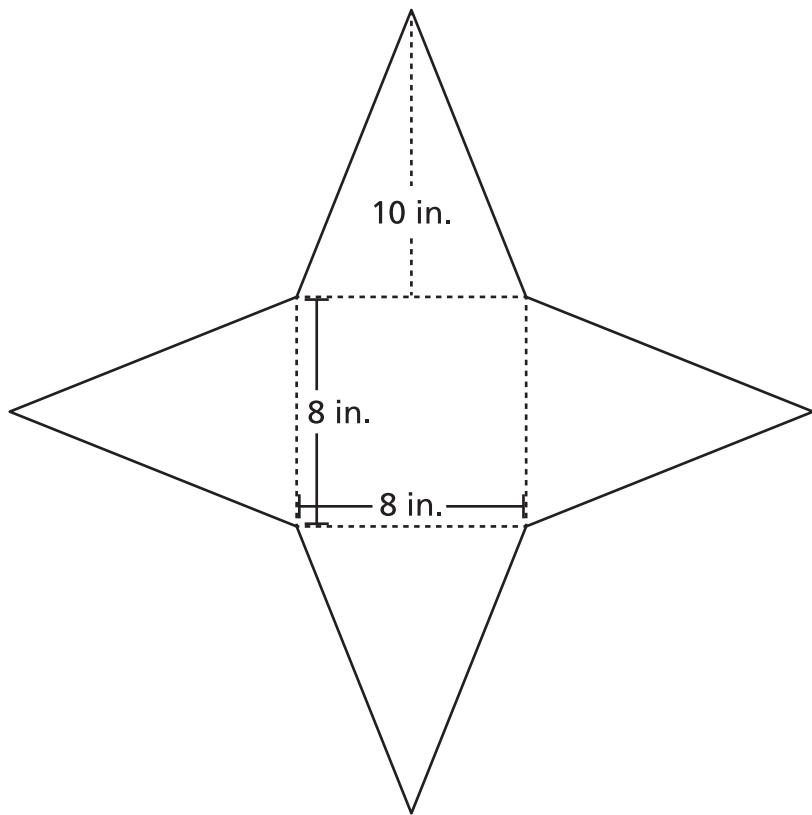
A bakery owner bakes 450 cookies each day. Which equation can be used to determine the number of cookies, c , the owner bakes for any number of days, d ?

- A** $c = d + 450$
- B** $d = c + 450$
- C** $450d = c$
- D** $450c = d$

GO ON

7

The net of a right square pyramid is shown below.



What is the surface area, in square inches, of the square pyramid?

- A 64
- B 80
- C 224
- D 384

GO ON

12

Which expression is equivalent to 14 less than the product of 8 and y ?

A $14 - 8y$

B $14 - \frac{y}{8}$

C $8y - 14$

D $\frac{y}{8} - 14$

GO ON

13

What is the least common multiple of 9 and 12?

- A 3
- B 36
- C 72
- D 108

14

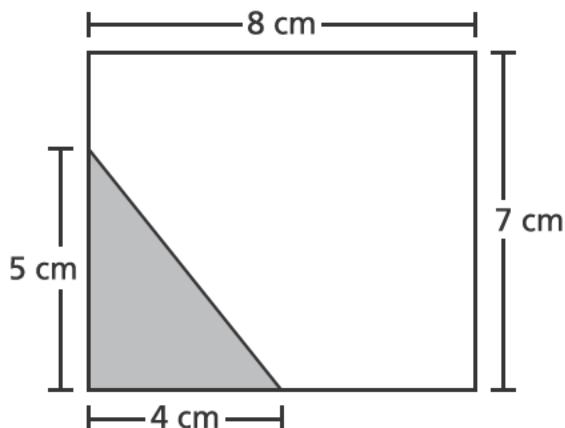
What is the value of the expression $\frac{3(7 - 2) + 5^3}{2}$?

- A 15
- B 17
- C 70
- D 72

GO ON

15

The figure below shows a shaded triangle within a rectangle.



What is the area, in square centimeters, of the part of the rectangle that is **not** shaded?

- A 36
- B 46
- C 56
- D 66

GO ON

17

Lukas recorded the elevations, in feet, of four activities while on vacation. The table below shows the elevation of each activity, relative to sea level.

ACTIVITY ELEVATION

Activity	Elevation
Biking	83 ft
Diving	-122 ft
Hiking	456 ft
Swimming	-17 ft

Which activity has an elevation closest to sea level?

- A biking
- B diving
- C hiking
- D swimming

18

An expression is shown below.

$$5z + (9 \div 3)$$

What is the coefficient of the variable in this expression?

- A 5
- B z
- C 9
- D 3

GO ON

21

A quadrilateral is drawn on a coordinate plane with the points A(−4,8), B(6,8), C(6,4), and D(−4,4). What is the length, in units, of side AB?

A 2

B 6

C 10

D 16

GO ON

22

What is the value of the expression $5b + c^3$ when $b = 7$ and $c = 4$?

A 24

B 47

C 76

D 99

24

Which expression is equivalent to $8(2a + 3b) - 2b$?

A $16a + b$

B $16a + 8b$

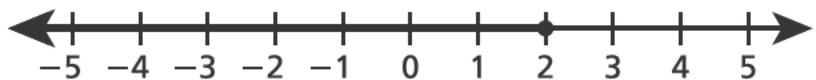
C $16a + 22b$

D $16a + 24b$

GO ON

30

Which inequality, in terms of x , is graphed on the number line shown below?



- A $x > 2$
- B $x < 2$
- C $x \geq 2$
- D $x \leq 2$

STOP

Session 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 making your choice or 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.

31

The number 60 is 75% of what number?

- A 45
- B 80
- C 120
- D 125

32

The table below shows the ratio of the number of teachers to the number of students at a school. The ratio of teachers to students is constant. Three numbers are missing from the table.

TEACHERS AND STUDENTS

Number of Teachers	2	?	8	12	?
Number of Students	5	15	?	30	75

Which table shows the correct missing numbers in the table above?

TEACHERS AND STUDENTS

A

Number of Teachers	2	6	8	12	37
Number of Students	5	15	16	30	75

TEACHERS AND STUDENTS

C

Number of Teachers	2	12	8	12	72
Number of Students	5	15	11	30	75

TEACHERS AND STUDENTS

B

Number of Teachers	2	6	8	12	30
Number of Students	5	15	20	30	75

TEACHERS AND STUDENTS

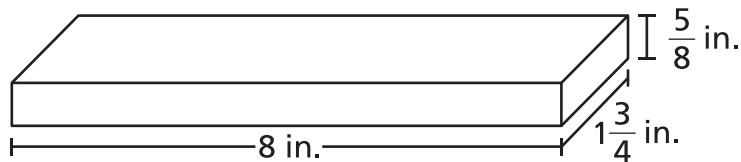
D

Number of Teachers	2	6	8	12	32
Number of Students	5	15	20	30	75

GO ON

33

A diagram of a right rectangular prism is shown below.



What is the volume, in cubic inches, of the right rectangular prism?

- A $6\frac{3}{4}$
- B $8\frac{3}{4}$
- C $10\frac{3}{8}$
- D $14\frac{5}{8}$

34

The ratio of number of yards to number of miles is $3,520 : 2$. How many yards are in 5 miles?

- A 1,760
- B 5,280
- C 7,040
- D 8,800

GO ON

35

Which expression is equivalent to $4(3m + 1)$?

- A $7m + 1$
- B $7m + 5$
- C $12m + 1$
- D $12m + 4$

36

Mark ran 8 miles in 60 minutes. If Mark continues to run at that same rate, how many minutes will it take him to run 12 miles?

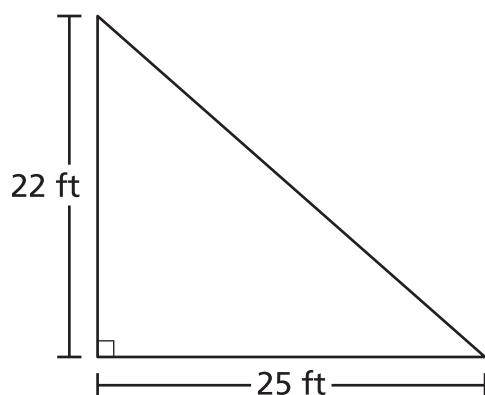
- A 48
- B 72
- C 90
- D 96

GO ON

37

This question is worth 1 credit.

A right triangle is shown below.



What is the area, in square feet, of the right triangle?

Answer _____ square feet

GO ON

38

This question is worth 1 credit.

The lowest recorded temperatures for each of two states are listed below.

-27°F and -35°F

Write a statement using $<$, $>$, \leq , or \geq to compare the recorded temperatures of the two states.

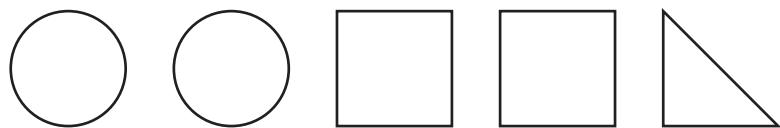
Answer _____

GO ON

39

This question is worth 1 credit.

A set of shapes is shown below.



What is the ratio of the number of circles to the total number of shapes?

Answer _____

GO ON

40

This question is worth 2 credits.

Lee makes a rectangular-shaped tile pattern by placing three tiles side by side, with no space between the tiles. The list below describes the shape of each tile and the order in which they are placed.

- The first tile is in the shape of a square with side lengths of x inches.
- The middle tile is shaped like a rectangle with a width of x inches and a length of $3x$ inches.
- The third tile is shaped like a square with side lengths of x inches.

The perimeter of the tile pattern is 60 inches. What is the value of x in the tile pattern?

Show your work.

Answer _____ inches

GO ON

41

This question is worth 2 credits.

The list below shows the cost of the same candle at two different stores.

- Store ABC sells 6 of these candles for \$12.00.
- Store XYZ sells 8 of these candles for \$14.00.

Which store sells the candle for a lower unit rate?

Explain how you determined your answer.

GO ON

42

This question is worth 2 credits.

A box contains $8\frac{1}{4}$ cups of cereal. One serving of cereal is $\frac{3}{4}$ cup. How many servings of cereal are in the box?

Show your work.

Answer _____ servings

GO ON

43

This question is worth 2 credits.

What is the value of the expression $7 \times (5 - 3)^3 - 20 \div 4$?

Show your work.

Answer _____

GO ON

44

This question is worth 2 credits.

The tables below show the ratios of distance to time traveled by Car A and Car B.

CAR A

Time (hours)	Distance (miles)
2	130
4	260
6	390

CAR B

Time (hours)	Distance (miles)
3	186
5	310
7	434

If both cars maintain their rates of speed, what is the difference between the distances, in miles, traveled by Car A and by Car B after 8 hours?

Show your work.

Answer _____ miles

GO ON

45

This question is worth 2 credits.

A shipping container in the shape of a right rectangular prism has a base with an area of 42 square feet. The height of the container is $5\frac{3}{4}$ feet. What is the volume, in cubic feet, of the shipping container?

Show your work.

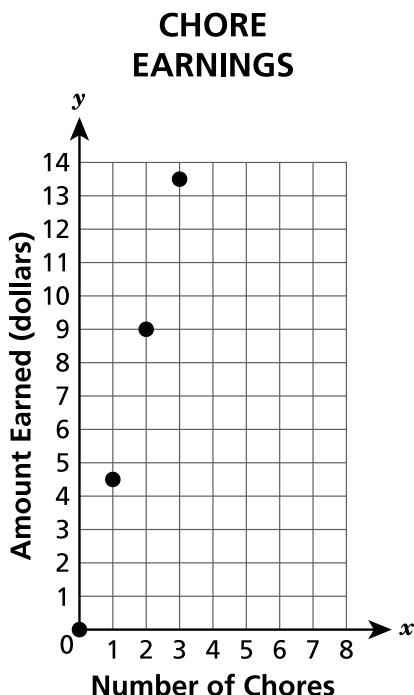
Answer _____ cubic feet

GO ON

46

This question is worth 3 credits.

Logan earns money for completing chores. The graph shown below represents the relationship between the number of chores, x , he completes, and the amount of money, y , he earns.



Based on the graph, explain the relationship between the number of chores Logan completes and the amount of money he earns. Be sure to identify the dependent and the independent variables in your answer.

Explain your answer.

Determine the total amount of money Logan will earn after completing 9 chores.

Answer \$ _____

STOP

THE STATE EDUCATION DEPARTMENT
THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234
2023 Mathematics Tests Map to the Standards
Grade 6 Released Questions

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)
Session 1									
2	Multiple Choice	B	1	NGLS.Math.Content.NY-6.NS.6c	The Number System		0.6313		
3	Multiple Choice	C	1	NGLS.Math.Content.NY-6.EE.9	Expressions and Equations		0.4641		
7	Multiple Choice	C	1	NGLS.Math.Content.NY-6.G.4	Geometry		0.4141		
12	Multiple Choice	C	1	NGLS.Math.Content.NY-6.EE.2a	Expressions and Equations		0.4894		
13	Multiple Choice	B	1	NGLS.Math.Content.NY-6.NS.4	The Number System		0.4402		
14	Multiple Choice	C	1	NGLS.Math.Content.NY-6.EE.1	Expressions and Equations		0.6059		
15	Multiple Choice	B	1	NGLS.Math.Content.NY-6.G.1	Geometry		0.2707		
17	Multiple Choice	D	1	NGLS.Math.Content.NY-6.NS.7c	The Number System	NGLS.Math.Content.NY-6.NS.5	0.6673		
18	Multiple Choice	A	1	NGLS.Math.Content.NY-6.EE.2b	Expressions and Equations		0.5137		
21	Multiple Choice	C	1	NGLS.Math.Content.NY-6.G.3	Geometry		0.5655		
22	Multiple Choice	D	1	NGLS.Math.Content.NY-6.EE.2c	Expressions and Equations		0.6058		
24	Multiple Choice	C	1	NGLS.Math.Content.NY-6.EE.3	Expressions and Equations		0.4951		
30	Multiple Choice	D	1	NGLS.Math.Content.NY-6.EE.8	Expressions and Equations		0.4636		
Session 2									
31	Multiple Choice	B	1	NGLS.Math.Content.NY-6.RP.3c	Ratios and Proportional Relationships		0.6013		
32	Multiple Choice	B	1	NGLS.Math.Content.NY-6.RP.3a	Ratios and Proportional Relationships		0.5538		
33	Multiple Choice	B	1	NGLS.Math.Content.NY-6.G.2	Geometry		0.5475		
34	Multiple Choice	D	1	NGLS.Math.Content.NY-6.RP.3b	Ratios and Proportional Relationships	NGLS.Math.Content.NY-6.RP.3d	0.5502		
35	Multiple Choice	D	1	NGLS.Math.Content.NY-6.EE.3	Expressions and Equations		0.4899		
36	Multiple Choice	C	1	NGLS.Math.Content.NY-6.RP.3b	Ratios and Proportional Relationships		0.6124		
37	Constructed Response		1	NGLS.Math.Content.NY-6.G.1	Geometry			0.5400	0.5400
38	Constructed Response		1	NGLS.Math.Content.NY-6.NS.7b	The Number System			0.5679	0.5679
39	Constructed Response		1	NGLS.Math.Content.NY-6.RP.1	Ratios and Proportional Relationships			0.6482	0.6482
40	Constructed Response		2	NGLS.Math.Content.NY-6.EE.7	Expressions and Equations	NGLS.Math.Content.NY-6.EE.3		0.4131	0.2065
41	Constructed Response		2	NGLS.Math.Content.NY-6.RP.2	Ratios and Proportional Relationships			0.3635	0.1818
42	Constructed Response		2	NGLS.Math.Content.NY-6.NS.1	The Number System			0.3784	0.1892
43	Constructed Response		2	NGLS.Math.Content.NY-6.EE.1	Expressions and Equations			0.4028	0.2014
44	Constructed Response		2	NGLS.Math.Content.NY-6.RP.3b	Ratios and Proportional Relationships			0.3767	0.1884
45	Constructed Response		2	NGLS.Math.Content.NY-6.G.2	Geometry			0.3540	0.1770
46	Constructed Response		3	NGLS.Math.Content.NY-6.EE.9	Expressions and Equations	NGLS.Math.Content.NY-6.RP.3b		0.2549	0.0850

*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.

1-Credit Constructed-Response Rubric

1 Credit	A 1-credit response is a correct answer to the question which indicates a thorough understanding of mathematical concepts and/or procedures.
0 Credits*	A 0-credit response is incorrect, irrelevant, or incoherent.

* 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).

2-Credit Constructed-Response Holistic Rubric

2 Credits	<p>A 2-credit response includes the correct solution to the question and demonstrates a thorough understanding of the mathematical concepts and/or procedures in the task.</p> <p>This response</p> <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 Credit	<p>A 1-credit response demonstrates only a partial understanding of the mathematical concepts and/or procedures in the task.</p> <p>This response</p> <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 Credits*	<p>A 0-credit 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.</p>

* 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).

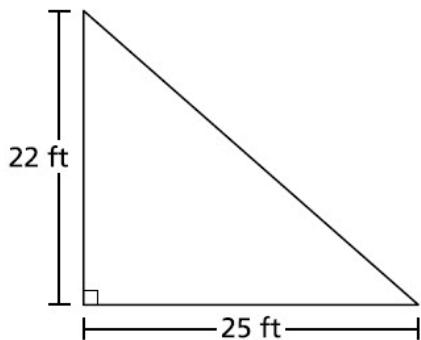
3-Credit Constructed-Response Holistic Rubric

3 Credits	<p>A 3-credit response includes the correct solution(s) to the question and demonstrates a thorough understanding of the mathematical concepts and/or procedures in the task.</p> <p>This response</p> <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 Credits	<p>A 2-credit response demonstrates a partial understanding of the mathematical concepts and/or procedures in the task.</p> <p>This response</p> <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 Credit	<p>A 1-credit response demonstrates only a limited understanding of the mathematical concepts and/or procedures in the task.</p> <p>This response</p> <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 Credits*	<p>A 0-credit 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.</p>

* 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).

37

A right triangle is shown below.



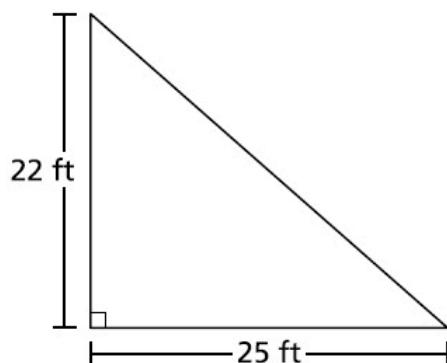
What is the area, in square feet, of the right triangle?

Answer _____ square feet

EXEMPLARY RESPONSE

37

A right triangle is shown below.



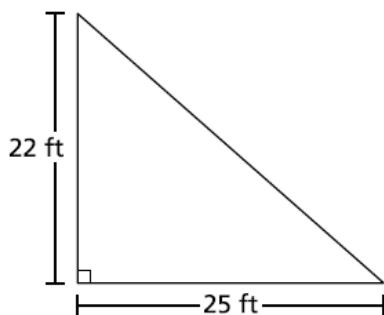
What is the area, in square feet, of the right triangle?

Answer 275 or $A = 275$ or equivalent square feet

GUIDE PAPER 1

37

A right triangle is shown below.



What is the area, in square feet, of the right triangle?

Answer

275

square feet

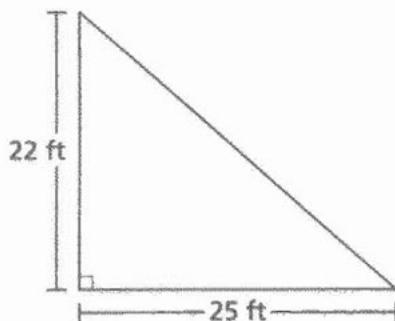
Score Point 1 (out of 1 credit)

A correct answer is provided.

GUIDE PAPER 2

37

A right triangle is shown below.



What is the area, in square feet, of the right triangle? [1]

$$\begin{aligned} A &= \frac{1}{2} \cdot b \cdot h \\ A &= \frac{1}{2} (25 \times 22) \\ A &= \frac{1}{2} (550) \\ &= 275 \text{ ft}^2 \end{aligned}$$

Answer 275 square feet

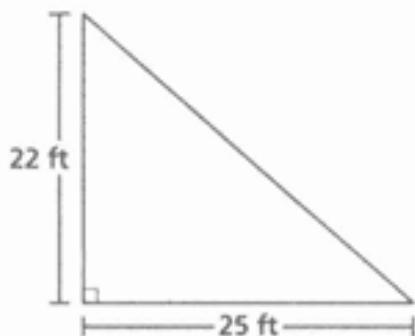
Score Point 1 (out of 1 credit)

A correct answer is provided.

GUIDE PAPER 3

37

A right triangle is shown below.



What is the area, in square feet, of the right triangle? [1]

$$\frac{1}{2}bh$$

$$22 \times 25 = 550$$

$$550 \div 2 = 275$$

Answer 245 square feet

Score Point 0 (out of 1 credit)

An incorrect answer is provided.

38

The lowest recorded temperatures for each of two states are listed below.

-27°F and -35°F

Write a statement using $<$, $>$, \leq , or \geq to compare the recorded temperatures of the two states.

Answer _____

EXEMPLARY RESPONSE

38

The lowest recorded temperatures for each of two states are listed below.

-27°F and -35°F

Write a statement using $<$, $>$, \leq , or \geq to compare the recorded temperatures of the two states.

Answer

$-27 > -35$ *or equivalent*

GUIDE PAPER 1

38

The lowest recorded temperatures for each of two states are listed below.

-27°F and -35°F

Write a statement using $<$, $>$, \leq , or \geq to compare the recorded temperatures of the two states.

Answer

$-27 > -35$

Score Point 1 (out of 1 credit)

A correct answer is provided.

GUIDE PAPER 2

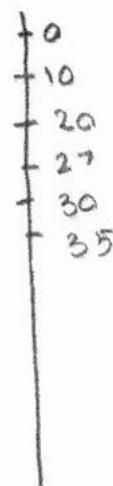
38

The lowest recorded temperatures for each of two states are listed below.

-27°F and -35°F

Write a statement using $<$, $>$, \leq , or \geq to compare the recorded temperatures of the two states. [1]

-27 Hotter
 -35 colder



Answer $-27 > -35$

Score Point 1 (out of 1 credit)

A correct answer is provided.

GUIDE PAPER 3

38

The lowest recorded temperatures for each of two states are listed below.

-27°F and -35°F

Write a statement using $<$, $>$, \leq , or \geq to compare the recorded temperatures of the two states.

Answer

$-27 < -35$

Score Point 0 (out of 1 credit)

An incorrect answer is provided.

39

A set of shapes is shown below.



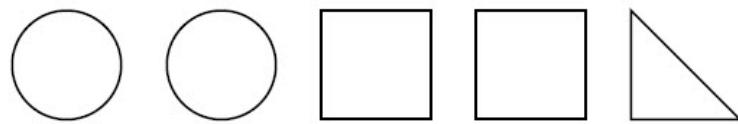
What is the ratio of the number of circles to the total number of shapes?

Answer _____

EXEMPLARY RESPONSE

39

A set of shapes is shown below.



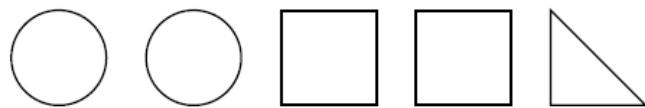
What is the ratio of the number of circles to the total number of shapes?

Answer $2 : 5$ or 2 to 5 or $\frac{2}{5}$ or equivalent

GUIDE PAPER 1

39

A set of shapes is shown below.



What is the ratio of the number of circles to the total number of shapes?

Answer

2:5

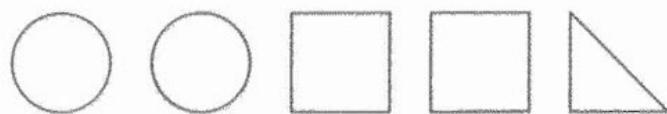
Score Point 1 (out of 1 credit)

A correct answer is provided.

GUIDE PAPER 2

39

A set of shapes is shown below.



What is the ratio of the number of circles to the total number of shapes? [1]

2 circles

total shapes = 5 shapes

circles to the total number of shapes

= 2:5

Answer 2:5

Score Point 1 (out of 1 credit)

A correct answer is provided.

GUIDE PAPER 3

39

A set of shapes is shown below.



What is the ratio of the number of circles to the total number of shapes? [1]

Answer 2 - 5

Score Point 0 (out of 1 credit)

An incorrect answer is provided.

40

Lee makes a rectangular-shaped tile pattern by placing three tiles side by side, with no space between the tiles. The list below describes the shape of each tile and the order in which they are placed.

- The first tile is in the shape of a square with side lengths of x inches.
- The middle tile is shaped like a rectangle with a width of x inches and a length of $3x$ inches.
- The third tile is shaped like a square with side lengths of x inches.

The perimeter of the tile pattern is 60 inches. What is the value of x in the tile pattern?

Show your work.

Answer _____ inches

EXEMPLARY RESPONSE

40

Lee makes a rectangular-shaped tile pattern by placing three tiles side by side, with no space between the tiles. The list below describes the shape of each tile and the order in which they are placed.

- The first tile is in the shape of a square with side lengths of x inches.
- The middle tile is shaped like a rectangle with a width of x inches and a length of $3x$ inches.
- The third tile is shaped like a square with side lengths of x inches.

The perimeter of the tile pattern is 60 inches. What is the value of x in the tile pattern?

Show your work.

$$P = 3x + 3x + 3x + 3x = 12x$$

$$60 = 12x$$

$$x = 60 \div 12$$

$$x = 5 \text{ inches}$$

or other valid process

Answer 5 inches

GUIDE PAPER 1

Additional

40

Lee makes a rectangular-shaped tile pattern by placing three tiles side by side, with no space between the tiles. The list below describes the shape of each tile and the order in which they are placed.

- The first tile is in the shape of a square with side lengths of x inches.
- The middle tile is shaped like a rectangle with a width of x inches and a length of $3x$ inches.
- The third tile is shaped like a square with side lengths of x inches.

The perimeter of the tile pattern is 60 inches. What is the value of x in the tile pattern?

Show your work.

$$\begin{aligned} \text{1st tile} &= \text{all } x\text{'s} \\ \text{2nd tile} &= \text{width of } x \text{ and a length of } 3x \text{ inches} \\ \text{3rd tile} &= \text{all } x\text{'s} \\ x + x + x + 3x + 3x + x + x + x &= 60 \text{ inches} \\ 12x &= 60 \text{ inches} \\ 60 \div 12 &= 5 \text{ inches.} \end{aligned}$$

Answer

The value of
 x is 5.
inches

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. A correct equation is written, and it is correctly solved to determine the value of x . This response is complete and correct.

GUIDE PAPER 2

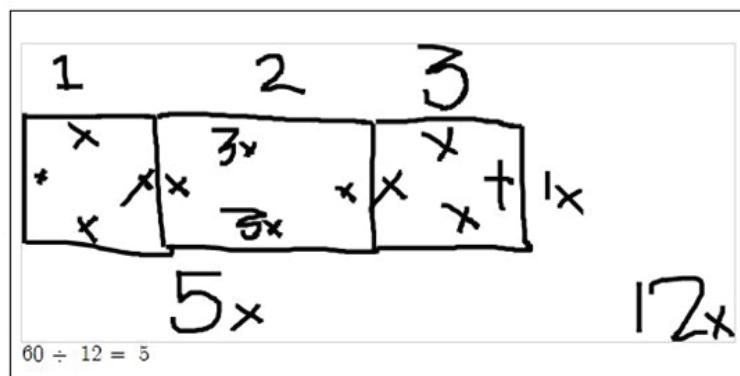
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- The middle tile is shaped like a rectangle with a width of x inches and a length of $3x$ inches.
- The third tile is shaped like a square with side lengths of x inches.

The perimeter of the tile pattern is 60 inches. What is the value of x in the tile pattern?

Show your work.



Answer inches

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. A correct representation of the placed tiles is drawn, and it is correctly used to determine the algebraic expression that represents the perimeter of the tile pattern and the value of x . This response is complete and correct.

GUIDE PAPER 3

40

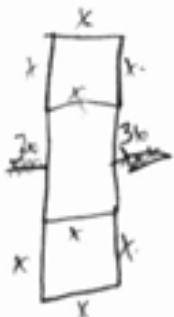
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- The first tile is in the shape of a square with side lengths of x inches.
- The middle tile is shaped like a rectangle with a width of x inches and a length of $3x$ inches.
- The third tile is shaped like a square with side lengths of x inches.

The perimeter of the tile pattern is 60 inches. What is the value of x in the tile pattern?

Show your work.

$$x \neq 4$$



$$\begin{array}{r} 12 \\ + 12 \\ \hline 24 \\ + 16 \\ \hline 40 \\ + 16 \\ \hline 56 \end{array}$$

$x + x$

$$12x = 60$$

$$12x = 60$$

Answer 5 inches

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. A correct representation of the placed tiles is drawn. A correct equation is written, and it is correctly solved to determine the value of x . This response is complete and correct.

GUIDE PAPER 4

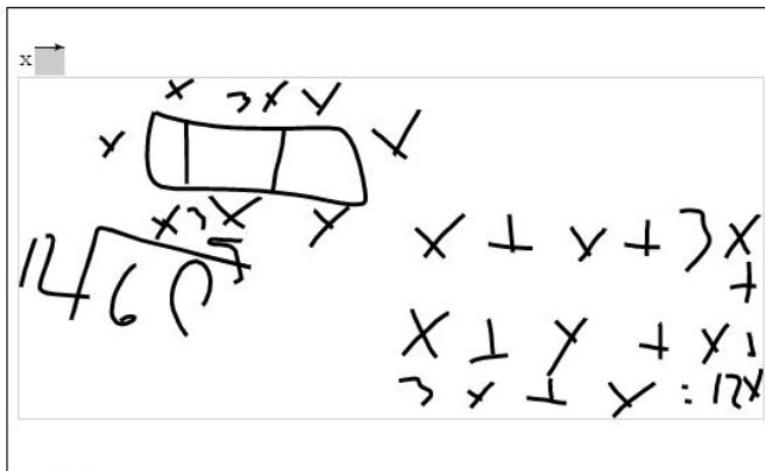
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- The middle tile is shaped like a rectangle with a width of x inches and a length of $3x$ inches.
- The third tile is shaped like a square with side lengths of x inches.

The perimeter of the tile pattern is 60 inches. What is the value of x in the tile pattern?

Show your work.



Answer $x=12$ inches

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. A correct representation of the placed tiles is drawn, and a correct algebraic expression representing the perimeter of the pattern is written. Although the value of x is correctly calculated in the work, an incorrect solution is provided. This response correctly addresses only some elements of the task.

GUIDE PAPER 5

40

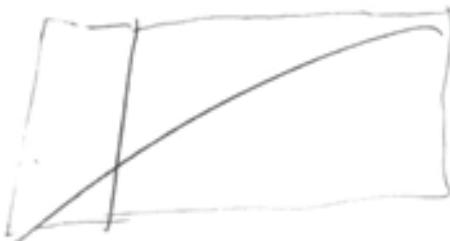
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- The first tile is in the shape of a square with side lengths of x inches.
- The middle tile is shaped like a rectangle with a width of x inches and a length of $3x$ inches.
- The third tile is shaped like a square with side lengths of x inches.

The perimeter of the tile pattern is 60 inches. What is the value of x in the tile pattern?

Show your work.

$$\begin{array}{r} 6 \\ \overline{)10+60} \\ -60 \\ \hline 0 \end{array}$$



$$\begin{aligned} & x + x + x + 3x + x + x + x \\ & 6 + 6 + 6 + 3(6) + 6 + 6 + 6 \\ & 18 + 18 + 18 + 6 \\ & 54 + 6 \\ & 60 \end{aligned}$$

Answer

6 inches

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. A partially correct algebraic expression representing the perimeter of the pattern is written, with one side length inappropriately represented as x instead of $3x$. The written expression is correctly used to determine a solution for x . This response correctly addresses only some elements of the task.

GUIDE PAPER 6

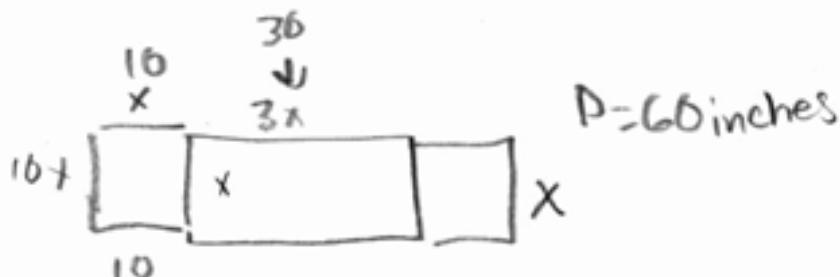
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- The third tile is shaped like a square with side lengths of x inches.

The perimeter of the tile pattern is 60 inches. What is the value of x in the tile pattern?

Show your work.



$$3x + x + x + 10 = 60$$

$$\begin{aligned} 5x &= 60 \\ 5 &= 5 \\ x &= 10 \end{aligned}$$

Answer

10 inches

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. A correct representation of the placed tiles is drawn, with some of the sides appropriately marked with lengths x and $3x$. The perimeter of the pattern is misrepresented algebraically in the written equation; however, the written equation is correctly solved to determine a solution for x . This response correctly addresses only some elements of the task.

GUIDE PAPER 7

40

Lee makes a rectangular-shaped tile pattern by placing three tiles side by side. The list below describes the shape of each tile and the order in which they are placed.

- The first tile is in the shape of a square with side lengths of x inches.
- The middle tile is shaped like a rectangle with a width of x inches and a length of $3x$ inches.
- The third tile is shaped like a square with side lengths of x inches.

The perimeter of the tile pattern is 60 inches. What is the value of x in the tile pattern?

Show your work.

$$\begin{array}{r} 3x = 60 \\ \hline 8 \quad 3 \\ \hline x = 20 \end{array}$$

$$\begin{array}{r} 20 \\ 3 \overline{) 60} \\ -6 \quad \cancel{0} \\ \hline 0 \end{array}$$

Answer $x = 20$ inches

Score Point 0 (out of 2 credits)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. The perimeter of the pattern is misrepresented algebraically in the written equation. Although the written equation is solved correctly, holistically, the work is not sufficient to show any understanding.

GUIDE PAPER 8

Additional

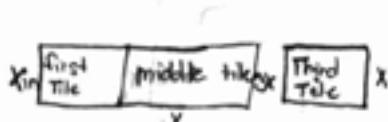
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- The third tile is shaped like a square with side lengths of x inches.

The perimeter of the tile pattern is 60 inches. What is the value of x in the tile pattern?

Show your work.



$$3x \quad x = 5$$

Answer 5 inches

Score Point 0 (out of 2 credits)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although a correct solution is provided, the drawing is incorrect. The work does not support the obtained solution and it is not clear how it is obtained. Holistically, this response is insufficient to show any understanding.

The list below shows the cost of the same candle at two different stores.

- Store ABC sells 6 of these candles for \$12.00.
- Store XYZ sells 8 of these candles for \$14.00.

Which store sells the candle for a lower unit rate?

Explain how you determined your answer.

EXEMPLARY RESPONSE

41

The list below shows the cost of the same candle at two different stores.

- Store ABC sells 6 of these candles for \$12.00.
- Store XYZ sells 8 of these candles for \$14.00.

Which store sells the candle for a lower unit rate?

Explain how you determined your answer.

ABC: $12 \div 6 = 2$ dollars per candle

XYZ: $14 \div 8 = 1.75$ dollars per candle

Store XYZ has a lower unit rate.

or other valid explanation

GUIDE PAPER 1

Additional

41

The list below shows the cost of the same candle at two different stores.

- Store ABC sells 6 of these candles for \$12.00.

$$\frac{12}{6} = 2$$

- Store XYZ sells 8 of these candles for \$14.00.

$$\frac{14}{8} = 1.75$$

Which store sells the candle for a lower unit rate? [2]

Explain how you determined your answer.

Store XYZ is the better store to buy candles because it has a lower unit rate.

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. Store XYZ is correctly identified to have a lower cost per candle, and the process of determining the unit rates at each store is correctly explained to support the answer. Per Scoring Policy #1 for 2- and 3- credit responses, the work shown in other than a designated “Explain” area should still be scored. The explanation is complete and correct.

GUIDE PAPER 2

41

The list below shows the cost of the same candle at two different stores.

- Store ABC sells 6 of these candles for \$12.00.
- Store XYZ sells 8 of these candles for \$14.00.

Which store sells the candle for a lower unit rate?

Explain how you determined your answer.

Store XYZ sells for the lower unit rate because Store ABC costs \$2.00 for each candle ($6 \times 2 = \12.00) and Store XYZ sells for less because 8×2 does not equal \$14.00 it equals \$16.00.

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. Store XYZ is correctly identified to have a lower cost per candle, and the process of determining the unit rate at store ABC is correctly explained. Although the unit rate at store XYZ is not calculated, the explanation is sufficient to support the choice of store XYZ.

GUIDE PAPER 3

41

The list below shows the cost of the same candle at two different stores.

- Store ABC sells 6 of these candles for \$12.00.
- Store XYZ sells 8 of these candles for \$14.00.

Which store sells the candle for a lower unit rate? [2]

Explain how you determined your answer.

X Y Z, I got this answer by dividing
8 and 14.

ABC $\frac{2}{6 \overline{) 12}}$ *2 dollars*

X Y Z $\frac{1.75}{8 \overline{) 14.00}}$ *1.75 dollars*

$$\begin{array}{r} 1.75 \\ 8 \overline{) 14.00} \\ -8 \\ \hline 6 \\ -6 \\ \hline 0 \end{array}$$

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. Store XYZ is correctly identified to have a lower cost per candle, and the process to determine the unit rates using division is correctly explained to support the answer. Although the phrase “*by dividing 8 and 14*” does not specify the order of division, the division is performed correctly. The explanation is sufficient to show a thorough understanding.

GUIDE PAPER 4

41

The list below shows the cost of the same candle at two different stores.

- Store ABC sells 6 of these candles for \$12.00.
- Store XYZ sells 8 of these candles for \$14.00.

Which store sells the candle for a lower unit rate? [2]

Explain how you determined your answer.

XYZ sells the candles for a lower unit price because ABC's candles cost \$2 per candle and XYZ's candle cost \$1.75 per candle. $2 > 1.75$.

ABC: \$12.00 for 6 candles

XYZ: \$14.00 for 8 candles

ABC: \$2 per candle

XYZ: \$1.75 per candle.

$2 > 1.75$

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. Store XYZ is correctly identified to have a lower cost per candle; however, the explanation is incomplete. Although the unit rates are correctly compared, the process of calculating the cost per candle is not explained. This response correctly addresses only some elements of the task.

GUIDE PAPER 5

41

The list below shows the cost of the same candle at two different stores.

- Store ABC sells 6 of these candles for \$12.00.
- Store XYZ sells 8 of these candles for \$14.00.

Which store sells the candle for a lower unit rate? [2]

Explain how you determined your answer.

I did $12 \div 6$ and $14 \div 8$ and got \$2 and \$1.75. Then I chose the smaller amount as my answer.

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. Although the process of calculating the unit rates is correctly explained, the store with the lower unit rate is not identified, and it is not clear from the explanation which store has a lower cost per candle. This response correctly addresses only some elements of the task.

GUIDE PAPER 6

41

The list below shows the cost of the same candle at two different stores.

- Store ABC sells 6 of these candles for \$12.00.
- Store XYZ sells 8 of these candles for \$14.00.

Which store sells the candle for a lower unit rate?

Explain how you determined your answer.

Store XYZ sell candles for a lower unit rate because for every one candle cost \$1.60 and store ABC sells \$2.00 for one candle.

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The unit rate at store ABC is correctly calculated, and store XYZ is correctly identified to have a lower cost per candle; however, the unit rate at store XYZ is incorrect, and it is not clear from the explanation how the cost per candle is determined. This response correctly addresses only some elements of the task.

GUIDE PAPER 7

41

The list below shows the cost of the same candle at two different stores.

- Store ABC sells 6 of these candles for \$12.00.
- Store XYZ sells 8 of these candles for \$14.00.

Which store sells the candle for a lower unit rate?

Explain how you determined your answer.

yuo get more more from store ABC because 6 times 2 gets you
12 and nothing times 8 gets you 14.

Score Point 0 (out of 2 credits)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although 2 is used to show the cost of candles at store ABC, store ABC is incorrectly chosen to have a lower unit rate, the cost per candle at store XYZ is not determined, and the phrase “*nothing times 8 gets you 14*” is incorrect. Holistically, the explanation is insufficient to show any understanding.

GUIDE PAPER 8

Additional

41

The list below shows the cost of the same candle at two different stores.

- Store ABC sells 6 of these candles for \$12.00.
- Store XYZ sells 8 of these candles for \$14.00.

Which store sells the candle for a lower unit rate? [2]

Explain how you determined your answer.

Store XYZ is better, I determined my answer by finding the unit rate for both.



Score Point 0 (out of 2 credits)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although store XYZ is correctly identified to have a lower cost per candle, the unit rates are not determined, and the process is not explained. The explanation is insufficient to show any understanding of the task.

42

A box contains $8\frac{1}{4}$ cups of cereal. One serving of cereal is $\frac{3}{4}$ cup. How many servings of cereal are in the box?

Show your work.

Answer _____ servings

EXEMPLARY RESPONSE

42

A box contains $8\frac{1}{4}$ cups of cereal. One serving of cereal is $\frac{3}{4}$ cup. How many servings of cereal are in the box?

Show your work.

$$8\frac{1}{4} \div \frac{3}{4} =$$

$$\frac{33}{4} \div \frac{3}{4} =$$

$$\frac{33}{4} \times \frac{4}{3} =$$

$$\frac{132}{12} = \frac{33}{3} = 11$$

or

$$8.25 \div 0.75 = 11$$

or other valid process

Answer 11 or equivalent servings

GUIDE PAPER 1

Additional

42

A box contains $8\frac{1}{4}$ cups of cereal. One serving of cereal is $\frac{3}{4}$ cup. How many servings of cereal are in the box?

Show your work.

$$\begin{aligned}8\frac{1}{4} &= \frac{33}{4} \\ \frac{33}{4} \div \frac{3}{4} &= \frac{33}{4} \times \frac{4}{3} \\ \frac{33}{4} \times \frac{4}{3} &= \frac{132}{12} \\ \frac{132}{12} &= 11\end{aligned}$$

Answer servings

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The mixed number is correctly converted to an improper fraction, and multiplication and division are correctly performed to determine the total number of servings of cereal. This response is complete and correct.

GUIDE PAPER 2

42

A box contains $8\frac{1}{4}$ cups of cereal. One serving of cereal is $\frac{3}{4}$ cup. How many servings of cereal are in the box?

Show your work.

$8\frac{1}{4}$ <-turn into improper fraction- $\frac{33}{4}$ <- subtract $\frac{3}{4}$ 11 times and there will be no more times you can serve there for there are 11 servings in the cereal box.

Answer 11 servings. servings

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The mixed number is correctly converted to an improper fraction, and a correct process of repeated subtraction is used to determine the correct solution. This response is complete and correct.

GUIDE PAPER 3

42

A box contains $8\frac{1}{4}$ cups of cereal. One serving of cereal is $\frac{3}{4}$ cup. How many servings of cereal are in the box? [2]

Show your work.

$$\begin{array}{c} \frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{4}{4}, \frac{5}{4}, \frac{6}{4}, \frac{7}{4}, \frac{8}{4}, \frac{9}{4}, \frac{10}{4}, \frac{11}{4} \\ \frac{3}{4}, 1\frac{1}{4}, 2\frac{1}{4}, 3\frac{1}{4}, 3\frac{3}{4}, 4\frac{2}{4}, 5\frac{1}{4}, 6, 6\frac{2}{4}, 7\frac{2}{4}, 8\frac{1}{4} \\ 1, 2, 3, 4 \end{array}$$

Answer 11 servings

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. A correct process of repeated addition is used to determine the total number of servings of cereal. This response is complete and correct.

GUIDE PAPER 4

42

A box contains $8\frac{1}{4}$ cups of cereal. One serving of cereal is $\frac{3}{4}$ cup. How many servings of cereal are in the box? [2]

Show your work.



$$\frac{36}{4} \div \frac{3}{4}$$

$$\frac{36}{4} \times \frac{4}{3}$$
$$= \frac{144}{12}$$

$$\begin{array}{r} 2 \\ \times 12 \\ \hline 144 \end{array}$$
$$12 \overline{)144}$$
$$\quad -12$$
$$\quad \quad \quad 24$$

Answer

12 servings

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. An error occurs when converting the mixed number to an improper fraction ($8\frac{1}{4} \neq \frac{36}{4}$). The rest of the work is carried out correctly using multiplication and division procedures to determine the total number of servings. This response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 5

42

A box contains $8\frac{1}{4}$ cups of cereal. One serving of cereal is $\frac{3}{4}$ cup. How many servings of cereal are in the box?

Show your work.

$$8\frac{1}{4} = \frac{33}{4}$$

$$\frac{33}{4} \div \frac{3}{4} = \frac{33}{4} \times \frac{4}{3} = \frac{132}{12} = 11\frac{1}{4}$$

Answer

$$11\frac{1}{4}$$

: servings

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The mixed number is correctly converted to an improper fraction, and a correct process is written to determine the total number of cereal servings; however, a calculation error occurs when dividing 132 by 12. This response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 6

42

A box contains $8\frac{1}{4}$ cups of cereal. One serving of cereal is $\frac{3}{4}$ cup. How many servings of cereal are in the box?

Show your work.

$$8\frac{1}{4} = \frac{33}{4}$$
$$\frac{33}{4} \div \frac{3}{4} = \frac{11}{4}$$

Answer There are

$$\frac{11}{4}$$

servings of cereal.

servings

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The mixed number is correctly converted to an improper fraction, and a correct division process is written to determine the total number of cereal servings; however, a calculation error occurs when dividing fractions. This response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 7

42

A box contains $8\frac{1}{4}$ cups of cereal. One serving of cereal is $\frac{3}{4}$ cup. How many servings of cereal are in the box? [2]

Show your work.

Answer

 _____ servings

Score Point 0 (out of 2 credits)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although a correct solution is stated, no work is provided to support the correct solution. Per Scoring Policy #3 for 2- and 3- credit responses, this response receives no credit.

GUIDE PAPER 8

Additional

42

A box contains $8\frac{1}{4}$ cups of cereal. One serving of cereal is $\frac{3}{4}$ cup. How many servings of cereal are in the box?

Show your work.

$$8\frac{1}{4} = \frac{32}{4} = 32 \div 4 = 8$$
$$8\frac{3}{4}$$

Answer

$$\frac{3}{4}$$

servings

Score Point 0 (out of 2 credits)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. The mixed number is incorrectly written as an improper fraction, and the rest of the work is incorrect. Holistically, this response shows no overall understanding.

43

What is the value of the expression $7 \times (5 - 3)^3 - 20 \div 4$?

Show your work.

Answer _____

EXEMPLARY RESPONSE

43

What is the value of the expression $7 \times (5 - 3)^3 - 20 \div 4$?

Show your work.

$$7 \times (5 - 3)^3 - 20 \div 4 =$$

$$7 \times (2)^3 - 20 \div 4 =$$

$$7 \times 8 - 20 \div 4 =$$

$$56 - 5 = 51$$

or other valid process

Answer

51

GUIDE PAPER 1

Additional

43

What is the value of the expression $7 \times (5 - 3)^3 - 20 \div 4$? [2]

Show your work.

$$7 \times (5 - 3)^3 - 20 \div 4$$

P ✓

E ✓

M ✓

D ✓

* ✓

S ✓

$$7 \times (2)^3 - 20 \div 4$$

↓

$$7 \times 8 - 20 \div 4$$

$$56 - 20 \div 4$$

$$56 - 5$$

51

Answer 51

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The operations are performed in the correct order, and the value of the expression is correctly determined. This response is complete and correct.

GUIDE PAPER 2

43

What is the value of the expression $7 \times (5 - 3)^3 - 20 \div 4$?

Show your work.

$$[7 \times 2^3] - 5$$

$$[7 \times 8] - 5$$

$$56 - 5 = 51$$

Answer

The value of
the
expression is
51

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The steps of evaluating the expression are correctly shown, and a correct value of the expression is provided. Holistically, this response contains sufficient work to show a thorough understanding.

GUIDE PAPER 3

43

What is the value of the expression $7 \times (5 - 3)^3 - 20 \div 4$?

Show your work.

$$\begin{aligned}5 - 3 &= 2 \\2^3 &= 8 \times 7 = 56 \\20 \div 4 &= 5 \\56 - 5 &= 51\end{aligned}$$

Answer

51

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The operations are performed in the correct order, and the value of the expression is correctly determined. The response is complete and correct.

GUIDE PAPER 4

43

per hundert

What is the value of the expression $7 \times (5 - 3)^3 - 20 \div 4$? [2]

Show your work.

$$\begin{aligned} & 7 \times (5-3)^3 - 20 \div 4 \\ & 7 \times 2^3 - 20 \div 4 \\ & 14 - 20 \div 4 \\ & 14 - 5 \\ & 9 \end{aligned}$$

Answer

9

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The operations are performed in the correct order; however, the exponent of 3 is ignored. The rest of the work is carried out correctly. This response correctly addresses only some elements of the task.

GUIDE PAPER 5

43

What is the value of the expression $7 \times (5 - 3)^3 - 20 \div 4$?

Show your work.

$$7x(5 - 3)^3 - 20 \div 4$$

$$56 - 20 \div 4$$

$$51$$

Answer

51

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. Although the expression is evaluated correctly, the work showing the order of operations to evaluate the expression is limited. This response contains the correct solution, but the required work is incomplete.

GUIDE PAPER 6

43

What is the value of the expression $7 \times (5 - 3)^3 - 20 \div 4$?

Show your work.

7 × (5 – 3) to the 3rd power – 20/4
7 × 2 to the 3rd power – 20/4
7 × 8 – 20/4
56 – 20/4
56/5
11.6

Answer 11.6

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The order of operations is correctly followed on lines 1 through 4; however, the rest of the work contains errors: subtraction is inappropriately replaced with division, and the division is incorrectly carried out. This response correctly addresses only some elements of the task.

GUIDE PAPER 7

43

What is the value of the expression $7 \times (5 - 3)^3 - 20 \div 4$? [2]

Show your work.

$$7 \times (5-3)^3 - 20 \div 4 = 9 \\ (8)$$

Answer 9

Score Point 0 (out of 2 credits)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although the part of the expression in the parentheses is correctly evaluated to be 8, the rest of the work is missing, and an incorrect solution is provided. Holistically, the work is insufficient to show any understanding.

GUIDE PAPER 8

Additional

43

What is the value of the expression $7 \times (5 - 3)^3 - 20 \div 4$?

Show your work.

$$7 \times (5 - 3)^3 - 20 \div 4 = 51$$

Answer

51

Score Point 0 (out of 2 credits)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although the expression is correctly evaluated, the response contains no work to support the correct solution. Per Scoring Policy #3 for 2- and 3- credit responses, this response receives no credit.

This question is worth 2 credits.

The tables below show the ratios of distance to time traveled by Car A and Car B.

CAR A

Time (hours)	Distance (miles)
2	130
4	260
6	390

CAR B

Time (hours)	Distance (miles)
3	186
5	310
7	434

If both cars maintain their rates of speed, what is the difference between the distances, in miles, traveled by Car A and by Car B after 8 hours?

Show your work.

Answer _____ miles

EXEMPLARY RESPONSE

44

This question is worth 2 credits.

The tables below show the ratios of distance to time traveled by Car A and Car B.

CAR A

Time (hours)	Distance (miles)
2	130
4	260
6	390

CAR B

Time (hours)	Distance (miles)
3	186
5	310
7	434

If both cars maintain their rates of speed, what is the difference between the distances, in miles, traveled by Car A and by Car B after 8 hours?

Show your work.

$$\text{Car A: } 130 \div 2 = 65 \text{ miles/hour}$$

$$65 \times 8 = 520 \text{ miles}$$

$$\text{Car B: } 186 \div 3 = 62 \text{ miles/hour}$$

$$62 \times 8 = 496 \text{ miles}$$

$$520 - 496 = 24 \text{ miles}$$

or

$$\text{Car A: } 130 + 390 = 520 \text{ miles}$$

$$\text{Car B: } 186 + 310 = 496 \text{ miles}$$

$$520 - 496 = 24 \text{ miles}$$

or other valid process

Answer 24 miles

GUIDE PAPER 1

Additional

44

The tables below show the ratios of distance to time traveled by Car A and Car B.

CAR A

Time (hours)	Distance (miles)
2	130
4	260
6	390

CAR B

Time (hours)	Distance (miles)
3	186
5	310
7	434

If both cars maintain their rates of speed, what is the difference between the distances, in miles, traveled by Car A and by Car B after 8 hours? [2]

Show your work.

$$\frac{130}{2} = \frac{?}{8}$$

$$\frac{130}{2} \times 4 = \frac{520}{8}$$

$$\frac{186}{3} = \frac{?}{1}$$

$$\frac{186}{3} \div 3 = \frac{62}{1} = \frac{496}{8}$$

$$520 - 496 = \\ 24 \text{ miles}$$

Answer 24 miles

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The distances traveled by each car are correctly determined by finding equivalent ratios. The two distances are correctly subtracted to determine the solution. This response is complete and correct.

GUIDE PAPER 2

44

The tables below show the ratios of distance to time traveled by Car A and Car B.

CAR A

Time (hours)	Distance (miles)
2	130
4	260
6	390

CAR B

Time (hours)	Distance (miles)
3	186
5	310
7	434

If both cars maintain their rates of speed, what is the difference between the distances, in miles, traveled by Car A and by Car B after 8 hours?

Show your work.

$$186 + 310 = 496$$

$$130 + 390 = 520$$

$$520 - 496 = 24$$

Answer

24

miles

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The distances traveled by each car are correctly determined by adding distances traveled after 2 and 6 hours for Car A, and after 3 and 5 hours for Car B. The two distances are correctly subtracted to determine the difference. This response is complete and correct.

GUIDE PAPER 3

44

The tables below show the ratios of distance to time traveled by Car A and Car B.

CAR A

Time (hours)	Distance (miles)
2	130
4	260
6	390

CAR B

Time (hours)	Distance (miles)
3	186
5	310
7	434

If both cars maintain their rates of speed, what is the difference between the distances, in miles, traveled by Car A and by Car B after 8 hours?

Show your work.

$$130 \div 2 = 65$$

$$8 \times 65 = 520$$

$$186 \div 3 = 62$$

$$8 \times 62 = 496$$

Answer

24

miles

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The speed and distances traveled by each car are correctly determined, and a correct difference between the distances is provided as a solution. Although the last step of subtracting the two distances is not shown, the response contains sufficient work to demonstrate a thorough understanding.

GUIDE PAPER 4

44

The tables below show the ratios of distance to time traveled by Car A and Car B.

CAR A

Time (hours)	Distance (miles)
2	130
4	260
6	390

CAR B

Time (hours)	Distance (miles)
3	186
5	310
7	434

If both cars maintain their rates of speed, what is the difference between the distances, in miles, traveled by Car A and by Car B after 8 hours?

Show your work.

Car a 2 hours 130, 4 hours 260, 6 hours 390, 8 hours 520

Car b 5 hours + 3 hours = 8 hours

$$310 + 186 = 496$$

Answer

496

miles

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The distances traveled by each car are correctly determined by continuing the pattern in the table for Car A and adding distances traveled for Car B; however, the difference between the two distances is not calculated. This response correctly addresses only some elements of the task.

GUIDE PAPER 5

44

The tables below show the ratios of distance to time traveled by Car A and Car B.

CAR A

Time (hours)	Distance (miles)
2	130
4	260
6	390

CAR B

Time (hours)	Distance (miles)
3	186
5	310
7	434

If both cars maintain their rates of speed, what is the difference between the distances, in miles, traveled by Car A and by Car B after 8 hours? [2]

Show your work.

Time (hours)	Distance (miles)
2	130
4	260
6	390
8	520

Time (hours)	Distance (miles)
3	186
5	310
7	434
9	558

$$\begin{array}{r} 558 \\ - 520 \\ \hline 38 \end{array}$$

Answer 38 miles

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The distance traveled by Car A is correctly determined by continuing the pattern in the table. The distance traveled by Car B is inappropriately calculated for 9 hours of travel. The obtained distances are correctly subtracted to determine the difference. This response correctly addresses only some elements of the task.

GUIDE PAPER 6

44

The tables below show the ratios of distance to time traveled by Car A and Car B.

CAR A

Time (hours)	Distance (miles)
2	130
4	260
6	390

CAR B

Time (hours)	Distance (miles)
3	186
5	310
7	434

If both cars maintain their rates of speed, what is the difference between the distances, in miles, traveled by Car A and by Car B after 8 hours? [2]

Show your work.

$$\begin{array}{r} 186 \\ \times 2 \\ \hline 372 \\ -434 \\ \hline 46 \end{array}$$

Car A for 8 hours is 520 miles

Car B for every 2 hours they go 124 m

Car B for 8 hours would be 124 divided

by 2 so 62 then add 434 and you

get 496 miles

So car A is faster by a 86 miles

Answer 86 miles

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The distance traveled by Car A is correctly stated with no work to show how the answer is obtained. The distance traveled by Car B is correctly determined by adding distances after 1 and 7 hours of travel. Although the distance of 496 miles is correctly calculated for Car B, 434 miles is used when calculating the difference between the two distances. This response correctly addresses only some elements of the task.

GUIDE PAPER 7

44

This question is worth 2 credits.

The tables below show the ratios of distance to time traveled by Car A and Car B.

CAR A

Time (hours)	Distance (miles)
2	130
4	260
6	390

CAR B

Time (hours)	Distance (miles)
3	186
5	310
7	434

If both cars maintain their rates of speed, what is the difference between the distances, in miles, traveled by Car A and by Car B after 8 hours?

Show your work.

carb 496 car a 520

Answer

520

miles

Score Point 0 (out of 2 credits)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although the two distances are correctly calculated, they are not supported with any work, and it is not clear how they are obtained. The difference between the distances is not addressed, and one of the distances is inappropriately provided as the solution. Holistically, this response is insufficient to show any understanding of the task.

GUIDE PAPER 8

Additional

44

The tables below show the ratios of distance to time traveled by Car A and Car B.

CAR A

Time (hours)	Distance (miles)
2	130
4	260
6	390

CAR B

Time (hours)	Distance (miles)
3	186
5	310
7	434

If both cars maintain their rates of speed, what is the difference between the distances, in miles, traveled by Car A and by Car B after 8 hours?

Show your work.

124 – 120

Answer

4

miles

Score Point 0 (out of 2 credits)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Two incorrect distances are stated, and it is not clear how they are obtained. Although the two incorrect distances are correctly subtracted, holistically, this response is insufficient to show any understanding of the task.

45

A shipping container in the shape of a right rectangular prism has a base with an area of 42 square feet. The height of the container is $5\frac{3}{4}$ feet. What is the volume, in cubic feet, of the shipping container?

Show your work.

Answer _____ cubic feet

EXEMPLARY RESPONSE

45

A shipping container in the shape of a right rectangular prism has a base with an area of 42 square feet. The height of the container is $5\frac{3}{4}$ feet. What is the volume, in cubic feet, of the shipping container?

Show your work.

$$42 \times 5\frac{3}{4} =$$

$$42 \times \frac{23}{4} =$$

$$\frac{966}{4} = 241\frac{1}{2}$$

or other valid process

Answer $241\frac{1}{2}$ or equivalent cubic feet

GUIDE PAPER 1

Additional

45

A shipping container in the shape of a right rectangular prism has a base with an area of 42 square feet. The height of the container is $5\frac{3}{4}$ feet. What is the volume, in cubic feet, of the shipping container?

Show your work.

$$\begin{aligned}\frac{42}{1} \times 5\frac{3}{4} &= \\ \frac{42}{1} \times \frac{23}{4} &= \frac{966}{4} = 241\frac{1}{2}\end{aligned}$$

Answer

$241\frac{1}{2}$

cubic feet

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The volume of the shipping container is correctly determined using sound procedures. This response is complete and correct.

GUIDE PAPER 2

45

A shipping container in the shape of a right rectangular prism has a base with an area of 42 square feet. The height of the container is $5\frac{3}{4}$ feet. What is the volume, in cubic feet, of the shipping container? [2]

Show your work.

$$V = b \cdot h$$

$$42 \times 5.75 = \underline{\underline{241.5}}$$

Answer 241.5 cubic feet

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The height of the container is correctly written as a decimal, and a correct procedure is applied to determine the volume of the shipping container. This response is complete and correct.

GUIDE PAPER 3

45

A shipping container in the shape of a right rectangular prism has a base with an area of 42 square feet. The height of the container is $5\frac{3}{4}$ feet. What is the volume, in cubic feet, of the shipping container?

Show your work.

$$A_{rp} = LWH$$

$$\text{Base} = B$$

$$\text{Height} = H \quad H = 5\frac{3}{4} = 5.75\text{ft}$$

Base is the length and width combined.

$$5\frac{3}{4} \times 42 = 241\frac{2}{4} = 241.5\text{ft}$$

Answer 241.5 cubic feet

Score Point 2 (out of 2 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The volume of the shipping container is correctly determined using a sound procedure. Although incorrect units are referenced in the work, it does not detract from the demonstration of a thorough understanding.

GUIDE PAPER 4

45

A shipping container in the shape of a right rectangular prism has a base with an area of 42 square feet. The height of the container is $5\frac{3}{4}$ feet. What is the volume, in cubic feet, of the shipping container?

Show your work.

$$\frac{23}{4} \times 42 = 242$$

Answer 242 cubic feet

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The height of the container is correctly written as an improper fraction. A correct procedure is used to determine the volume of the container; however, the solution is inappropriately rounded. This response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 5

45

A shipping container in the shape of a right rectangular prism has a base with an area of 42 square feet. The height of the container is $5\frac{3}{4}$ feet. What is the volume, in cubic feet, of the shipping container? [2]

Show your work.

$$A=42 \text{ sq ft}$$

$$5\frac{3}{4}$$

$$\frac{42}{1} \times \frac{18}{4} = \frac{756}{4} = 189$$

Answer 189 cubic feet cubic feet

Score Point 1 (out of 2 credits)

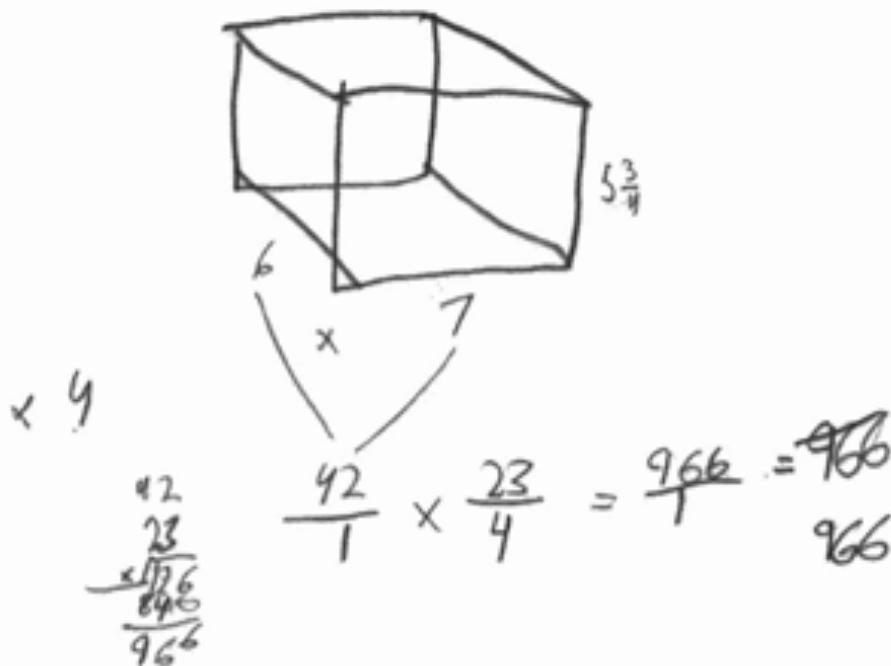
This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. An error occurs when converting the mixed number to an improper fraction ($5\frac{3}{4} \neq \frac{18}{4}$). The rest of the work is carried out correctly to determine the volume of the container. This response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 6

45

A shipping container in the shape of a right rectangular prism has a base with an area of 42 square feet. The height of the container is $5\frac{3}{4}$ feet. What is the volume, in cubic feet, of the shipping container? [2]

Show your work.



Answer 966 ¹/₂₃ cubic feet

Score Point 1 (out of 2 credits)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The height of the container is correctly written as an improper fraction, and the work contains a correct procedure to determine the volume of the container; however, the division by 4 is ignored, resulting in an incorrect solution. The reference to the base dimensions within the diagram is considered inconsequential. This response correctly addresses only some elements of the task.

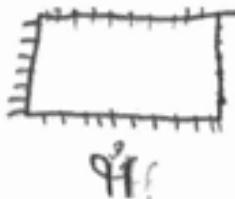
GUIDE PAPER 7

45

A shipping container in the shape of a right rectangular prism has a base with an area of 42 square feet. The height of the container is $5\frac{3}{4}$ feet. What is the volume, in cubic feet, of the shipping container? [2]

Show your work.

$$42 \times 5\frac{3}{4} = 21$$



Answer 9 cubic feet

Score Point 0 (out of 2 credits)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although a correct process is written to determine the volume of the container, the multiplication is incorrectly carried out. A different incorrect solution is provided, and it is not clear how it is obtained. This response is incoherent, and, holistically, is insufficient to show any understanding.

GUIDE PAPER 8

Additional

45

A shipping container in the shape of a right rectangular prism has a base with an area of 42 square feet. The height of the container is $5\frac{3}{4}$ feet. What is the volume, in cubic feet, of the shipping container?

Show your work.

$$\begin{array}{ll} V = lwh & V = 42(42)(5.75) \\ V = bh & \textcircled{V = 10,143} \end{array}$$

$$\textcircled{V = 10.143 \text{ in}^3}$$

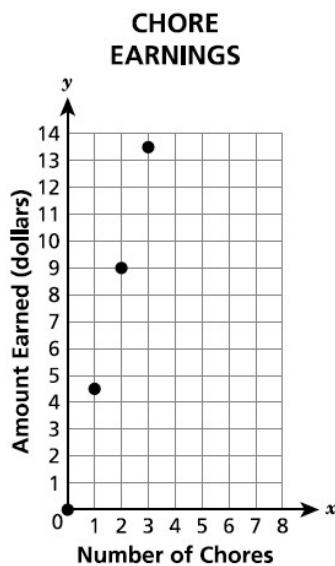
Answer

cubic feet

Score Point 0 (out of 2 credits)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although the height of the container is correctly written as a decimal, an extra term of 42 is used when determining the volume, and the solution is incorrectly written in decimal form. Holistically, this response shows no overall understanding.

Logan earns money for completing chores. The graph shown below represents the relationship between the number of chores, x , he completes, and the amount of money, y , he earns.



Based on the graph, explain the relationship between the number of chores Logan completes and the amount of money he earns. Be sure to identify the dependent and the independent variables in your answer.

Explain your answer.

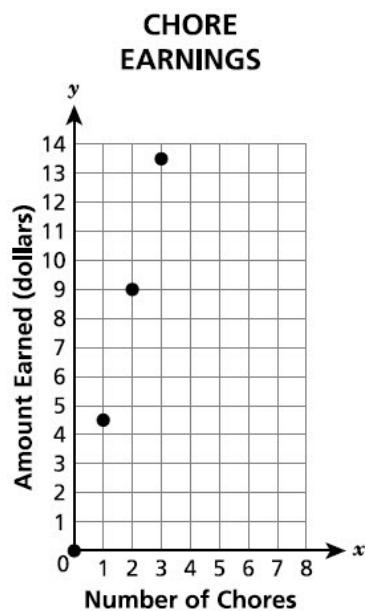
Determine the total amount of money Logan will earn after completing 9 chores.

Answer \$ _____

EXEMPLARY RESPONSE

46

Logan earns money for completing chores. The graph shown below represents the relationship between the number of chores, x , he completes, and the amount of money, y , he earns.



Based on the graph, explain the relationship between the number of chores Logan completes and the amount of money he earns. Be sure to identify the dependent and the independent variables in your answer.

Explain your answer.

For every chore Logan completes, he earns \$4.50. The dependent variable is the amount of money earned, and the independent variable is the number of chores.

or other valid explanation

Determine the total amount of money Logan will earn after completing 9 chores.

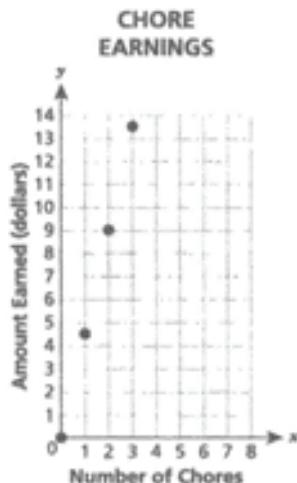
Answer \$ 40.50

GUIDE PAPER 1

Additional

46

Logan earns money for completing chores. The graph shown below represents the relationship between the number of chores, x , he completes, and the amount of money, y , he earns.



Based on the graph, explain the relationship between the number of chores Logan completes and the amount of money he earns. Be sure to identify the dependent and the independent variables in your answer. [3]

Explain your answer.

*The relationship is each chore Logan does
he gets 4.50. The dependent variable is the Amount
Earned and the independent is the chores.*

Determine the total amount of money Logan will earn after completing 9 chores.

Answer is 40.50

$$\begin{array}{r} 4 \\ \times 4.50 \\ \hline 20 \\ 18 \\ \hline 40.50 \end{array}$$

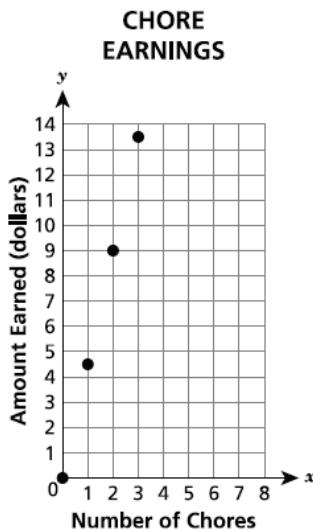
Score Point 3 (out of 3 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The relationship between the number of chores and the amount of money earned is correctly explained, and the dependent and the independent variables are correctly identified. The total amount of money earned is correctly determined and is written in the money format correctly. This response is complete and correct.

GUIDE PAPER 2

46

Logan earns money for completing chores. The graph shown below represents the relationship between the number of chores, x , he completes, and the amount of money, y , he earns.



Based on the graph, explain the relationship between the number of chores Logan completes and the amount of money he earns. Be sure to identify the dependent and the independent variables in your answer.

Explain your answer.

The dependent variable is the dollars and the independent variable is the number of chores. Logan makes \$4.50 for each chore he does and how many chores he does you times chores and the dollars to get the amount of many he earned. So it depends on how many chores he does to get the amount of money he earns.

Determine the total amount of money Logan will earn after completing 9 chores.

Answer \$

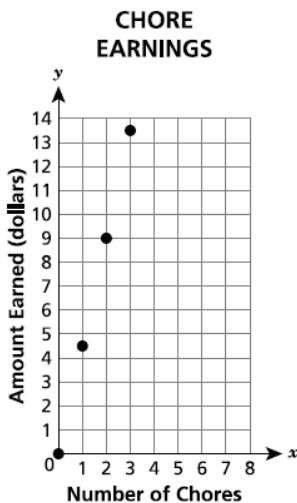
Score Point 3 (out of 3 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The relationship between the number of chores and the amount of money earned is correctly explained, and the dependent and the independent variables are correctly identified. The total amount of money earned is correctly determined and is written in the money format correctly. This response is complete and correct.

GUIDE PAPER 3

46

Logan earns money for completing chores. The graph shown below represents the relationship between the number of chores, x , he completes, and the amount of money, y , he earns.



Based on the graph, explain the relationship between the number of chores Logan completes and the amount of money he earns. Be sure to identify the dependent and the independent variables in your answer.

Explain your answer.

$$x \times 4\frac{1}{2} = y \quad \text{The independent variable is } x \text{ and the dependent variable is } y$$

$$9 \times 4\frac{1}{2} = 40\frac{1}{2}$$

Determine the total amount of money Logan will earn after completing 9 chores.

Answer \$ 40.50

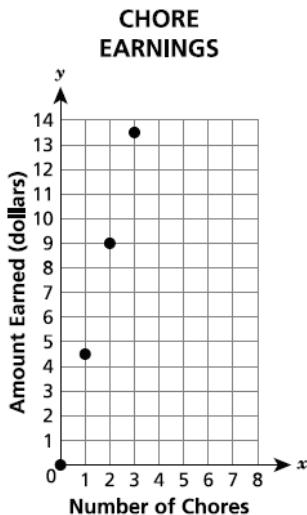
Score Point 3 (out of 3 credits)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. A correct equation is written to describe the relationship between the number of chores and the amount of money earned. The dependent and the independent variables are correctly identified. The total amount of money earned is correctly determined and is written in the money format correctly. This response contains sufficient work to show a thorough understanding.

GUIDE PAPER 4

46

Logan earns money for completing chores. The graph shown below represents the relationship between the number of chores, x , he completes, and the amount of money, y , he earns.



Based on the graph, explain the relationship between the number of chores Logan completes and the amount of money he earns. Be sure to identify the dependent and the independent variables in your answer.

Explain your answer.

Every chore he does, he gets \$4.50. The dependent variable is the fact that 1 chore=\$4.50. The independent variable is the amount of chores he does.

Determine the total amount of money Logan will earn after completing 9 chores.

Answer \$

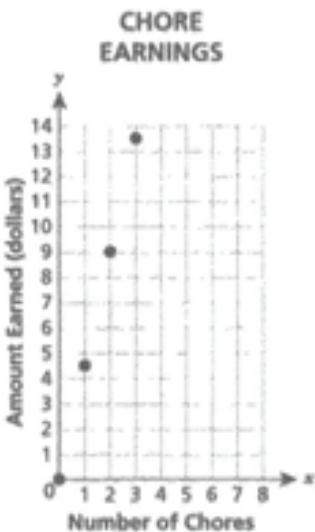
Score Point 2 (out of 3 credits)

This response demonstrates a partial understanding of the mathematical concepts and procedures in the task. The relationship between the number of chores and the amount of money earned is correctly explained, and the independent variable is correctly identified; however, the dependent variable is identified incorrectly. The total amount of money earned is correctly determined and is written in the money format correctly. This response reflects some minor misunderstanding of the underlying mathematical concepts.

GUIDE PAPER 5

46

Logan earns money for completing chores. The graph shown below represents the relationship between the number of chores, x , he completes, and the amount of money, y , he earns.



14.50
X 9
4.50

Based on the graph, explain the relationship between the number of chores Logan completes and the amount of money he earns. Be sure to identify the dependent and the independent variables in your answer. [3]

Explain your answer.

The relationship between chores and money is if one is greater the other becomes greater as well. The independent variable is 4.5 and the dependent variables are the chores and money.

Determine the total amount of money Logan will earn after completing 9 chores.

Answer \$ 40.50

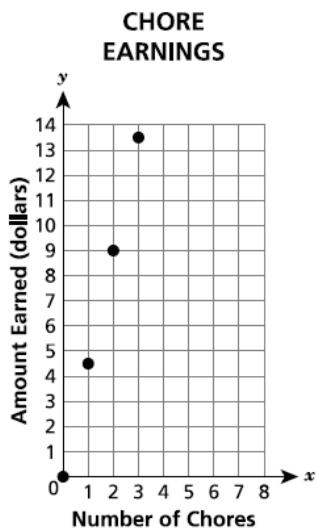
Score Point 2 (out of 3 credits)

This response demonstrates a partial understanding of the mathematical concepts and procedures in the task. The relationship between the number of chores and the amount of money earned is correctly explained; however, the dependent and the independent variables are incorrectly identified. The total amount of money earned is correctly determined and is written in the money format correctly. This response appropriately addresses most, but not all, aspects of the task.

GUIDE PAPER 6

46

Logan earns money for completing chores. The graph shown below represents the relationship between the number of chores, x , he completes, and the amount of money, y , he earns.



Based on the graph, explain the relationship between the number of chores Logan completes and the amount of money he earns. Be sure to identify the dependent and the independent variables in your answer.

Explain your answer.

logan gets \$4.50 dollars for each chore he does

Determine the total amount of money Logan will earn after completing 9 chores.

Answer \$

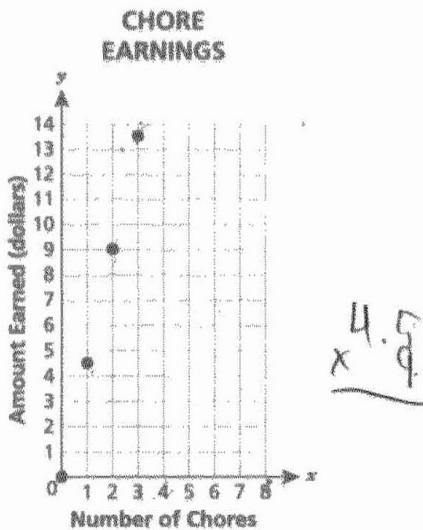
Score Point 2 (out of 3 credits)

This response demonstrates a partial understanding of the mathematical concepts and procedures in the task. The relationship between the number of chores and the amount of money earned is correctly explained; however, the dependent and independent variables are not identified. The total amount of money earned is correctly determined and is written in the money format correctly. This response appropriately addresses most, but not all, aspects of the task.

GUIDE PAPER 7

46

Logan earns money for completing chores. The graph shown below represents the relationship between the number of chores, x , he completes, and the amount of money, y , he earns.



Based on the graph, explain the relationship between the number of chores Logan completes and the amount of money he earns. Be sure to identify the dependent and the independent variables in your answer. [3]

Explain your answer.

*I noticed that each point doubles
as it goes up.*

Determine the total amount of money Logan will earn after completing 9 chores.

Answer \$ 40.50

Score Point 1 (out of 3 credits)

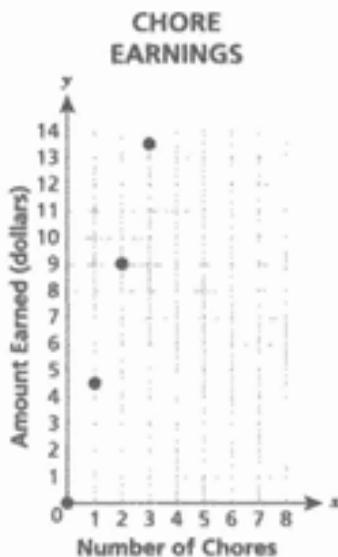
This response demonstrates only a limited understanding of the mathematical concepts and procedures in the task. The relationship between the number of chores and the amount of money earned is incorrectly explained, and the dependent and independent variables are not identified. The total amount of money earned is correctly determined and is written in the money format correctly. This response exhibits multiple flaws related to misunderstanding of important aspects of the task.

GUIDE PAPER 8

Additional

46

Logan earns money for completing chores. The graph shown below represents the relationship between the number of chores, x , he completes, and the amount of money, y , he earns.



Based on the graph, explain the relationship between the number of chores Logan completes and the amount of money he earns. Be sure to identify the dependent and the independent variables in your answer. [3]

Explain your answer.

The independent is the chores
and the dependent is the money.

Determine the total amount of money Logan will earn after completing 9 chores.

Answer \$ 36

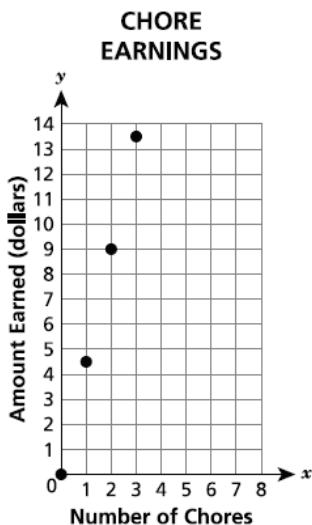
Score Point 1 (out of 3 credits)

This response demonstrates only a limited understanding of the mathematical concepts and procedures in the task. The dependent and the independent variables are correctly identified; however, the relationship between the two variables is not explained, and an incorrect solution for the total amount of money earned is provided. This response addresses some elements of the task correctly but is faulty and incomplete.

GUIDE PAPER 9

46

Logan earns money for completing chores. The graph shown below represents the relationship between the number of chores, x , he completes, and the amount of money, y , he earns.



Based on the graph, explain the relationship between the number of chores Logan completes and the amount of money he earns. Be sure to identify the dependent and the independent variables in your answer.

Explain your answer.

for numbers of chores 1 he earned \$4.50 for numbers chores
for 2 he earned \$9 for number chores for 3 he earned \$13.50

$$13.50 + 4.50 + 9 =$$

Determine the total amount of money Logan will earn after completing 9 chores.

Answer \$

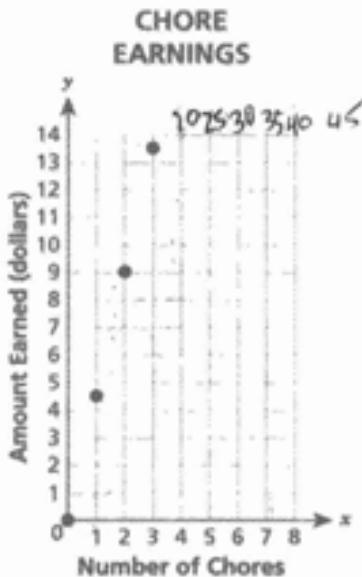
Score Point 1 (out of 3 credits)

This response demonstrates only a limited understanding of the mathematical concepts and procedures in the task. The relationship between the number of chores and the amount of money earned is correctly explained; however, the dependent and the independent variables are not identified, and an incorrect solution for the total amount of money earned is provided. This response addresses some elements of the task correctly but is faulty and incomplete.

GUIDE PAPER 10

46

Logan earns money for completing chores. The graph shown below represents the relationship between the number of chores, x , he completes, and the amount of money, y , he earns.



Based on the graph, explain the relationship between the number of chores Logan completes and the amount of money he earns. Be sure to identify the dependent and the independent variables in your answer. [3]

Explain your answer.

He earns \$5 more each time he completes a chore.

Determine the total amount of money Logan will earn after completing 9 chores.

Answer \$ 45

Score Point 0 (out of 3 credits)

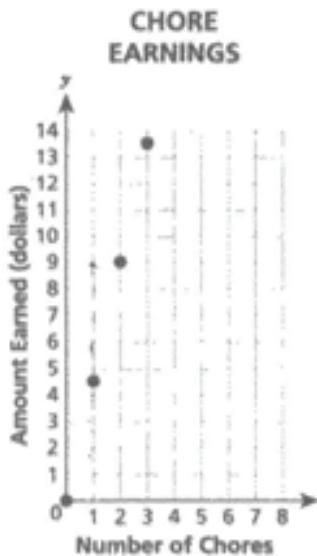
This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. The amount of dollars earned per chore is inappropriately rounded, the dependent and the independent variables are not identified, and an incorrect solution is provided. Holistically, this response is insufficient to show any understanding of the task.

GUIDE PAPER 11

Additional

46

Logan earns money for completing chores. The graph shown below represents the relationship between the number of chores, x , he completes, and the amount of money, y , he earns.



1
14
18
11
12
17
16
15
13
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0

Based on the graph, explain the relationship between the number of chores Logan completes and the amount of money he earns. Be sure to identify the dependent and the independent variables in your answer. [3]

Explain your answer.

Well the relationship between the number of chores Logan Completes is high. Plus by adding up the numbers you get 27 but multiply and you get 64.

Determine the total amount of money Logan will earn after completing 9 chores.

Answer \$ 64

Score Point 0 (out of 3 credits)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Describing the relationship as “is high” is insufficient. The dependent and the independent variables are not identified, and an incorrect solution is provided. Holistically, this response is insufficient to show any understanding of the task.