

New York NYSTP 2017 Grade 6 Math

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Grade 6 Mathematics Reference Sheet

CONVERSIONS

1 inch = 2.54 centimeters

1 meter = 39.37 inches

1 mile = 5,280 feet

1 mile = 1,760 yards

1 mile = 1.609 kilometers

1 kilometer = 0.62 mile

1 pound = 16 ounces

1 pound = 0.454 kilogram

1 kilogram = 2.2 pounds

1 ton = 2,000 pounds

1 cup = 8 fluid ounces

1 pint = 2 cups

1 quart = 2 pints

1 gallon = 4 quarts

1 gallon = 3.785 liters

1 liter = 0.264 gallon

1 liter = 1,000 cubic centimeters

FORMULAS

Triangle

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

Right Rectangular Prism

$$V = Bh \text{ or } V = lwh$$

Name: _____



New York State *Testing Program*

2017 Common Core Mathematics Test Book 1

Grade **6**



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.

1

A bakery sells 5 apple muffins for every 2 bran muffins sold. Which table shows this ratio?

A

	Apple	Bran
5	2	
10	12	
20	22	

C

	Apple	Bran
5	2	
18	8	
20	10	

B

	Apple	Bran
10	4	
15	6	
35	14	

D

	Apple	Bran
20	4	
30	6	
40	8	

2

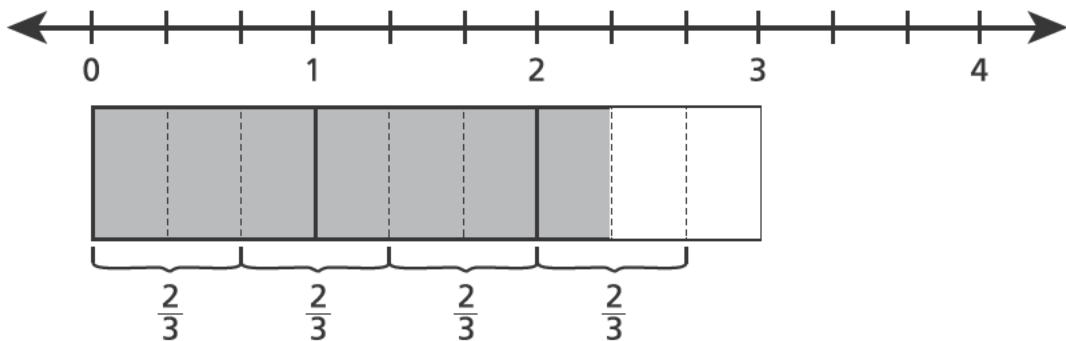
In which set do all of the values make the inequality $2x - 1 < 10$ true?

- A {10, 15, 20}
- B {5, 7, 9}
- C {4, 6, 8}
- D {2, 3, 4}

GO ON

3

The model below represents a division problem.



Which equation is represented by the model?

A $2\frac{1}{3} \div \frac{2}{3} = 3\frac{1}{2}$

B $2\frac{1}{3} \div \frac{2}{3} = 3\frac{1}{3}$

C $\frac{7}{1} \div \frac{1}{3} = 2\frac{1}{3}$

D $\frac{2}{3} \div 3\frac{1}{2} = 2\frac{1}{3}$

4

What is the value of the expression below?

$$2[3(4^2 + 1)] - 2^3$$

A 156

B 110

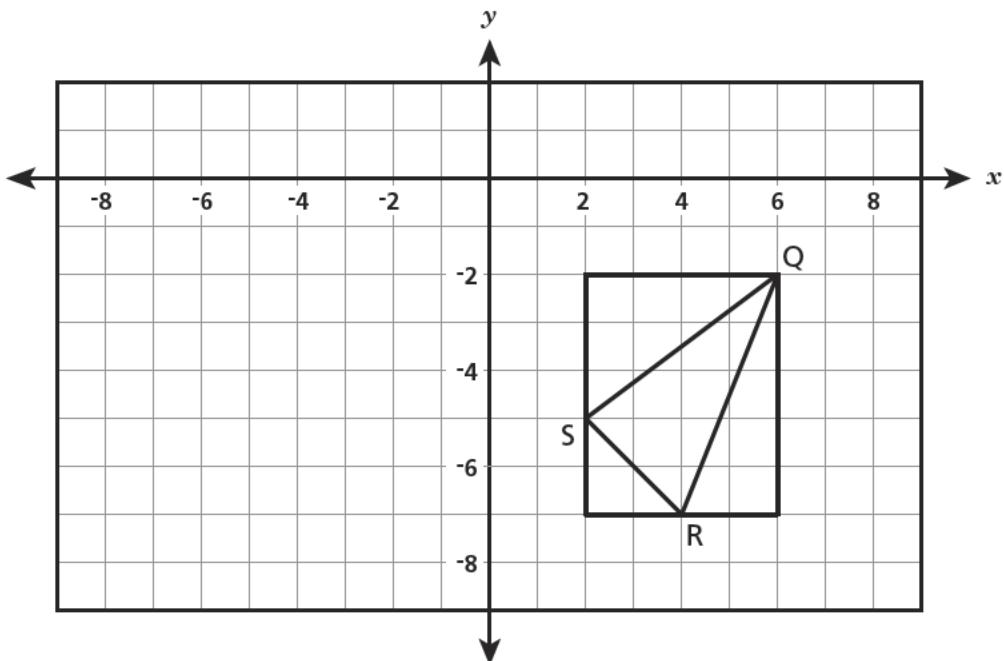
C 94

D 48

GO ON

9

Triangle QRS, with vertices $Q(6, -2)$, $R(4, -7)$, and $S(2, -5)$, is drawn inside a rectangle, as shown below.



What is the area, in square units, of triangle QRS?

A 7

C 13

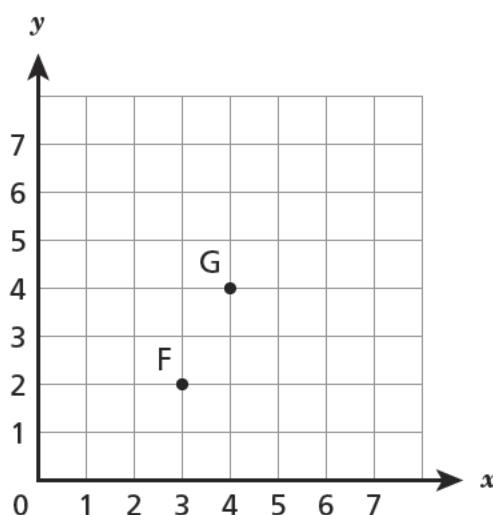
B 10

D 18

GO ON

10

Points F and G have been plotted on the coordinate plane below.



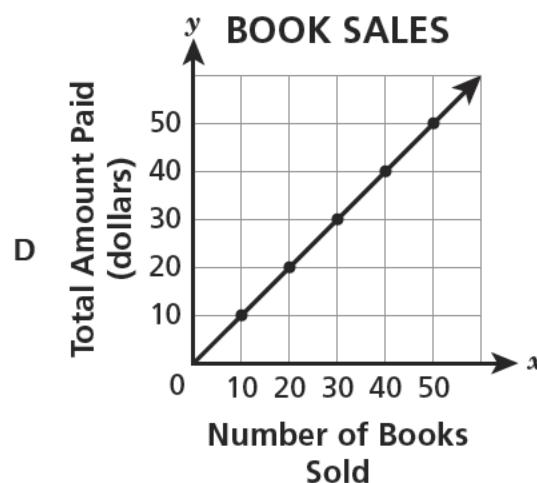
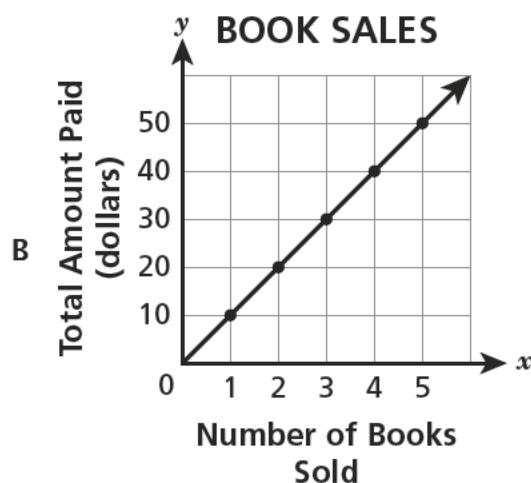
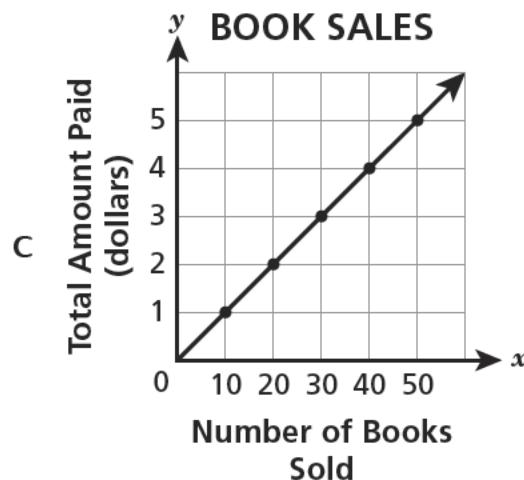
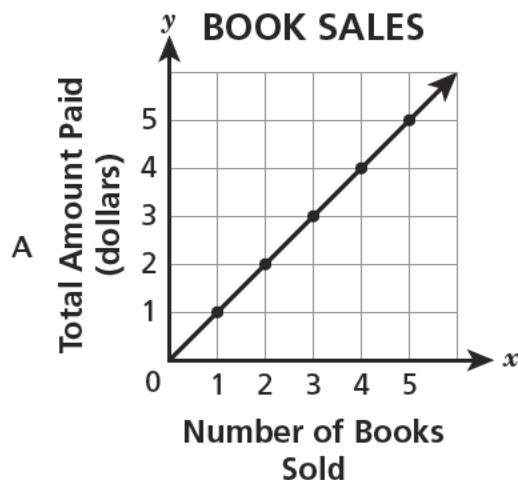
Point G and point H are the same distance from point F. Which coordinates could be the location of point H?

- A (1, 2)
- B (4, 2)
- C (5, 1)
- D (2, 5)

GO ON

13

A bookstore is selling books for \$10 each. Which graph shows the relationship between the number of books, x , the store sold and the total amount of money, y , paid from the book sales?



GO ON

14

The ratio of students to adults on a field trip is 8 to 1. Which table correctly shows this ratio for each grade?

A

Grade	Number of Students	Number of Adults
6	96	88
7	120	112
8	136	128

C

Grade	Number of Students	Number of Adults
6	96	12
7	120	15
8	136	17

B

Grade	Number of Students	Number of Adults
6	96	104
7	120	128
8	136	144

D

Grade	Number of Students	Number of Adults
6	96	11
7	120	13
8	136	15

15

Which phrase is a description of $2m + 7$?

- A 7 more than 2 times m
- B 2 more than 7 times m
- C 2 times the sum of 7 and m
- D 7 times the sum of 2 and m

GO ON

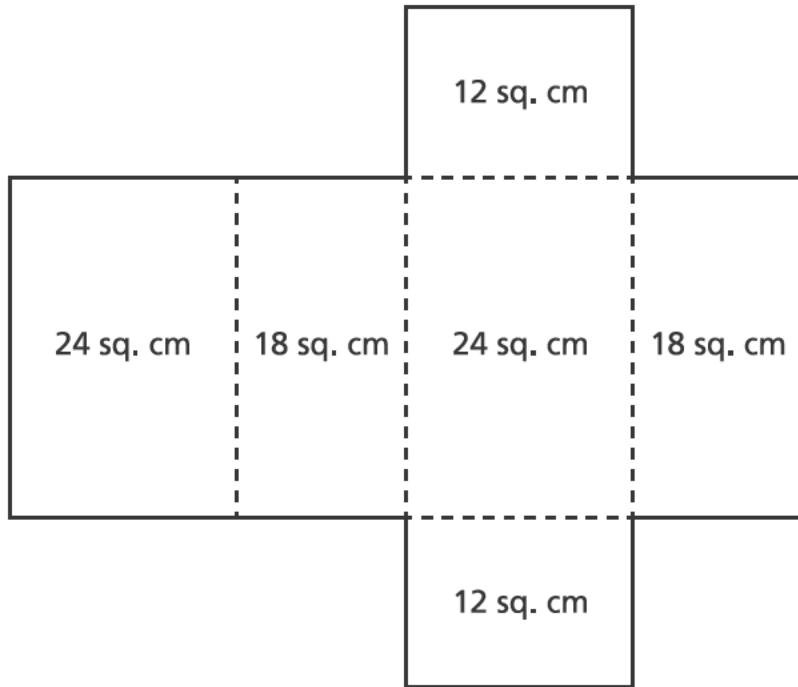
16

George has \$23 to spend on art supplies. He wants to buy markers, paper, and glue. If the total cost of the markers and paper is more than \$14, which inequality represents the dollar amount, p , George can spend on glue?

- A $p < 9$
- B $p > 9$
- C $p < 37$
- D $p > 37$

17

The net of a rectangular prism is shown below. The surface area of each face is labeled.



Which values represent the dimensions, in centimeters, of the rectangular prism?

- A 12, 18, 24
- B 3, 4, 8
- C 3, 4, 6
- D 2, 9, 12

GO ON

18

A salesperson had \$240,000 in sales last year, which is 60% of the sales she had this year. Which equation could be used to determine x , the salesperson's total amount of sales, in dollars, for this year?

A $\frac{240,000}{x} = \frac{60}{100}$

B $\frac{240,000}{100} = \frac{x}{60}$

C $\frac{60}{240,000} = \frac{x}{100}$

D $\frac{60}{100} = \frac{x}{240,000}$

19

A student formed a pattern in which each term is represented by a sum. The first four terms of the pattern are shown below.

<i>n</i>	Sum
1	1
2	$1 + 3$
3	$1 + 3 + 5$
4	$1 + 3 + 5 + 7$

Which expression can be used to determine the value of the sum in any term, n ?

A n^2

B $4n$

C $n + 3$

D 2^n

GO ON

20

Jason will use a $\frac{1}{3}$ -gallon pitcher to fill an empty $\frac{3}{4}$ -gallon water jug. How much water will he need in order to completely fill the water jug?

- A between 1 and 2 full pitchers
- B between 2 and 3 full pitchers
- C about $\frac{1}{2}$ of a full pitcher
- D about $\frac{1}{4}$ of a full pitcher

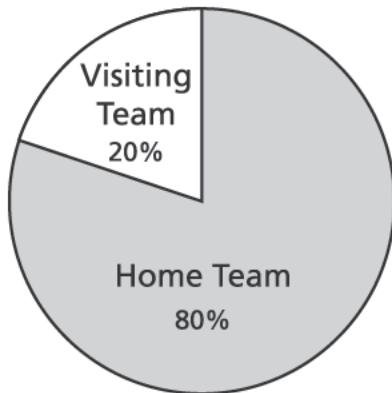
GO ON

23 Which expression is equivalent to $5(6x + 3y)$?

- A $11x + 3y$
- B $11x + 8y$
- C $30x + 3y$
- D $30x + 15y$

24 The diagram below shows the percentages of people attending a football game who were supporters of either the home team or the visiting team.

SUPPORTERS AT FOOTBALL GAME



If the total number of people attending the game was 64,000, how many people were supporters of the home team?

- A 12,800
- B 38,400
- C 48,000
- D 51,200

GO ON

25 Which pair of expressions is equivalent for any variable value greater than zero?

- A $3(x + 2)$ and $3x + 2$
- B $4d + 2e$ and $8d + e$
- C $f + f + f + g$ and $3fg$
- D $b + b + 3c$ and $2b + 3c$

26 What is the greatest common factor of 42 and 84?

- A 7
- B 21
- C 42
- D 84

STOP

Book 2



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27

Kira studied data collected on the school basketball team for one season. She noticed that a player on the team had 13 successful free throws out of a total of 20 attempted free throws. To find the percentage of the total free throws attempted by this player that were successful, Kira set up the equivalent ratios below.

$$\frac{13}{20} = \frac{m}{n}$$

What are the values for m and n in Kira's equation?

A $m = 65$
 $n = 1$

B $m = 100$
 $n = 65$

C $m = 93$
 $n = 100$

D $m = 65$
 $n = 100$

28

What is the least common multiple of 4 and 10?

- A 14
B 20
C 40
D 60

GO ON

29

The surface area, S , of a right rectangular prism with length l , width w , and height h can be found using the formula below.

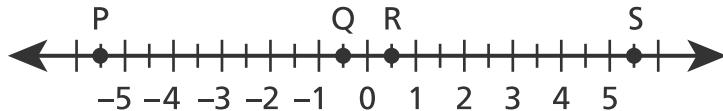
$$S = 2(lw + wh + hl)$$

What is the surface area, in square inches, of a prism with a length of 12 inches, a width of 9 inches, and a height of 2 inches?

- A 300
- B 258
- C 150
- D 92

30

Which point on the number line below represents the number opposite the number $-5\frac{1}{2}$?



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

GO ON

34

In 2010, Kim-Ly earned \$17.50 for 2 hours of work. Which table shows the relationship between the number of hours worked and Kim-Ly's total earnings, if her rate per hour is constant?

A

Number of Hours	Total Earnings
1	\$17.50
2	\$35.00
3	\$52.50
4	\$70.00

C

Number of Hours	Total Earnings
1	\$16.50
2	\$17.50
3	\$18.50
4	\$19.50

B

Number of Hours	Total Earnings
1	\$17.50
2	\$17.50
3	\$17.50
4	\$17.50

D

Number of Hours	Total Earnings
1	\$8.75
2	\$17.50
3	\$26.25
4	\$35.00

35

Susan reads a book at a rate of 1 page every 3 minutes. If her reading rate remains the same, which method could be used to determine the number of minutes for her to read 18 pages?

- A add 18 and 3
- B divide 18 by 3
- C multiply 3 by 18
- D subtract 3 from 18

GO ON

36

A triangle has vertices on a coordinate grid at points J($-1, 5$), K($4, 5$), and L($4, -2$). What is the length, in units, of \overline{KL} ?

A 3

B 7

C 8

D 11

37

Rosa has a goal of running a total of 100 miles this month. Each day that she ran, she ran 5 miles. Which expression could Rosa use to determine how many miles she has left to run after running for d days?

A $100 - 5d$

B $5d + 100$

C $\frac{100}{5d}$

D $5d$

GO ON

38

The inequality below compares two rational numbers.

$$-\frac{8}{18} > -\frac{17}{27}$$

If the two numbers were plotted as values on a horizontal number line, which statement would be true?

- A Both numbers lie to the right of 0, and $-\frac{8}{18}$ lies to the left of $-\frac{17}{27}$.
- B Both numbers lie to the left of 0, and $-\frac{8}{18}$ lies to the left of $-\frac{17}{27}$.
- C Both numbers lie to the right of 0, and $-\frac{8}{18}$ lies to the right of $-\frac{17}{27}$.
- D Both numbers lie to the left of 0, and $-\frac{8}{18}$ lies to the right of $-\frac{17}{27}$.

39

Which value or values for the variable c from the set below will make $5.6 + 0.4c \leq 6c$ true?

$$\{0, 0.875, 1, 2.5\}$$

- A only 2.5
- B 1 and 2.5
- C 0.875, 1, and 2.5
- D all values in the set

GO ON

40

Steve ordered plastic cases for storing his baseball cards. Each case has a length of 12 centimeters, a width of 6.5 centimeters, and a height of 1.25 centimeters. What is the volume, in cubic centimeters, of one baseball card case?

- A 39.5
- B 97.5
- C 118.5
- D 202.25

41

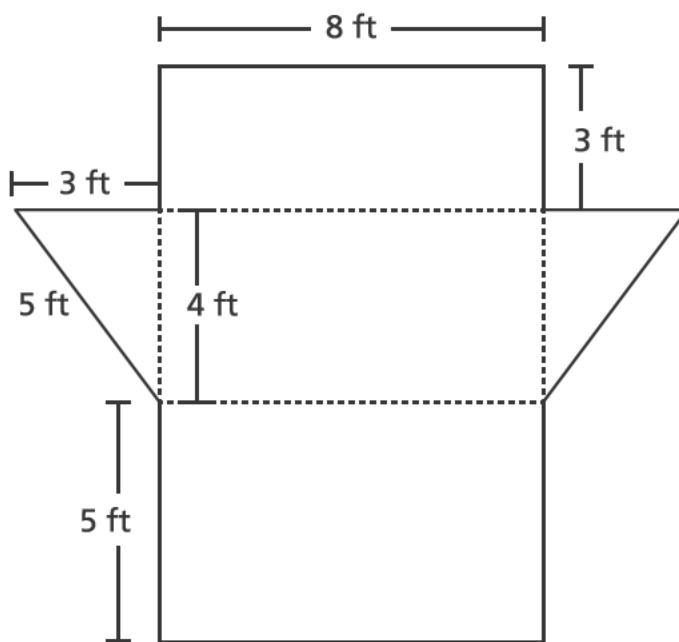
Kim rode her bicycle 135 miles in 9 weeks, riding the same distance each week. Eric rode his bicycle 102 miles in 6 weeks, riding the same distance each week. Which statement correctly compares the number of miles per week they rode?

- A Eric rode 2 more miles per week than Kim rode.
- B Kim rode 3 more miles per week than Eric rode.
- C Kim rode 11 more miles per week than Eric rode.
- D Eric rode 17 more miles per week than Kim rode.

GO ON

42

A net of a triangular prism is shown below.



What is the surface area, in square feet, of the triangular prism?

- A 44
- B 96
- C 108
- D 120

GO ON

43

The two expressions below are equivalent.

$$y(2.5 + 7) + y - 2$$

$$10.5y - 2$$

Which statement **best** explains why the expressions are equivalent?

- A The expressions have the same value for any value of y .
- B The expressions have the same value for only whole number values of y .
- C The expressions have the same value only when y is an odd number.
- D The expressions have the same value only when y is an even number.

44

Two whole numbers have a least common multiple of 60.

- Each number is less than or equal to 12.
- The greatest common factor of the two numbers is 2.

What are the two numbers?

- A 6 and 10
- B 5 and 12
- C 10 and 12
- D 12 and 15

GO ON

45

Which quantity could go in the blank to make the equation below true?

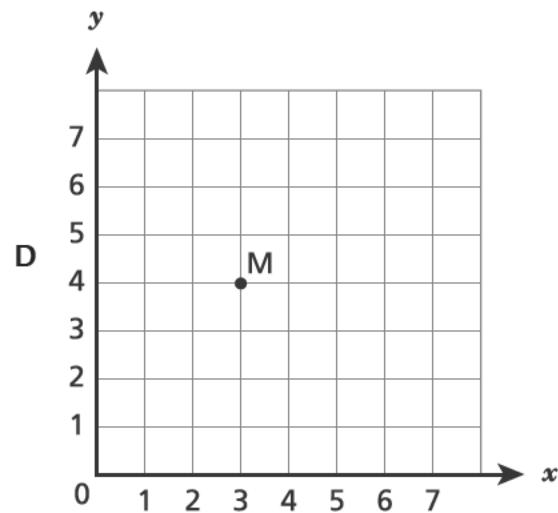
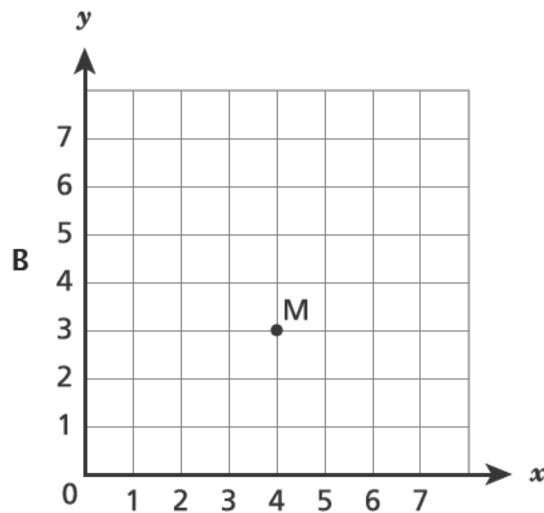
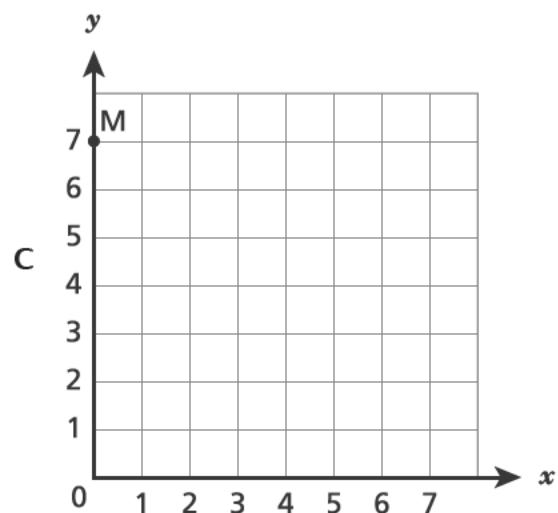
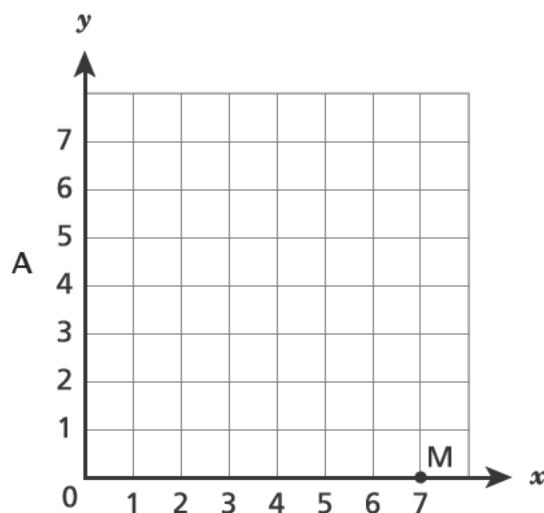
$$x + 2x + \underline{\quad} = 5x$$

- A 2
- B 3
- C $2x$
- D $3x$

GO ON

46

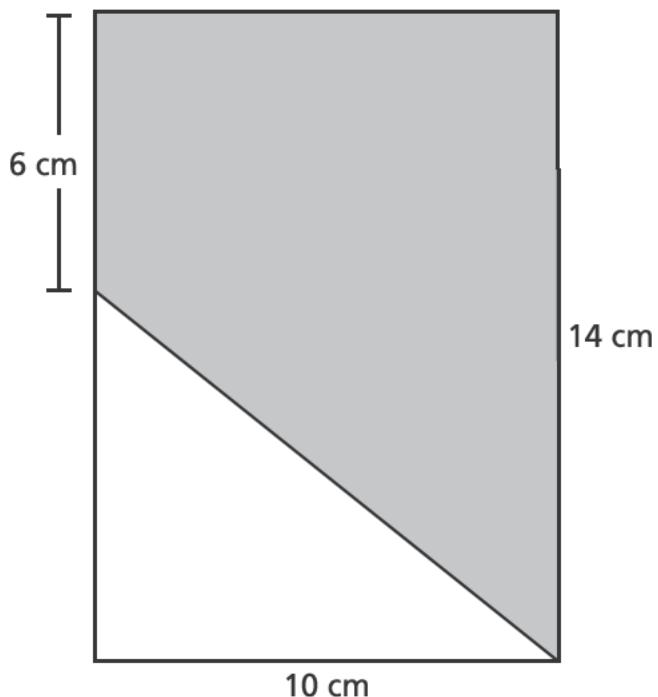
Which coordinate grid shows point M plotted at (4, 3)?



GO ON

50

What is the area, in square centimeters, of the shaded part of the rectangle shown below?



- A** 20
- B** 60
- C** 100
- D** 140

GO ON

51

A sandwich shop sells sandwiches for \$5.95 each, including tax. The shop received a total of \$71.40 from the sales of sandwiches one afternoon. Which equation can be used to determine the number of sandwiches, x , sold by the sandwich shop that afternoon?

- A $5.95 + x = 71.40$
- B $5.95 \div 71.40 = x$
- C $5.95x = 71.40$
- D $5.95 \div x = 71.40$

STOP

Book 3



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- Be sure to show your work when asked.

52

Dana and Monique are dog groomers. Dana's workday is 10 hours and Monique's workday is 8 hours. Dana and Monique each work 40 hours per week.

On Monday, Dana groomed 15 dogs in 10 hours and Monique groomed 10 dogs in 8 hours. They each earn \$12.75 for each dog groomed. Assuming that for the rest of the week Dana and Monique groom the same number of dogs per workday as they did on Monday, what will be the difference between their weekly earnings?

Show your work.

Answer \$_____

GO ON

53

The formula below is used to convert a temperature in degrees Celsius, C , to a temperature in degrees Fahrenheit, F .

$$F = 1.8C + 32$$

The high temperature in a mountain city was 15°C . What was the high temperature in degrees Fahrenheit?

Show your work.

Answer _____ $^{\circ}\text{F}$

GO ON

54

A seamstress needs to cut 15-inch pieces of ribbon from a roll of ribbon that is 9 feet in length. What is the greatest number of 15-inch pieces the seamstress can cut from 5 of these rolls of ribbon?

Show your work.

Answer _____ pieces

GO ON

55

It is recommended that one fire extinguisher be available for every 6,000 square feet in a building. Write and solve an equation to determine x , the number of fire extinguishers needed for a building that has 135,000 square feet.

Show your work.

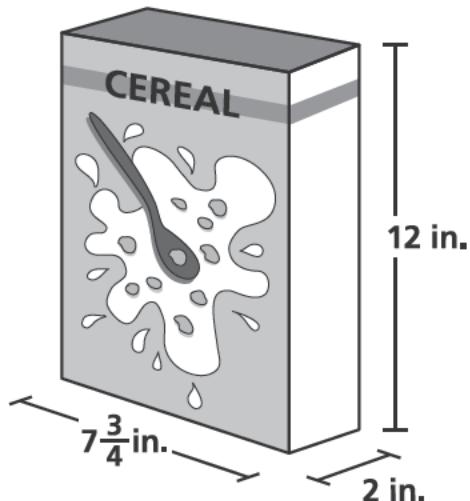
Answer _____ fire extinguishers

GO ON

56

A company sells cereal in two different-sized boxes. The smaller box has the dimensions shown below.

Smaller Cereal Box



The height of the smaller box is 80% of the height of the larger box, while the other two dimensions are the same for both boxes. What is the difference in the volumes of the two boxes?

Show your work.

Answer _____ cubic inches

GO ON

57

The area of Brian's rectangular garden, in square feet, can be found by using the expression $6(2x + 5y)$. Use the distributive property to write an equivalent expression for the area of Brian's garden.

Equivalent expression _____

Use your equivalent expression to find the area of Brian's garden, in square feet, if $x = 3$ and $y = 4$.

Show your work.

Area _____ square feet

GO ON

58

A hotel has a number of meeting rooms, m , available for events. Each meeting room has 325 chairs. Write an equation to represent c , the total number of chairs, in all of the meeting rooms at the hotel.

Equation _____

If $m = 7$, use your equation to find the total number of chairs in all of the meeting rooms at the hotel.

Show your work.

Answer _____ chairs

GO ON

59

Jimmy and his family are on their way to visit some family friends who live 780 miles away from them. Based on the route they chose, they expect to complete their trip in three days. The distances and average speeds for the first two days driven are shown below.

- First day: 4 hours at an average speed of 60 miles per hour
- Second day: 6 hours at an average speed of 65 miles per hour

If the average speed on the third day is 60 miles per hour, how many more hours will it take for them to reach their family friends' home?

Show your work.

Answer _____ hours

GO ON

60

A right rectangular prism has a length of $2\frac{1}{2}$ feet, a width of 3 feet, and a height of $1\frac{1}{2}$ feet. Unit cubes with side lengths of $\frac{1}{2}$ foot are added to completely fill the prism with no space remaining. What is the volume, in cubic feet, of the right rectangular prism?

Show your work.

Answer _____ cubic feet

How many $\frac{1}{2}$ -foot unit cubes can be added to fill the prism completely? Use what you know about unit cubes or the side lengths of prisms to show your work or explain your answer.

Answer _____ unit cubes

GO ON

61

The table below shows the elevations at which different artifacts were found during an archeological dig.

Artifact	Elevation
arrow head	15 feet above sea level
bone	721 feet above sea level
clay bowl	sea level
necklace	462 feet above sea level
woven basket	1,200 feet below sea level

Write the name of each artifact and the elevation at which each artifact was found using a positive integer, zero, or negative integer.

Explain how you determined if an elevation required a positive integer, zero, or negative integer.

STOP

**THE STATE EDUCATION DEPARTMENT
THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234
2017 Mathematics Tests Map to the Standards
Released Questions on EngageNY**

Grade 6	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	B	1	CCSS.Math.Content.6.RP.A.3a	Ratios and Proportional Relationships			0.56			
2	Multiple Choice	D	1	CCSS.Math.Content.6.EE.B.5	Expressions and Equations			0.57			
3	Multiple Choice	A	1	CCSS.Math.Content.6.NS.A.1	The Number System			0.35			
4	Multiple Choice	C	1	CCSS.Math.Content.6.EE.A.1	Expressions and Equations			0.69			
9	Multiple Choice	A	1	CCSS.Math.Content.6.G.A.1	Geometry			0.24			
10	Multiple Choice	C	1	CCSS.Math.Content.5.G.A.2	The Number System			0.38			
13	Multiple Choice	B	1	CCSS.Math.Content.6.EE.C.9	Expressions and Equations			0.73			
14	Multiple Choice	C	1	CCSS.Math.Content.6.RP.A.3a	Ratios and Proportional Relationships			0.65			
15	Multiple Choice	A	1	CCSS.Math.Content.6.EE.A.2a	Expressions and Equations			0.65			
16	Multiple Choice	A	1	CCSS.Math.Content.6.EE.B.8	Expressions and Equations			0.46			
17	Multiple Choice	C	1	CCSS.Math.Content.6.G.A.4	Geometry			0.22			
18	Multiple Choice	A	1	CCSS.Math.Content.6.RP.A.3c	Ratios and Proportional Relationships			0.53			
19	Multiple Choice	A	1	CCSS.Math.Content.6.EE.B.6	Expressions and Equations			0.42			
20	Multiple Choice	B	1	CCSS.Math.Content.6.NS.A.1	The Number System			0.42			
23	Multiple Choice	D	1	CCSS.Math.Content.6.EE.A.3	Expressions and Equations			0.64			
24	Multiple Choice	D	1	CCSS.Math.Content.6.RP.A.3c	Ratios and Proportional Relationships			0.49			
25	Multiple Choice	D	1	CCSS.Math.Content.6.EE.A.4	Expressions and Equations			0.41			
26	Multiple Choice	C	1	CCSS.Math.Content.6.NS.B.4	The Number System			0.52			
Book 2											
27	Multiple Choice	D	1	CCSS.Math.Content.6.RP.A.3c	Ratios and Proportional Relationships			0.78			

Released Questions on EngageNY

Grade 6	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)	
	28	Multiple Choice	B	1	CCSS.Math.Content.6.NS.B.4	The Number System		0.83			
	29	Multiple Choice	A	1	CCSS.Math.Content.6.EE.A.2c	Expressions and Equations		0.53			
	30	Multiple Choice	D	1	CCSS.Math.Content.6.NS.C.6a	The Number System		0.76			
	34	Multiple Choice	D	1	CCSS.Math.Content.6.EE.C.9	Expressions and Equations		0.70			
	35	Multiple Choice	C	1	CCSS.Math.Content.6.RP.A.3	Ratios and Proportional Relationships		0.68			
	36	Multiple Choice	B	1	CCSS.Math.Content.6.G.A.3	Geometry		0.54			
	37	Multiple Choice	A	1	CCSS.Math.Content.6.EE.B.6	Expressions and Equations		0.49			
	38	Multiple Choice	D	1	CCSS.Math.Content.6.NS.C.7a	The Number System		0.54			
	39	Multiple Choice	B	1	CCSS.Math.Content.6.EE.B.5	Expressions and Equations		0.38			
	40	Multiple Choice	B	1	CCSS.Math.Content.6.G.A.2	Geometry		0.82			
	41	Multiple Choice	A	1	CCSS.Math.Content.6.RP.A.2	Ratios and Proportional Relationships		0.59			
	42	Multiple Choice	C	1	CCSS.Math.Content.6.G.A.4	Geometry		0.45			
	43	Multiple Choice	A	1	CCSS.Math.Content.6.EE.A.4	Expressions and Equations		0.50			
	44	Multiple Choice	C	1	CCSS.Math.Content.6.NS.B.4	The Number System		0.45			
	45	Multiple Choice	C	1	CCSS.Math.Content.6.EE.A.3	Expressions and Equations		0.41			
	46	Multiple Choice	B	1	CCSS.Math.Content.5.G.A.1	The Number System		0.85			
	50	Multiple Choice	C	1	CCSS.Math.Content.6.G.A.1	Geometry		0.35			
	51	Multiple Choice	C	1	CCSS.Math.Content.6.EE.B.7	Expressions and Equations		0.49			

Book 3

52	Constructed Response		2	CCSS.Math.Content.6.RP.A.3b	Ratios and Proportional Relationships			0.76	0.38
53	Constructed Response		2	CCSS.Math.Content.6.EE.A.2c	Expressions and Equations			0.82	0.41
54	Constructed Response		2	CCSS.Math.Content.6.RP.A.3d	Ratios and Proportional Relationships			0.42	0.21

Released Questions on EngageNY

Grade 6	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)	
	55	Constructed Response		2	CCSS.Math.Content.6.EE.B.7	Expressions and Equations			1.13	0.56	
	56	Constructed Response		2	CCSS.Math.Content.6.RP.A.3c	Ratios and Proportional Relationships			0.70	0.35	
	57	Constructed Response		2	CCSS.Math.Content.6.EE.A.3	Expressions and Equations	CCSS.Math.Content.6.EE.A.2c		1.07	0.54	
	58	Constructed Response		3	CCSS.Math.Content.6.EE.B.7	Expressions and Equations			2.07	0.69	
	59	Constructed Response		3	CCSS.Math.Content.6.RP.A.3b	Ratios and Proportional Relationships			1.16	0.39	
	60	Constructed Response		3	CCSS.Math.Content.6.G.A.2	Geometry			0.76	0.25	
	61	Constructed Response		3	CCSS.Math.Content.6.NS.C.5	The Number System			1.96	0.65	

*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	<p>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.</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 Point	<p>A two-point 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 Point	<p>A one-point 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 Point*	<p>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.</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).

2017 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 shows the work in other than a designated “Show your work” or “Explain” area, that work should still be scored.
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. If students are directed to show work, a correct answer with **no** work shown receives **no** credit.
4. 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.
5. If the student provides one legible response (and one response only), the rater should score the response, even if it has been crossed out.
6. If the student has written more than one response but has crossed some out, the rater should score only the response that has **not** been crossed out.
7. Trial-and-error responses are **not** subject to Scoring Policy #6 above, since crossing out is part of the trial-and-error process.
8. If a response shows repeated occurrences of the same conceptual error within a question, the conceptual error should **not** be considered more than once in gauging the demonstrated level of understanding.
9. In questions requiring number sentences, the number sentences must be written horizontally.
10. 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

Dana and Monique are dog groomers. Dana's workday is 10 hours and Monique's workday is 8 hours. Dana and Monique each work 40 hours per week.

On Monday, Dana groomed 15 dogs in 10 hours and Monique groomed 10 dogs in 8 hours. They each earn \$12.75 for each dog groomed. Assuming that for the rest of the week Dana and Monique groom the same number of dogs per workday as they did on Monday, what will be the difference between their weekly earnings?

Show your work.

Dana:

$$\begin{aligned} &4 \text{ days/week} \\ &15 \times 4 = 60 \end{aligned}$$

Monique:

$$\begin{aligned} &5 \text{ days/week} \\ &10 \times 5 = 50 \end{aligned}$$

$$60 - 50 = 10$$

$$10 \times 12.75 = 127.50$$

The difference is \$127.50

Or other valid process

Answer

\$127.50

GUIDE PAPER 1

Additional

52

Dana and Monique are dog groomers. Dana's workday is 10 hours and Monique's workday is 8 hours. Dana and Monique each work 40 hours per week.

On Monday, Dana groomed 15 dogs in 10 hours and Monique groomed 10 dogs in 8 hours. They each earn \$12.75 for each dog groomed. Assuming that for the rest of the week Dana and Monique groom the same number of dogs per workday as they did on Monday, what will be the difference between their weekly earnings?

Show your work.

Dana: \$765 a week

$$40 \div 10 = 4 \text{ days a week}$$

$$\$12.75 \times 15 \text{ dogs} = \$191.25 \leftarrow \text{one day}$$

$$\$191.25 \times 4 \text{ days} = \underline{\$765} \leftarrow \text{a week}$$

Monique: \$637.50 a week

$$40 \div 8 = 5 \text{ days a week}$$

$$\$12.75 \times 10 \text{ dogs} = \$127.50 \leftarrow \text{one day}$$

$$\$127.50 \times 5 \text{ days} = \underline{\$637.50} \leftarrow \text{a week}$$

$$\$765 - \$637.50 = \boxed{\$127.50}$$

Answer

\$127.50

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The weekly earnings of both groomers and the difference between their earnings are correctly determined using mathematically sound procedures.

GUIDE PAPER 2

52

Dana and Monique are dog groomers. Dana's workday is 10 hours and Monique's workday is 8 hours. Dana and Monique each work 40 hours per week.

On Monday, Dana groomed 15 dogs in 10 hours and Monique groomed 10 dogs in 8 hours. They each earn \$12.75 for each dog groomed. Assuming that for the rest of the week Dana and Monique groom the same number of dogs per workday as they did on Monday, what will be the difference between their weekly earnings?

Show your work.

$$15 \cdot 4 = 60 \times 12.75 = \$765$$

$$10 \cdot 5 = 50 \times 12.75 = \$637.5$$

$$\begin{array}{r} 765.0 \\ - 637.5 \\ \hline 127.5 \end{array}$$

Answer

Dana will earn \$127.5 more than Monique.

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The weekly earnings of both groomers and the difference between their earnings are correctly determined using mathematically sound procedures.

GUIDE PAPER 3

52

Dana and Monique are dog groomers. Dana's workday is 10 hours and Monique's workday is 8 hours. Dana and Monique each work 40 hours per week.

On Monday, Dana groomed 15 dogs in 10 hours and Monique groomed 10 dogs in 8 hours. They each earn \$12.75 for each dog groomed. Assuming that for the rest of the week Dana and Monique groom the same number of dogs per workday as they did on Monday, what will be the difference between their weekly earnings?

Show your work.

$$\boxed{D} \quad 15 \cdot 4 = 60 \quad \$12.75 \cdot 60$$

$$\boxed{M} \quad 10 \cdot 5 = 50 \quad \$12.75 \cdot 50$$

$$60 - 50 = 10$$

$$\$12.75 \cdot 10 = \$127.50$$

Answer

$$\underline{\$127.50}$$

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The difference in the number of dogs groomed per week is correctly calculated, and the difference between earnings is correctly determined using mathematically sound procedures.

GUIDE PAPER 4

52

Dana and Monique are dog groomers. Dana's workday is 10 hours and Monique's workday is 8 hours. Dana and Monique each work 40 hours per week.

On Monday, Dana groomed 15 dogs in 10 hours and Monique groomed 10 dogs in 8 hours. They each earn \$12.75 for each dog groomed. Assuming that for the rest of the week Dana and Monique groom the same number of dogs per workday as they did on Monday, what will be the difference between their weekly earnings?

Show your work.

$$\begin{array}{r} 15 \\ \times 12.75 (2) \\ \hline 6375 \\ +12750 \\ \hline 191.25 \end{array}$$

$$\begin{array}{r} 12.75(2) \\ \times 10 \\ \hline 127.50 \end{array}$$

$$\begin{array}{r} 191.25 \\ \times 4 \\ \hline 765.00 \end{array}$$

$$\begin{array}{r} 127.50 \\ \times 5 \\ \hline 637.50 \end{array}$$

$$\begin{array}{r} 191.25 \\ - 127.50 \\ \hline 637.50 \\ - 687.50 \\ \hline 77.50 \end{array}$$

Answer

\$77.50

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. Dana's weekly earnings are calculated correctly; however, a calculation error occurs when determining Monique's weekly earnings (127.5×5), resulting in an incorrect final solution. The response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 5

52

Dana and Monique are dog groomers. Dana's workday is 10 hours and Monique's workday is 8 hours. Dana and Monique each work 40 hours per week.

On Monday, Dana groomed 15 dogs in 10 hours and Monique groomed 10 dogs in 8 hours. They each earn \$12.75 for each dog groomed. Assuming that for the rest of the week Dana and Monique groom the same number of dogs per workday as they did on Monday, what will be the difference between their weekly earnings?

Show your work.

$$\begin{array}{r} 13 \overset{?}{\overline{)12.75}} \\ \times 15 \\ \hline 16375 \\ +12750 \\ \hline \$191.25 \end{array}$$
$$\begin{array}{r} 12.75 \\ \times 10 \\ \hline 12750 \\ \$127.50 \end{array}$$

$$\begin{array}{r} 801.2 \\ 181.85 \\ -127.50 \\ \hline \$63.75 \end{array}$$

Answer

63.75

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The difference between daily earnings rather than weekly earnings is calculated. The response correctly addresses only some elements of the task.

GUIDE PAPER 6

52

Dana and Monique are dog groomers. Dana's workday is 10 hours and Monique's workday is 8 hours. Dana and Monique each work 40 hours per week.

On Monday, Dana groomed 15 dogs in 10 hours and Monique groomed 10 dogs in 8 hours. They each earn \$12.75 for each dog groomed. Assuming that for the rest of the week Dana and Monique groom the same number of dogs per workday as they did on Monday, what will be the difference between their weekly earnings?

Show your work.

$$\begin{aligned}D &= 4 \text{ days} \\M &= 5 \text{ days}\end{aligned}$$

$$\begin{array}{r}191.25 \\127.5\end{array}$$

$$\begin{array}{r}765 \\637.5\end{array}$$

ANSWER

The difference is \$127.50.

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. Although correct answers are provided for daily and weekly earnings as well as the difference between weekly earnings, the response contains limited work to support them. The response contains the correct solution but required work is incomplete.

GUIDE PAPER 7

52

Dana and Monique are dog groomers. Dana's workday is 10 hours and Monique's workday is 8 hours. Dana and Monique each work 40 hours per week.

On Monday, Dana groomed 15 dogs in 10 hours and Monique groomed 10 dogs in 8 hours. They each earn \$12.75 for each dog groomed. Assuming that for the rest of the week Dana and Monique groom the same number of dogs per workday as they did on Monday, what will be the difference between their weekly earnings?

Show your work.

$$\begin{array}{r} 132 \\ \times 12.75 \\ \hline 1015 \\ 1275 \\ \hline 16875 \\ 11750 \\ \hline 191.25 \end{array}$$

Answer

191.25 is my answer.

Score Point 0 (out of 2 points)

Although Dana's daily earnings are calculated correctly, holistically this calculation alone is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task.

GUIDE PAPER 8

Additional

52

Dana and Monique are dog groomers. Dana's workday is 10 hours and Monique's workday is 8 hours. Dana and Monique each work 40 hours per week.

On Monday, Dana groomed 15 dogs in 10 hours and Monique groomed 10 dogs in 8 hours. They each earn \$12.75 for each dog groomed. Assuming that for the rest of the week Dana and Monique groom the same number of dogs per workday as they did on Monday, what will be the difference between their weekly earnings?

Show your work.

Dana	Monique
\$12.75	\$12.75
- 10	- 8
<hr/> $\$12.65$	<hr/> 12.67
- 15	- 15
<hr/> $\$12.60$	<hr/> $\$12.52$

Answer

Their earnings will decrease.

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. An incorrect procedure of subtracting hours from dollars is used to determine the solution.

EXEMPLARY RESPONSE

53

The formula below is used to convert a temperature in degrees Celsius, C , to a temperature in degrees Fahrenheit, F .

$$F = 1.8C + 32$$

The high temperature in a mountain city was 15°C . What was the high temperature in degrees Fahrenheit?

Show your work.

$$F = 1.8 \times 15 + 32$$

$$F = 27 + 32 = 59$$

Or other valid process

Answer 59 °F

GUIDE PAPER 1

Additional

53

The formula below is used to convert a temperature in degrees Celsius, C , to a temperature in degrees Fahrenheit, F .

$$F = 1.8C + 32$$

The high temperature in a mountain city was 15°C . What was the high temperature in degrees Fahrenheit?

Show your work.

$$F = 1.8C + 32$$

$$59^{\circ}\text{F}$$

$$F = 1.8(15) + 32$$

$$F = 27 + 32$$

$$F = 59$$

Answer 59°F

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly uses the given formula to convert the high temperature to degrees Fahrenheit.

GUIDE PAPER 2

53

The formula below is used to convert a temperature in degrees Celsius, C , to a temperature in degrees Fahrenheit, F .

$$F = 1.8C + 32$$

The high temperature in a mountain city was 15°C . What was the high temperature in degrees Fahrenheit?

Show your work.

$$F = 1.8 \cdot 15 + 32$$

$$59^{\circ}\text{F}$$

Answer 59°F

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly uses the given formula to convert the high temperature to degrees Fahrenheit.

GUIDE PAPER 3

53

The formula below is used to convert a temperature in degrees Celsius, C , to a temperature in degrees Fahrenheit, F .

$$F = 1.8C + 32$$

The high temperature in a mountain city was 15°C . What was the high temperature in degrees Fahrenheit?

Show your work.

$$\begin{array}{r} 1.8 \cdot 15 + 32 \\ 27 + 32 \\ \hline 59 \end{array}$$

$$\begin{array}{r} 1.8 \\ \times 15 \\ \hline 140 \\ + 180 \\ \hline 270 \end{array}$$

Answer 59 °F

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly uses the given formula to convert the high temperature to degrees Fahrenheit.

GUIDE PAPER 4

53

The formula below is used to convert a temperature in degrees Celsius, C , to a temperature in degrees Fahrenheit, F .

$$F = 1.8C + 32$$

The high temperature in a mountain city was 15°C . What was the high temperature in degrees Fahrenheit?

Show your work.

$$F = 1.8C + 32$$

$$F = 1.8 \times 15 + 32$$

$$F = 270 + 32$$

$$F = 302$$

$$\begin{array}{r} 15 \\ \times 1.8 \\ \hline 100 \\ 15 \\ \hline 270 \end{array}$$

Answer 302 °F

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. This response contains a correct equation ($F = 1.8 \times 15 + 32$); however, there is a calculation error in solving for the degrees Fahrenheit, ($1.8 \times 15 = 270$). This response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 5

53

The formula below is used to convert a temperature in degrees Celsius, C, to a temperature in degrees Fahrenheit, F.

$$F = 1.8C + 32$$

The high temperature in a mountain city was 15°C. What was the high temperature in degrees Fahrenheit?

Show your work.

$$\begin{array}{r} 1.8 \times 15 \\ \times 15 \\ \hline 90 \\ 180 \\ \hline 270 \end{array}$$

27°f

Answer 27 °F

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response correctly multiplies 1.8 and 15 to get 27°; however, the constant in the formula is omitted while converting from degrees of Celsius to degrees of Fahrenheit. This response correctly addresses only some elements of the task.

GUIDE PAPER 6

53

The formula below is used to convert a temperature in degrees Celsius, C , to a temperature in degrees Fahrenheit, F .

$$F = 1.8C + 32$$

The high temperature in a mountain city was 15°C . What was the high temperature in degrees Fahrenheit?

Show your work.

$$\begin{array}{r} 41.5 \\ \times 15 \\ \hline 190 \\ 180 \\ \hline 225.0 \\ \end{array}$$

$F = 1.8C + 32$

$F = 1.8 \cdot 15^{\circ}\text{C} + 32$

$$\begin{array}{r} 1.8 \cdot 15 \\ \hline 8 \quad 1 \\ -16 \\ \hline 27 \\ \end{array}$$
$$\begin{array}{r} 270 \\ +32 \\ \hline 302 \\ \end{array}$$
$$\begin{array}{r} 64 \\ -57 \\ \hline 17 \\ \end{array}$$
$$\begin{array}{r} 30 \\ -20 \\ \hline 10 \\ \end{array}$$

Answer 302 °F

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. This response contains a correct equation ($F = 1.8 \cdot 15^{\circ}\text{C} + 32$); however, there is a calculation error in solving for the degrees Fahrenheit, ($1.8 \times 15 = 270$). This response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 7

53

The formula below is used to convert a temperature in degrees Celsius, C , to a temperature in degrees Fahrenheit, F .

$$F = 1.8C + 32$$

The high temperature in a mountain city was 15°C . What was the high temperature in degrees Fahrenheit?

Show your work.

$$\begin{array}{r} 32 + 1.8(15) \\ \swarrow \quad \searrow \\ 33.8 \times 15 \\ \swarrow \quad \searrow \\ 507 \end{array}$$

Answer 507 °F

Score Point 0 (out of 2 points)

Although this response correctly writes the expression to convert to degrees Fahrenheit, the student does not apply the order of operations properly. Holistically this response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task.

GUIDE PAPER 8

Additional

53

The formula below is used to convert a temperature in degrees Celsius, C , to a temperature in degrees Fahrenheit, F .

$$F = 1.8C + 32$$

The high temperature in a mountain city was 15°C . What was the high temperature in degrees Fahrenheit?

Show your work.

$$15 \div 1.8 = 8.3$$

$$8.3 + 32 = 40.3$$

$$40.3^{\circ}\text{F}$$

Answer

$^{\circ}\text{F}$

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. This response incorrectly divides 15 by 1.8.

EXEMPLARY RESPONSE

54

A seamstress needs to cut 15-inch pieces of ribbon from a roll of ribbon that is 9 feet in length. What is the greatest number of 15-inch pieces the seamstress can cut from 5 of these rolls of ribbon?

Show your work.

$$9 \text{ feet} \times 12 \text{ inches} = 108 \text{ inches per roll of ribbon}$$

$$108 \div 15 = 7.2 \text{ pieces per roll}$$

$$7 \times 5 = 35 \text{ pieces}$$

Or other valid process

35

Answer _____ pieces

GUIDE PAPER 1

Additional

54

A seamstress needs to cut 15-inch pieces of ribbon from a roll of ribbon that is 9 feet in length. What is the greatest number of 15-inch pieces the seamstress can cut from 5 of these rolls of ribbon?

Show your work.

$$\textcircled{1} \quad 1\text{ft} = 12 \text{ in.}$$

$$9\text{ft} = 108 \text{ in.}$$

$$\begin{array}{r} \cancel{7} \cancel{1} \cancel{5} \\ \cancel{15) } \overline{10} \cancel{8} \end{array} \quad \begin{array}{r} 3 \\ 12 \\ \hline 105 \\ 3 \end{array}$$

$$7 \frac{3}{15} \approx 7$$

Answer 35 pieces

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The number of pieces that can be cut from a single roll of ribbon is calculated correctly and appropriately multiplied to account for all 5 rolls of ribbon.

GUIDE PAPER 2

54

A seamstress needs to cut 15-inch pieces of ribbon from a roll of ribbon that is 9 feet in length. What is the greatest number of 15-inch pieces the seamstress can cut from 5 of these rolls of ribbon?

Show your work.

$$\frac{9 \cdot 12}{15} = \frac{108}{15} = 7\frac{3}{15} \rightarrow 7$$

$$7 \cdot 5 = 35$$

$$\begin{array}{r} 108 \\ 15) \overline{108} \\ 105 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 108 \\ 15) \overline{108} \\ 105 \\ \hline 3 \\ 15) \overline{30} \\ 15 \\ \hline 15 \\ 15) \overline{15} \\ 15 \\ \hline 0 \end{array}$$

Answer 35 pieces

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The number of pieces that can be cut from a single roll of ribbon is calculated correctly and appropriately multiplied to account for all 5 rolls of ribbon.

GUIDE PAPER 3

54

A seamstress needs to cut 15-inch pieces of ribbon from a roll of ribbon that is 9 feet in length. What is the greatest number of 15-inch pieces the seamstress can cut from 5 of these rolls of ribbon?

Show your work.

The student has written several calculations:

- A vertical division problem: $\begin{array}{r} 9 \\ \times 5 \\ \hline 45 \end{array}$. The 9 is crossed out, and the 45 is crossed out with a large X.
- A horizontal multiplication: $45 \times 5 = 225$. The entire row is crossed out with a large X.
- A vertical multiplication: $\begin{array}{r} 9 \\ \times 12 \\ \hline 108 \end{array}$.
- A vertical division: $\begin{array}{r} 9 \\ \overline{)35} \\ 35 \\ \hline 0 \end{array}$.
- A long division problem: $15 \overline{)108}$. The 108 is crossed out, and the entire row is crossed out with a large X.

Answer 72 pieces

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The number of pieces that can be cut from a single roll of ribbon is calculated correctly and appropriately multiplied to account for all 5 rolls of ribbon. As per Scoring Policy #6, the work that has been crossed out should not be considered in scoring.

GUIDE PAPER 4

54

A seamstress needs to cut 15-inch pieces of ribbon from a roll of ribbon that is 9 feet in length. What is the greatest number of 15-inch pieces the seamstress can cut from 5 of these rolls of ribbon?

Show your work.

$$12 \text{ inches} - 1 \text{ foot}$$

$$\begin{array}{r} 9 \\ \times 5 \\ \hline 45 \text{ feet total} \end{array}$$

- 1 piece - 1 foot 3 inches
2 pieces - 2 feet 6 inches
3 pieces - 3 feet 9 inches
4 pieces - 5 feet 12 inches
5 pieces - 6 feet 3 inches
7 pieces - 7 feet 6 inches
8 pieces - 8 feet 9 inches

8 pieces per roll

$$\begin{array}{r} 8 \\ \times 5 \\ \hline 40 \end{array}$$

Answer 40 pieces

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. 15-inch pieces are cumulatively added until 9 feet is reached; however, the count of pieces skips from 5 pieces to 7 pieces, resulting in an incorrect number of pieces per roll. The result is then appropriately multiplied to account for all 5 rolls of ribbon. The response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 5

54

A seamstress needs to cut 15-inch pieces of ribbon from a roll of ribbon that is 9 feet in length. What is the greatest number of 15-inch pieces the seamstress can cut from 5 of these rolls of ribbon?

Show your work.

$$9 \cdot 5 \cdot 12$$

$$45 \cdot 12$$

$$540 \text{ in.}$$

$$540 \div 15$$

$$\boxed{36}$$

Answer 36 pieces

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The total length in inches of all 5 rolls of ribbon is calculated correctly and appropriately divided by 15 to calculate the number of pieces that can be cut; however, this approach fails to account for each individual roll having some length of scrap material left over. The response correctly addresses only some elements of the task.

GUIDE PAPER 6

54

A seamstress needs to cut 15-inch pieces of ribbon from a roll of ribbon that is 9 feet in length. What is the greatest number of 15-inch pieces the seamstress can cut from 5 of these rolls of ribbon?

Show your work.

$$12 \text{ inches} = 1 \text{ foot}$$

$$\begin{array}{r} 12 \\ \times 9 \\ \hline 108 \end{array} \quad \begin{array}{r} 72 \\ \overline{(5)108} \\ 72 \end{array}$$

Answer 7 pieces

7 pieces with
six inches left
over.

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The number of pieces that can be cut from a single roll of ribbon is calculated correctly; however, this result is never multiplied to account for all 5 rolls of ribbon. The response correctly addresses only some elements of the task.

GUIDE PAPER 7

54

A seamstress needs to cut 15-inch pieces of ribbon from a roll of ribbon that is 9 feet in length. What is the greatest number of 15-inch pieces the seamstress can cut from 5 of these rolls of ribbon?

Show your work.

$$\begin{array}{r} 9 & 45 \\ \times 5 & \times 15 \\ \hline 45 & 675 \end{array}$$

Answer 675 pieces

Score Point 0 (out of 2 points)

Although some elements may contain correct mathematical procedures, holistically they are not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. The total length in feet of all 5 rolls of ribbon is calculated correctly; however, it is never converted into inches and is inappropriately multiplied by 15 rather than divided by 15.

GUIDE PAPER 8

Additional

54

A seamstress needs to cut 15-inch pieces of ribbon from a roll of ribbon that is 9 feet in length. What is the greatest number of 15-inch pieces the seamstress can cut from 5 of these rolls of ribbon?

Show your work.

$$\text{of } = 108 \text{ in}$$
$$15) 108$$

$$\begin{array}{r} 72 \\ -15 \\ \hline 36 \\ -15 \\ \hline 12 \\ -15 \\ \hline 0 \end{array}$$

Answer 72 pieces

Score Point 0 (out of 2 points)

Although some elements may contain correct mathematical procedures, holistically they are not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. The length of one roll of ribbon is correctly converted to inches and then divided by 15 to calculate the number of pieces that can be cut; however, this result is never multiplied to account for all 5 rolls of ribbon and a decimal point is missing from the solution.

EXEMPLARY RESPONSE

55

It is recommended that one fire extinguisher be available for every 6,000 square feet in a building. Write and solve an equation to determine x , the number of fire extinguishers needed for a building that has 135,000 square feet.

Show your work.

$$6,000 \times x = 135,000$$

$$x = 135,000 \div 6,000$$

$$x = 22.5$$

Or other valid process

Answer _____ 22 or 23 or 22.5 fire extinguishers

GUIDE PAPER 1

Additional

55

It is recommended that one fire extinguisher be available for every 6,000 square feet in a building. Write and solve an equation to determine x , the number of fire extinguishers needed for a building that has 135,000 square feet.

Show your work.

$$6,000x = 135,000$$

22.5

$$\begin{array}{r} 4000 \overline{)135,000} \\ -12000 \\ \hline 15000 \\ -12000 \\ \hline 30000 \\ -30000 \\ \hline 0 \end{array}$$

$\frac{6000}{\times} \overline{12000}$

Answer 23 fire extinguishers

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The equation is correctly written and solved with the appropriate answer indicated. This response indicates that the student has completed the task correctly, using mathematically sound procedures.

GUIDE PAPER 2

55

It is recommended that one fire extinguisher be available for every 6,000 square feet in a building. Write and solve an equation to determine x , the number of fire extinguishers needed for a building that has 135,000 square feet.

Show your work.

$$6000 \times 2 = 12,000$$

$$6000 \times 5 = 30,000$$

$$6000 \times 7 = 42,000$$

$$6000 \times 6 = 36,000$$

$$6000 \times 11 = 66,000$$

$$6000 \times 12 = 72,000$$

$$6000 \times 13 = 78,000$$

$$6000 \times 14 = 84,000$$

$$6000 \times 15 = 90,000$$

$$6000 \times 18 = 108,000$$

$$6000 \times 19 = 114,000$$

$$6000 \times 20 = 120,000$$

$$6000 \times 21 = 126,000$$

$$6000 \times 22 = 132,000$$

$$6000 \times 23 = 138,000$$

$$6000 \times 24 = 144,000$$

$$6000 \times 22.5 = 135,000$$

Answer 22.5 fire extinguishers

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The correct equation is provided along with the correct solution.

GUIDE PAPER 3

55

It is recommended that one fire extinguisher be available for every 6,000 square feet in a building. Write and solve an equation to determine x , the number of fire extinguishers needed for a building that has 135,000 square feet.

Show your work.

$$6000x = 135,000$$

$$\begin{array}{r} \underline{22.5} \\ 600 \overline{)135,000} \\ \underline{12} \\ 15 \\ \underline{12} \\ 30 \\ \underline{30} \\ 0 \end{array}$$

Answer

22

fire extinguishers

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The equation is correctly written and solved with the appropriate answer indicated. This response indicates that the student has completed the task correctly, using mathematically sound procedures.

GUIDE PAPER 4

55

It is recommended that one fire extinguisher be available for every 6,000 square feet in a building. Write and solve an equation to determine x , the number of fire extinguishers needed for a building that has 135,000 square feet.

Show your work.

$$6,000x = 135,000 \div 6,000$$

$$\begin{array}{r} 22.5 \\ \hline 6 \overline{)135.0} \\ -12 \hline 15 \\ -12 \hline 30 \\ -30 \hline 0 \end{array}$$

6,000
x 22.5
30,000
+ 30,000

0

Answer 22.5 fire extinguishers

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The number of fire extinguishers is correctly determined; however, an incorrect equation is provided to solve for the solution. This response correctly addresses only some elements of the task.

GUIDE PAPER 5

55

It is recommended that one fire extinguisher be available for every 6,000 square feet in a building. Write and solve an equation to determine x , the number of fire extinguishers needed for a building that has 135,000 square feet.

Show your work.



$$135,000 \div 6,000$$

6,000 $\overline{)135,000}$

xxxxx $\overline{\downarrow 25}$ $\rightarrow 23$

120 \downarrow

15000

12000

3000

3000

0

$$300 \div 6,000 = 5$$

Answer You would need 23 fire extinguishers

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response correctly solves for the proper number of fire extinguishers ($135,000 \div 6,000$); however, an equation is not provided. This response contains the correct solution but required work is incomplete.

GUIDE PAPER 6

55

It is recommended that one fire extinguisher be available for every 6,000 square feet in a building. Write and solve an equation to determine x , the number of fire extinguishers needed for a building that has 135,000 square feet.

Show your work.

$$\frac{22.5}{6,000} = \frac{135,000}{x}$$

Answer 22.5 fire extinguishers

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response correctly solves for the proper number of fire extinguishers; however, an equation is not provided. This response correctly addresses only some elements of the task.

GUIDE PAPER 7

55

It is recommended that one fire extinguisher be available for every 6,000 square feet in a building. Write and solve an equation to determine x , the number of fire extinguishers needed for a building that has 135,000 square feet.

Show your work.

$$x + 6,000 = 135,000$$

$$x = 129,000$$

$$\begin{array}{r} 1 \\ 129,000 \\ - 6,000 \\ \hline 135,000 \end{array}$$

Answer 129,000 fire extinguishers

Score Point 0 (out of 2 points)

Holistically, this response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. The equation written is incorrect and is used to determine the incorrect number of fire extinguishers.

GUIDE PAPER 8

Additional

55

It is recommended that one fire extinguisher be available for every 6,000 square feet in a building. Write and solve an equation to determine x , the number of fire extinguishers needed for a building that has 135,000 square feet.

Show your work.

$$\begin{array}{r} & 1 \\ & 135,000 \\ & 6,000 \\ + & \hline & 142,000 \end{array}$$

Answer 142,000 fire extinguishers

Score Point 0 (out of 2 points)

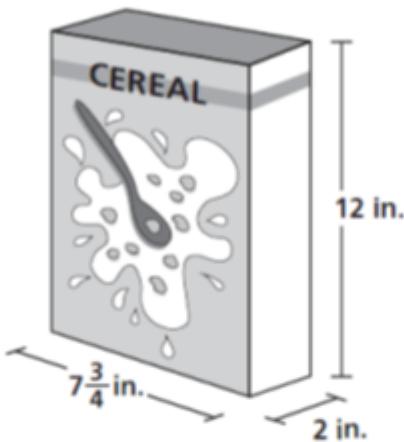
This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Values from the prompt are inappropriately added.

EXEMPLARY RESPONSE

56

A company sells cereal in two different-sized boxes. The smaller box has the dimensions shown below.

Smaller Cereal Box



The height of the smaller box is 80% of the height of the larger box, while the other two dimensions are the same for both boxes. What is the difference in the volumes of the two boxes?

Show your work.

$$\text{Volume of smaller box: } 7\frac{3}{4} \times 2 \times 12 = 186 \text{ cubic inches}$$

$$\begin{aligned}\text{Volume of larger box: } & 0.8h = 12 \\ & h = 12 \div 0.8 \\ & h = 15 \text{ inches} \\ & 7\frac{3}{4} \times 2 \times 15 = 232.5 \text{ cubic inches}\end{aligned}$$

$$\text{Difference in the volume: } 232.5 - 186 = 46.5$$

Or other valid process

Answer 46.5 cubic inches

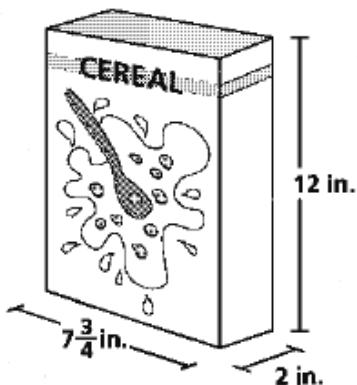
GUIDE PAPER 1

Additional

56

A company sells cereal in two different-sized boxes. The smaller box has the dimensions shown below.

Smaller Cereal Box



The height of the smaller box is 80% of the height of the larger box, while the other two dimensions are the same for both boxes. What is the difference in the volumes of the two boxes?

Show your work.

$$\begin{aligned} h &= 12 \div .8 \\ 15 &= 12 \div .8 \\ \text{Small} &= 12 \times 2 \times 7\frac{3}{4} = 186 \text{ in}^3 \\ \text{Large} &= 15 \times 2 \times 7\frac{3}{4} = 232\frac{1}{2} \text{ in}^3 \\ \text{Answer} &= \underline{46\frac{1}{2}} \text{ cubic inches} \end{aligned}$$
$$\begin{array}{r} 232\frac{1}{2} \text{ in}^3 \\ - 186 \text{ in}^3 \\ \hline 46\frac{1}{2} \text{ in}^3 \end{array}$$

Score Point 2 (out of 2 points)

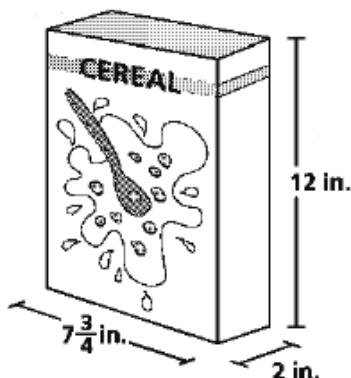
This response demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly determines the volume of both cereal boxes and then subtracts for a correct solution of the difference in the volumes. This response indicates that the student has completed the task correctly, using mathematically sound procedures.

GUIDE PAPER 2

56

A company sells cereal in two different-sized boxes. The smaller box has the dimensions shown below.

Smaller Cereal Box



The height of the smaller box is 80% of the height of the larger box, while the other two dimensions are the same for both boxes. What is the difference in the volumes of the two boxes?

Show your work.

$$\frac{12}{x} = \frac{8}{10}$$

$$8x = 120$$

$$x = 15$$

$$\begin{array}{r} 232.5 \\ - 186.0 \\ \hline 46.5 \end{array}$$

$$\begin{aligned} A &= 12 \times 2 \times 7 \frac{3}{4} \\ &= 24 \times \frac{31}{4} \\ &= 186 \text{ in}^3 \end{aligned}$$

$$\begin{aligned} B &= 15 \times 2 \times 7 \frac{3}{4} \\ &= 30 \times \frac{31}{4} \\ &= \underline{\underline{465}} \\ &= 232.5 \text{ in}^3 \end{aligned}$$

Answer 46.5 cubic inches

Score Point 2 (out of 2 points)

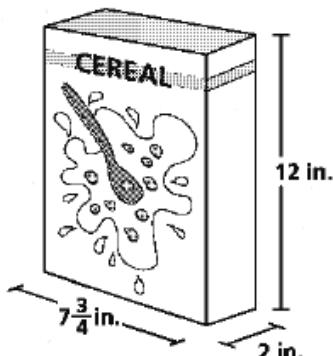
This response demonstrates a thorough understanding of the mathematical concepts in the task. The response uses ratios to correctly determine the height of the larger box. The volume of both cereal boxes is correctly calculated and the difference in the volumes is determined for the correct solution. This response indicates that the student has completed the task correctly, using mathematically sound procedures.

GUIDE PAPER 3

56

A company sells cereal in two different-sized boxes. The smaller box has the dimensions shown below.

Smaller Cereal Box



The height of the smaller box is 80% of the height of the larger box, while the other two dimensions are the same for both boxes. What is the difference in the volumes of the two boxes?

Show your work.

$$12 \div 4 = 3$$

$$3 \times 5 = 15$$

Big Box

Small Box

$$H = 12 \text{ in}$$

$$L = 7\frac{3}{4} \text{ in}$$

$$W = 2 \text{ in}$$

$$12 \times 2 = 24$$

$$\begin{array}{r} 232\frac{1}{2} \\ -186 \\ \hline 46\frac{1}{2} \end{array}$$

$$H = 15 \text{ in}$$

$$L = 7\frac{3}{4} \text{ in}$$

$$W = 2 \text{ in}$$

$$15 \times 2 = 30$$

$$7\frac{3}{4} \times 30 = 232\frac{1}{2}$$

$$24 \times 7\frac{3}{4} = 186$$

Answer

$$46\frac{1}{2}$$

cubic inches

Score Point 2 (out of 2 points)

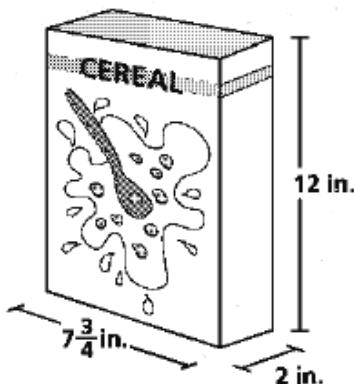
This response demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly determines the volume of both cereal boxes and then subtracts for a correct solution of the difference in the volumes. As per Scoring Policy #6, if the student has written more than one response but has crossed some out, raters should score only the response that has not been crossed out.

GUIDE PAPER 4

56

A company sells cereal in two different-sized boxes. The smaller box has the dimensions shown below.

Smaller Cereal Box



The height of the smaller box is 80% of the height of the larger box, while the other two dimensions are the same for both boxes. What is the difference in the volumes of the two boxes?

Show your work.

$$S \ V = 12 \times 2 \times 7.75 = 186$$

~~$\frac{186}{49.5}$~~ 15
 $\overline{80} \overline{1}, \overline{200}$

$$L \ V = 15 \times 2 \times 7.75 = 235.5$$

$$\begin{array}{r} 235.5 \\ -186 \\ \hline 49.5 \end{array}$$

~~$\frac{49.5}{15}$~~ 15
 $\overline{80} \overline{1}, \overline{200}$

Answer 49.5 cubic inches

Score Point 1 (out of 2 points)

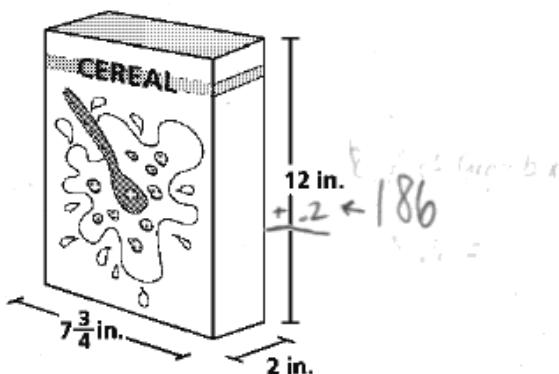
This response demonstrates only a partial understanding of the mathematical concepts in the task. The volume of the smaller cereal box is correctly calculated; however, the work for the volume of the larger cereal box contains a calculation error. This response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 5

56

A company sells cereal in two different-sized boxes. The smaller box has the dimensions shown below.

Smaller Cereal Box



The height of the smaller box is 20% of the height of the larger box, while the other two dimensions are the same for both boxes. What is the difference in the volumes of the two boxes?

Show your work.

$$\begin{aligned} & 12 \cdot 2 \times 7\frac{3}{4} = 189.1 \\ & 12 \times 2 \times 7\frac{3}{4} = 186 \\ & \quad 3.1 \end{aligned}$$

Answer 3.1 cubic inches

Score Point 1 (out of 2 points)

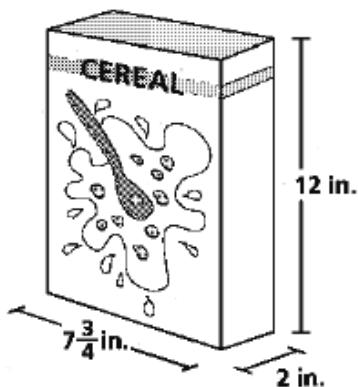
This response demonstrates only a partial understanding of the mathematical concepts in the task. The volume of the smaller cereal box is correctly calculated; however, the height of the larger cereal box is incorrect resulting in an incorrect volume of the larger cereal box. The difference between the two volumes is then used to determine the solution. This response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 6

56

A company sells cereal in two different-sized boxes. The smaller box has the dimensions shown below.

Smaller Cereal Box



The height of the smaller box is 80% of the height of the larger box, while the other two dimensions are the same for both boxes. What is the difference in the volumes of the two boxes?

Show your work.

$$7\frac{3}{4} \rightarrow \frac{31}{4}$$

$$\begin{array}{r} 12 \\ \times 2 \\ \hline 24 \\ \times 31 \\ \hline 4 \\ \hline 186 \end{array}$$

$$\begin{array}{r} 12 \\ \times 2 \\ \hline 24 \\ \times 31 \\ \hline 4 \\ \hline 186 \\ \times 2 \\ \hline 372 \end{array}$$

$$\begin{array}{r} 16 \\ 2372 \\ - 176 \\ \hline 186 \end{array}$$

Answer 186 cubic inches

Score Point 1 (out of 2 points)

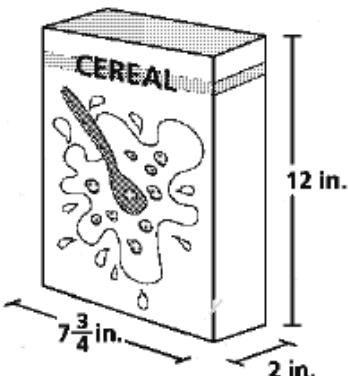
This response demonstrates only a partial understanding of the mathematical concepts in the task. The volume of the smaller cereal box is correctly calculated. The volume of the larger cereal box is calculated incorrectly (186×2), then the difference between the two volumes is determined for the solution. This response contains an incorrect solution but applies some mathematically appropriate processes.

GUIDE PAPER 7

56

A company sells cereal in two different-sized boxes. The smaller box has the dimensions shown below.

Smaller Cereal Box



The height of the smaller box is 80% of the height of the larger box, while the other two dimensions are the same for both boxes. What is the difference in the volumes of the two boxes?

Show your work.

$$\begin{aligned}V &= L \cdot W \cdot H \\V &= 7\frac{3}{4} \cdot 2 \cdot 12 \\V &= 126\end{aligned}$$

Answer 126 cubic inches

Score Point 0 (out of 2 points)

Holistically this response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although the equation for the volume of the small cereal box is correctly shown, it contains a calculation error and no other work is provided.

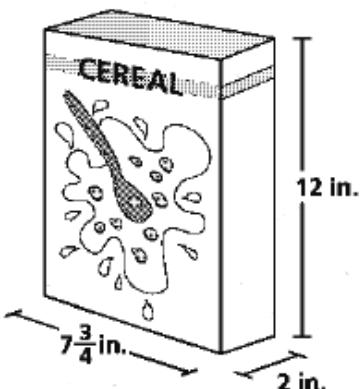
GUIDE PAPER 8

Additional

56

A company sells cereal in two different-sized boxes. The smaller box has the dimensions shown below.

Smaller Cereal Box



The height of the smaller box is 80% of the height of the larger box, while the other two dimensions are the same for both boxes. What is the difference in the volumes of the two boxes?

Show your work.

$$\begin{array}{r} 12 \\ \times 2 \\ \hline 24 \end{array}$$

7.54 186.00 - 148.80 <u>037.20</u>	64 186 X .80 <u>148.80</u>
--	--

Answer 51.0 cubic inches

Score Point 0 (out of 2 points)

Holistically this response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. The volume of the smaller box is shown; however, it is unclear how it was calculated. The other work contains multiple incorrect procedures that demonstrate no understanding of how to use this value.

EXEMPLARY RESPONSE

57

The area of Brian's rectangular garden, in square feet, can be found by using the expression $6(2x + 5y)$. Use the distributive property to write an equivalent expression for the area of Brian's garden.

$$12x + 30y$$

Equivalent expression _____.

Use your equivalent expression to find the area of Brian's garden, in square feet, if $x = 3$ and $y = 4$.

Show your work.

$$12(3) + 30(4)$$

$$36 + 120$$

$$156$$

Or other valid process

Area 156 square feet

GUIDE PAPER 1

Additional

57

The area of Brian's rectangular garden, in square feet, can be found by using the expression $6(2x + 5y)$. Use the distributive property to write an equivalent expression for the area of Brian's garden.

Equivalent expression

$$\underline{(12x) + (30y)}$$

Use your equivalent expression to find the area of Brian's garden, in square feet, if $x = 3$ and $y = 4$.

Show your work.

$$12(3) + 30(4)$$

$$36 + 120$$

$$156$$

Area 156 square feet

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The distributive property is correctly applied to the expression to construct an equivalent expression. This equivalent expression is used to correctly solve for the area of the garden. This response indicates that the student has completed the task correctly, using mathematically sound procedures.

GUIDE PAPER 2

57

The area of Brian's rectangular garden, in square feet, can be found by using the expression $6(2x + 5y)$. Use the distributive property to write an equivalent expression for the area of Brian's garden.

Equivalent expression

$$12x+30y$$

Use your equivalent expression to find the area of Brian's garden, in square feet, if $x = 3$ and $y = 4$.

Show your work.

$$\begin{aligned}12(3)+30(4) \\ 36+120=156\end{aligned}$$

Area 156 **square feet**

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The distributive property is correctly applied to the expression to construct an equivalent expression. This equivalent expression is used to correctly solve for the area of the garden.

GUIDE PAPER 3

57

The area of Brian's rectangular garden, in square feet, can be found by using the expression $6(2x + 5y)$. Use the distributive property to write an equivalent expression for the area of Brian's garden.

Equivalent expression

$$6(2x + 5y) \quad 12x + 30y$$

Use your equivalent expression to find the area of Brian's garden, in square feet, if $x = 3$ and $y = 4$.

Show your work.

$$\begin{aligned}12x &= 36 \\30y &= 120 \\120 + 36 &= 156\end{aligned}$$

Area 156 square feet

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The distributive property is correctly applied to the expression to construct an equivalent expression. This equivalent expression is used to correctly solve for the area of the garden.

GUIDE PAPER 4

57

The area of Brian's rectangular garden, in square feet, can be found by using the expression $6(2x + 5y)$. Use the distributive property to write an equivalent expression for the area of Brian's garden.

Equivalent expression $12x + 5y$

Use your equivalent expression to find the area of Brian's garden, in square feet, if $x = 3$ and $y = 4$.

Show your work.

$$\begin{aligned}12x + 5y \\12 \times 3 + 5 \times 4 \\36 + 20 \\56 \text{ square feet}\end{aligned}$$

Area 56 square feet

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The value of 6 is only distributed to the term $2x$ rather than to both terms within the parentheses; as a result, the expression is not equivalent to the given expression. The student then correctly solves for the area of the garden using the expression they created. As per Scoring Policy #8, if a response shows repeated occurrences of the same conceptual error within a question, the conceptual error should not be considered more than once in gauging the demonstrated level of understanding.

GUIDE PAPER 5

57

The area of Brian's rectangular garden, in square feet, can be found by using the expression $6(2x + 5y)$. Use the distributive property to write an equivalent expression for the area of Brian's garden.

Equivalent expression { $12X+30Y$ }

Use your equivalent expression to find the area of Brian's garden, in square feet, if $x = 3$ and $y = 4$.

Show your work.

(NO STUDENT RESPONSE GIVEN)

Area 156 ***square feet***

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The distributive property is correctly applied to construct an equivalent expression; however, no work is provided for the calculation of the area for the garden. This response correctly addresses only some elements of the task.

GUIDE PAPER 6

57

The area of Brian's rectangular garden, in square feet, can be found by using the expression $6(2x + 5y)$. Use the distributive property to write an equivalent expression for the area of Brian's garden.

Equivalent expression

$$6(4x + 2y + 6)$$

Use your equivalent expression to find the area of Brian's garden, in square feet, if $x = 3$ and $y = 4$.

Show your work.

$$6(2x + 5y) = 156$$

$$6 \times 26 = 156$$

$$6(4x + 2y + 6) =$$

Area 156 square feet

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. This response follows a correct procedure to determine the solution of 156 square feet; however, the expression provided is not equivalent. This response correctly addresses only some elements of the task.

GUIDE PAPER 7

57

The area of Brian's rectangular garden, in square feet, can be found by using the expression $6(2x + 5y)$. Use the distributive property to write an equivalent expression for the area of Brian's garden.

Equivalent expression

1[$6(2X+5Y)$]

Use your equivalent expression to find the area of Brian's garden, in square feet, if $x = 3$ and $y = 4$.

Show your work.

(NO STUDENT RESPONSE GIVEN)

Area 156 **square feet**

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 expression provided is copied from the prompt, multiplied by 1 and does not use the distributive property. Although the final solution is correct, as per Scoring Policy # 3, if students are directed to show work, a correct answer with no work shown receives no credit.

GUIDE PAPER 8

Additional

57

The area of Brian's rectangular garden, in square feet, can be found by using the expression $6(2x + 5y)$. Use the distributive property to write an equivalent expression for the area of Brian's garden.

Equivalent expression $6(5y + 2x)$

Use your equivalent expression to find the area of Brian's garden, in square feet, if $x = 3$ and $y = 4$.

Show your work.

$$\begin{array}{r} 5y + 420 + 6 \\ 2x \times 36 \end{array}$$

$$6 \sqrt{26}$$

Area $4\sqrt{3}$ square feet

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 expression is copied from the prompt and work is incorrect.

EXEMPLARY RESPONSE

58

A hotel has a number of meeting rooms, m , available for events. Each meeting room has 325 chairs. Write an equation to represent c , the total number of chairs, in all of the meeting rooms at the hotel.

Equation $325m = c$

If $m = 7$ use your equation to find the total number of chairs in all of the meeting rooms at the hotel.

Show your work.

$$325 \times 7 = c$$

$$2275 = c$$

Or other valid process

Answer 2275 chairs

GUIDE PAPER 1

Additional

58

A hotel has a number of meeting rooms, m , available for events. Each meeting room has 325 chairs. Write an equation to represent c , the total number of chairs, in all of the meeting rooms at the hotel.

Equation $C=325m$

If $m = 7$ use your equation to find the total number of chairs in all of the meeting rooms at the hotel.

Show your work.

$7 \times 325 = 2275$

Answer

2275

chairs

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. An appropriate equation is written and used to correctly solve for the total number of chairs. This response indicates that the student has used mathematically sound procedures.

GUIDE PAPER 2

58

A hotel has a number of meeting rooms, m , available for events. Each meeting room has 325 chairs. Write an equation to represent c , the total number of chairs, in all of the meeting rooms at the hotel.

Equation

$$M \cdot 325 = c$$

If $m = 7$ use your equation to find the total number of chairs in all of the meeting rooms at the hotel.

Show your work.

325.7

Answer

2275

chairs

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. An appropriate equation is written and used to correctly solve for the total number of chairs. Although a period is used in place of a multiplication sign, this constitutes an inconsequential error that does not detract from the correct solution and the demonstration of a thorough understanding.

GUIDE PAPER 3

58

A hotel has a number of meeting rooms, m , available for events. Each meeting room has 325 chairs. Write an equation to represent c , the total number of chairs, in all of the meeting rooms at the hotel.

Equation $m \times 325 = c$

If $m = 7$ use your equation to find the total number of chairs in all of the meeting rooms at the hotel.

Show your work.

$$325 \times 7 = (7 \times 5 = 35) + (7 \times 20 = 140) + (7 \times 300 = 2100) = 2275$$

Answer

2275

chairs

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. An appropriate equation is written and used to correctly solve for the total number of chairs. This response indicates that the student has used mathematically sound procedures.

GUIDE PAPER 4

58

A hotel has a number of meeting rooms, m , available for events. Each meeting room has 325 chairs. Write an equation to represent c , the total number of chairs, in all of the meeting rooms at the hotel.

Equation m325

If $m = 7$ use your equation to find the total number of chairs in all of the meeting rooms at the hotel.

Show your work.

I multiplied 325 chairs by the number of rooms which was 7 and got 2275 chairs total.

Answer

2275

chairs

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. A correct solution is determined by appropriately multiplying the number of chairs by the number of meeting rooms; however, the work does not contain an equation, only an expression is provided. The response addresses most, but not all aspects of the task.

GUIDE PAPER 5

58

A hotel has a number of meeting rooms, m , available for events. Each meeting room has 325 chairs. Write an equation to represent c , the total number of chairs, in all of the meeting rooms at the hotel.

Equation

$$325 \times 7 = c$$

If $m = 7$ use your equation to find the total number of chairs in all of the meeting rooms at the hotel.

Show your work.

$$\begin{aligned} 325 \times 7 &= 2875 \\ c &= 2875 \end{aligned}$$

Answer

$$2875$$

chairs

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. An appropriate equation is written; however, the value of 7 is used in place of the variable m . The response contains an incorrect solution due to a calculation error, but provides sound procedures.

GUIDE PAPER 6

58

A hotel has a number of meeting rooms, m , available for events. Each meeting room has 325 chairs. Write an equation to represent c , the total number of chairs, in all of the meeting rooms at the hotel.

Equation 325timesM

If $m = 7$ use your equation to find the total number of chairs in all of the meeting rooms at the hotel.

Show your work.

You have to multiply the # of meeting rooms by how many chairs are in each meeting room and it will equal 2275

Answer 2275 chairs

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. A correct solution is determined by appropriately multiplying the number of chairs by the number of meeting rooms; however, only an expression is provided. The response addresses most, but not all aspects of the task.

GUIDE PAPER 7

58

A hotel has a number of meeting rooms, m , available for events. Each meeting room has 325 chairs. Write an equation to represent c , the total number of chairs, in all of the meeting rooms at the hotel.

Equation

$$1M+C=325$$

If $m = 7$ use your equation to find the total number of chairs in all of the meeting rooms at the hotel.

Show your work.

$$7*325=1175$$

Answer

$$1175$$

chairs

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The number of chairs per meeting room is appropriately multiplied by the number of meeting rooms; however, the solution contains a calculation error and the equation provided is incorrect. This response exhibits multiple flaws related to misunderstanding of important aspects of the task.

GUIDE PAPER 8

Additional

58

A hotel has a number of meeting rooms, m , available for events. Each meeting room has 325 chairs. Write an equation to represent c , the total number of chairs, in all of the meeting rooms at the hotel.

Equation

$$7 \times 325 =$$

If $m = 7$ use your equation to find the total number of chairs in all of the meeting rooms at the hotel.

Show your work.

$$\begin{array}{l} 7x \\ 325=3275 \end{array}$$

Answer

$$3275$$

chairs

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. A solution is determined by appropriately multiplying the number of chairs by the number of meeting rooms; however, the solution contains a calculation error and the equation provided is incomplete. This response addresses some elements of the task correctly but reaches an inadequate solution.

GUIDE PAPER 9

58

A hotel has a number of meeting rooms, m , available for events. Each meeting room has 325 chairs. Write an equation to represent c , the total number of chairs, in all of the meeting rooms at the hotel.

Equation

$$c+(m*325)$$

If $m = 7$ use your equation to find the total number of chairs in all of the meeting rooms at the hotel.

Show your work.

(NO STUDENT RESPONSE GIVEN)

Answer

2275

chairs

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. A correct solution is determined by appropriately multiplying the number of chairs by the number of meeting rooms, which is related to the $(m*325)$ term shown; however, the expression provided is incorrect and is not an equation.

GUIDE PAPER 10

58

A hotel has a number of meeting rooms, m , available for events. Each meeting room has 325 chairs. Write an equation to represent c , the total number of chairs, in all of the meeting rooms at the hotel.

Equation

$m \times c$

If $m = 7$ use your equation to find the total number of chairs in all of the meeting rooms at the hotel.

Show your work.

(NO STUDENT RESPONSE GIVEN)

Answer

2275

chairs

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 expression provided does not support the final solution. Although the solution is correct, as per Scoring Policy #3, if students are directed to show work, a correct answer with no work shown receives no credit.

GUIDE PAPER 11

Additional

58

A hotel has a number of meeting rooms, m , available for events. Each meeting room has 325 chairs. Write an equation to represent c , the total number of chairs, in all of the meeting rooms at the hotel.

Equation

$$325/c=m$$

If $m = 7$ use your equation to find the total number of chairs in all of the meeting rooms at the hotel.

Show your work.

$$325/c=m$$

$$325/c=7$$

$$325/7= 46.42857142857143 \text{ rounded } 47$$

Answer

$$47$$

chairs

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. This response contains an incorrect solution obtained using an obviously incorrect procedure.

EXEMPLARY RESPONSE

59

Jimmy and his family are on their way to visit some family friends who live 780 miles away from them. Based on the route they chose, they expect to complete their trip in three days. The distances and average speeds for the first two days driven are shown below.

- First day: 4 hours at an average speed of 60 miles per hour
- Second day: 6 hours at an average speed of 65 miles per hour

If the average speed on the third day is 60 miles per hour, how many more hours will it take for them to reach their family friends' home?

Show your work.

$$4(60) + 6(65) + x(60) = 780$$

$$240 + 390 + 60x = 780$$

$$630 + 60x = 780$$

$$60x = 150$$

$$x = 2.5 \text{ hours}$$

Or other valid process

Answer 2.5 hours

GUIDE PAPER 1

Additional

59

Jimmy and his family are on their way to visit some family friends who live 780 miles away from them. Based on the route they chose, they expect to complete their trip in three days. The distances and average speeds for the first two days driven are shown below.

- First day: 4 hours at an average speed of 60 miles per hour
- Second day: 6 hours at an average speed of 65 miles per hour

If the average speed on the third day is 60 miles per hour, how many more hours will it take for them to reach their family friends' home?

Show your work.

$$\begin{array}{rcl} \text{Day 1} & 240 \text{ miles} \\ \text{Day 2} & 630 \text{ miles} & \begin{array}{r} 780 \\ - 630 \\ \hline 150 \end{array} \\ \text{Day 3} & 150 \text{ miles} & \begin{array}{r} 2.5 \text{ hours} \\ 60 \overline{) 150} \end{array} \end{array}$$

Answer 2.5 hours

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The number of miles traveled on the first two days is correctly calculated and then subtracted from the total miles to determine the number of miles to be traveled on the third day. The speed from the third day is then used to correctly calculate the solution.

GUIDE PAPER 2

59

Jimmy and his family are on their way to visit some family friends who live 780 miles away from them. Based on the route they chose, they expect to complete their trip in three days. The distances and average speeds for the first two days driven are shown below.

- First day: 4 hours at an average speed of 60 miles per hour
- Second day: 6 hours at an average speed of 65 miles per hour

If the average speed on the third day is 60 miles per hour, how many more hours will it take for them to reach their family friends' home?

Show your work.

$$4 \times 60 = 240 \text{ miles}$$

$$6 \times 65 = 390 \text{ miles}$$

$$\begin{array}{r} & 2.5 \\ 60 & \overline{)150} \\ & -120 \\ & \hline 30 \\ & -30 \\ & \hline 0 \end{array}$$

Answer 2.5 hours

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The number of miles to be traveled on the third day is correctly calculated and the speed from the third day is then used to correctly calculate the solution. This response indicates that the student has used mathematically sound procedures.

GUIDE PAPER 3

59

Jimmy and his family are on their way to visit some family friends who live 780 miles away from them. Based on the route they chose, they expect to complete their trip in three days. The distances and average speeds for the first two days driven are shown below.

- First day: 4 hours at an average speed of 60 miles per hour
- Second day: 6 hours at an average speed of 65 miles per hour

If the average speed on the third day is 60 miles per hour, how many more hours will it take for them to reach their family friends' home?

Show your work.

$$\begin{array}{r} 60 \\ \times 4 \\ \hline 240 \end{array} \quad \begin{array}{r} 365 \\ \times 6 \\ \hline 390 \end{array}$$

$$\begin{array}{r} 780 \\ - 630 \\ \hline 150 \end{array}$$

Answer $2\frac{1}{2}$ hours

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The number of miles to be traveled on the third day is correctly calculated and a correct solution is determined, using mathematically sound procedures. The final division is performed mentally, which is acceptable.

GUIDE PAPER 4

59

Jimmy and his family are on their way to visit some family friends who live 780 miles away from them. Based on the route they chose, they expect to complete their trip in three days. The distances and average speeds for the first two days driven are shown below.

- First day: 4 hours at an average speed of 60 miles per hour
- Second day: 6 hours at an average speed of 65 miles per hour

If the average speed on the third day is 60 miles per hour, how many more hours will it take for them to reach their family friends' home?

Show your work.

$$\begin{array}{r} 60 \\ \times 4 \\ \hline 240 \end{array}$$

$$\begin{array}{r} 65 \\ \times 6 \\ \hline 390 \end{array}$$

$$\begin{array}{r} 780 \\ - 630 \\ \hline 150 \end{array}$$

$$\begin{array}{r} 390 \\ + 240 \\ \hline 630 \end{array}$$

Answer 2h 3m hours

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The number of miles to be traveled on the third day is correctly calculated; however, the solution of 2h 3m recorded on the answer blank is incorrect and not supported by the work shown. The response contains an incorrect solution but provides sound reasoning.

GUIDE PAPER 5

59

Jimmy and his family are on their way to visit some family friends who live 780 miles away from them. Based on the route they chose, they expect to complete their trip in three days. The distances and average speeds for the first two days driven are shown below.

- First day: 4 hours at an average speed of 60 miles per hour
- Second day: 6 hours at an average speed of 65 miles per hour

If the average speed on the third day is 60 miles per hour, how many more hours will it take for them to reach their family friends' home?

Show your work.

$$\begin{array}{r} 630 \\ + 60 \text{ 1hr} \\ \hline 690 \\ + 60 \text{ 2hr} \\ \hline 750 \end{array} \qquad \begin{array}{r} 60 \\ \times 4 \\ \hline 240 \\ 65 \\ \times 6 \\ \hline 390 \\ + 240 \\ \hline 630 \end{array}$$

Answer 2 hours

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The number of miles traveled on the first two days is correctly calculated. The speed for the third day is added to the total miles for the first two days until 750 miles is reached; however, 30 miles is unaccounted for and the 2 hours is misinterpreted as the final solution. The response appropriately addresses most, but not all aspects of the task using mathematically sound procedures.

GUIDE PAPER 6

59

Jimmy and his family are on their way to visit some family friends who live 780 miles away from them. Based on the route they chose, they expect to complete their trip in three days. The distances and average speeds for the first two days driven are shown below.

- First day: 4 hours at an average speed of 60 miles per hour
- Second day: 6 hours at an average speed of 65 miles per hour

If the average speed on the third day is 60 miles per hour, how many more hours will it take for them to reach their family friends' home?

Show your work.

~~780~~

$$\begin{array}{r} 60 \\ \times 4 \\ \hline 240 \end{array}$$

$$\begin{array}{r} 65 \\ \times 6 \\ \hline 390 \end{array}$$

$$\begin{array}{r} 240 \\ - 60 \\ \hline 180 \end{array}$$

$$\begin{array}{r} 780 \\ - 630 \\ \hline 150 \end{array}$$

$$\begin{array}{r} 390 \\ + 180 \\ \hline 630 \end{array}$$

Answer 3 hours

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The number of miles to be traveled on the third day is correctly calculated; however, the solution of 3 hours recorded on the answer blank is incorrect and it is unclear how it was obtained. The response contains an incorrect solution but provides sound reasoning.

GUIDE PAPER 7

59

Jimmy and his family are on their way to visit some family friends who live 780 miles away from them. Based on the route they chose, they expect to complete their trip in three days. The distances and average speeds for the first two days driven are shown below.

- First day: 4 hours at an average speed of 60 miles per hour
- Second day: 6 hours at an average speed of 65 miles per hour

If the average speed on the third day is 60 miles per hour, how many more hours will it take for them to reach their family friends' home?

Show your work.

The student has written several calculations that are mostly crossed out with a large diagonal line. One calculation shows the multiplication of 60 by 4, resulting in 240. Another shows the multiplication of 65 by 1, resulting in 65. A third shows the addition of 240 and 65, resulting in 305. Below these, there is a large crossed-out calculation involving 60, 1, and 4, which appears to be a multiplication of 60 by 14, resulting in 840. At the bottom, the student has written "Answer 630 hours".

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. Although the total miles traveled on the first and second day are correctly calculated and added together; it was incorrectly interpreted as the final solution. This response exhibits multiple flaws related to misunderstanding of important aspects of the task. As per Scoring Policy #6, if the student has written more than one response but has crossed some out, raters should score only the response that has not been crossed out.

GUIDE PAPER 8

Additional

59

Jimmy and his family are on their way to visit some family friends who live 780 miles away from them. Based on the route they chose, they expect to complete their trip in three days. The distances and average speeds for the first two days driven are shown below.

- First day: 4 hours at an average speed of 60 miles per hour
- Second day: 6 hours at an average speed of 65 miles per hour

If the average speed on the third day is 60 miles per hour, how many more hours will it take for them to reach their family friends' home?

Show your work.

$$\begin{array}{r} 240 \\ + 390 \\ \hline 630 \end{array}$$
$$\begin{array}{r} 65 \\ \times 6 \\ \hline 390 \end{array}$$

Answer $2\frac{1}{2}$ hours

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The total miles traveled on the first two days is correctly calculated and added together; however, no other work is shown. This response contains the correct solution but required work is limited.

GUIDE PAPER 9

59

Jimmy and his family are on their way to visit some family friends who live 780 miles away from them. Based on the route they chose, they expect to complete their trip in three days. The distances and average speeds for the first two days driven are shown below.

- First day: 4 hours at an average speed of 60 miles per hour
- Second day: 6 hours at an average speed of 65 miles per hour

If the average speed on the third day is 60 miles per hour, how many more hours will it take for them to reach their family friends' home?

Show your work.

$$\begin{array}{r} \overset{3}{\cancel{6}} \\ \times 4 \\ \hline \cancel{24}0 \\ \end{array}$$
$$\begin{array}{r} \overset{3}{\cancel{6}} \\ \times 6 \\ \hline \cancel{3}90 \\ \end{array}$$
$$\begin{array}{r} 390 \\ - 240 \\ \hline 150 \end{array}$$

37

Answer 2.5 hours

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The number of miles traveled on the first and second day is correctly calculated; however, the difference between the first day and second day is determined. This response addresses some elements of the task correctly but provides reasoning that is faulty.

GUIDE PAPER 10

59

Jimmy and his family are on their way to visit some family friends who live 780 miles away from them. Based on the route they chose, they expect to complete their trip in three days. The distances and average speeds for the first two days driven are shown below.

- First day: 4 hours at an average speed of 60 miles per hour
- Second day: 6 hours at an average speed of 65 miles per hour

If the average speed on the third day is 60 miles per hour, how many more hours will it take for them to reach their family friends' home?

Show your work.

$$\begin{array}{r} 6 \\ \times 4 \\ \hline 240 \end{array}$$
$$\begin{array}{r} 780 \\ -240 \\ \hline 540 \end{array}$$

Answer 540 hours

Score Point 0 (out of 3 points)

The total miles traveled on the first day is correctly stated; however, the operation provided to show this calculation contains a transcription error for the speed traveled on the first day ($6 \times 4 = 240$), which is technically not calculated correctly. This value is subtracted from the total distance, ignoring the total miles traveled on the second day, and the result is provided as the final solution. Holistically the response is not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

GUIDE PAPER 11

Additional

59

Jimmy and his family are on their way to visit some family friends who live 780 miles away from them. Based on the route they chose, they expect to complete their trip in three days. The distances and average speeds for the first two days driven are shown below.

- First day: 4 hours at an average speed of 60 miles per hour
- Second day: 6 hours at an average speed of 65 miles per hour

If the average speed on the third day is 60 miles per hour, how many more hours will it take for them to reach their family friends' home?

Show your work.

21

Days	1	2	3	4	5	6
Hours	4	6	8	10	12	14
miles	60	65	70	75	80	85

Answer 8 hours

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 table provided incorrectly infers a pattern of 2 more hours at a speed of 5 more miles per hour each additional day.

EXEMPLARY RESPONSE

60

A right rectangular prism has a length of $2\frac{1}{2}$ feet, a width of 3 feet, and a height of $1\frac{1}{2}$ feet. Unit cubes with side lengths of $\frac{1}{2}$ foot are added to completely fill the prism with no space remaining. What is the volume, in cubic feet, of the right rectangular prism?

Show your work.

$$l \times w \times h = V$$

$$2\frac{1}{2} \times 3 \times 1\frac{1}{2} = 11\frac{1}{4}$$

Or other valid process

Answer 11 $\frac{1}{4}$ cubic feet

How many $\frac{1}{2}$ -foot unit cubes can be added to fill the prism completely? Use what you know about unit cubes or the side lengths of prisms to show your work or explain your answer.

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

$$11\frac{1}{4} \div \frac{1}{8} = 11\frac{1}{4} \times 8 = 90$$

Or other valid process

Answer 90 unit cubes

GUIDE PAPER 1

Additional

60

A right rectangular prism has a length of $2\frac{1}{2}$ feet, a width of 3 feet, and a height of $1\frac{1}{2}$ feet. Unit cubes with side lengths of $\frac{1}{2}$ foot are added to completely fill the prism with no space remaining. What is the volume, in cubic feet, of the right rectangular prism?

Show your work.

$$\begin{aligned}V &= LWH \\V &= 2\frac{1}{2} \cdot \frac{1}{2} \cdot 3 \\V &= \frac{11}{4}\end{aligned}$$

Answer $\frac{11}{4}$ cubic feet

How many $\frac{1}{2}$ -foot unit cubes can be added to fill the prism completely? Use what you know about unit cubes or the side lengths of prisms to show your work or explain your answer.

$$\begin{aligned}\frac{1}{4} \div \frac{1}{8} &= 8 \\V &= LWH \\V &= \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \\V &= \frac{1}{8} \\11\frac{1}{4} &= \text{Volume of prism}\end{aligned}$$

Cube = $\frac{1}{2}$ foot sides

Answer 90 unit cubes

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The volumes of the rectangular prism and the unit cube are correctly calculated. The volume of the rectangular prism is then divided by the volume of a unit cube to correctly solve for the number of unit cubes that will fit in the prism. This response indicates that the student has completed the task correctly, using mathematically sound procedures.

GUIDE PAPER 2

60

A right rectangular prism has a length of $2\frac{1}{2}$ feet, a width of 3 feet, and a height of $1\frac{1}{2}$ feet. Unit cubes with side lengths of $\frac{1}{2}$ foot are added to completely fill the prism with no space remaining. What is the volume, in cubic feet, of the right rectangular prism?

Show your work.

$$3 \cdot 2\frac{1}{2} = 7\frac{1}{2}$$

$$7\frac{1}{2} \cdot 1\frac{1}{2} = 11\frac{1}{4}$$

Answer 11 $\frac{1}{4}$ cubic feet

How many $\frac{1}{2}$ -foot unit cubes can be added to fill the prism completely? Use what you know about unit cubes or the side lengths of prisms to show your work or explain your answer.

I know $(\frac{1}{2})^3$ is $\frac{1}{8}$, and $11\frac{1}{4} \div \frac{1}{8}$ is the same as $11\frac{1}{4} \cdot 8$, so I multiplied them to get the answer of 90 unit cubes.

Answer 90 unit cubes

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The volumes of the rectangular prism and the unit cube are correctly calculated. The volume of the rectangular prism is then divided by the volume of a unit cube to correctly solve for the number of unit cubes that will fit in the prism. This response is complete and correct.

GUIDE PAPER 3

60

A right rectangular prism has a length of $2\frac{1}{2}$ feet, a width of 3 feet, and a height of $1\frac{1}{2}$ feet. Unit cubes with side lengths of $\frac{1}{2}$ foot are added to completely fill the prism with no space remaining. What is the volume, in cubic feet, of the right rectangular prism?

Show your work.

$$\frac{5}{2} \div \frac{1}{2} = \frac{5}{2} \times \frac{2}{1} = \frac{5}{1} = 5 \quad \frac{3}{1} \div \frac{1}{2} = \frac{3}{1} \times \frac{2}{1} = \frac{6}{1} = 6$$

$$\frac{3}{2} \div \frac{1}{2} = \frac{3}{2} \times \frac{2}{1} = \frac{6}{2} = 3 \quad 2\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = 1\frac{1}{4}$$

$$V = lwh \quad V = 5 \cdot 6 \cdot 3 \\ V = 30 \times 3 \\ V = 90$$

Answer $11\frac{1}{4}$ cubic feet

How many $\frac{1}{2}$ -foot unit cubes can be added to fill the prism completely? Use what

you know about unit cubes or the side lengths of prisms to show your work or

explain your answer.

$$V = S \times 6 \times 3 \\ V = 90 \text{ in.}^3$$

Answer 90 unit cubes

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The volume of the rectangular prism is correctly calculated. The number of unit cubes that will fit along each side of the prism is calculated and then multiplied to determine the correct total number of unit cubes per prism.

GUIDE PAPER 4

60

A right rectangular prism has a length of $2\frac{1}{2}$ feet, a width of 3 feet, and a height of $1\frac{1}{2}$ feet. Unit cubes with side lengths of $\frac{1}{2}$ foot are added to completely fill the prism with no space remaining. What is the volume, in cubic feet, of the right rectangular prism?

Show your work.

$$L = 2.5 \quad 2.5 \times 3 \times 1.5 = 11.25$$
$$W = 3$$
$$H = 1.5$$

Answer 11.25 cubic feet

How many $\frac{1}{2}$ -foot unit cubes can be added to fill the prism completely? Use what you know about unit cubes or the side lengths of prisms to show your work or explain your answer.

$$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4} \times \frac{6}{1} = \frac{6}{4} = 1\frac{2}{4} = 1\frac{1}{2}$$
$$\overbrace{1.5 \times 1.5}^{7.5} \overbrace{11.25}^{7.5}$$

Check!

$$\begin{array}{r} 7.5 \\ \times 1.5 \\ \hline 11.25 \end{array}$$

Answer 7.5 unit cubes

Score Point 2 (out of 3 points)

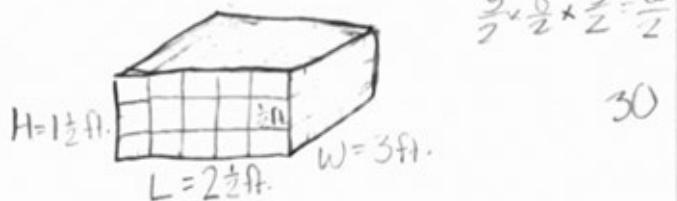
This response demonstrates a partial understanding of the mathematical concepts in the task. The volume of the rectangular prism is correctly calculated; however, the volume of a unit cube is not calculated correctly, the product of two side lengths is multiplied by 6 rather than by $\frac{1}{2}$. The number of unit cubes is correctly calculated using the incorrect volume of a unit cube. The response addresses most, but not all aspects of the task and reflects some minor misunderstanding of the underlying mathematical concepts.

GUIDE PAPER 5

60

A right rectangular prism has a length of $2\frac{1}{2}$ feet, a width of 3 feet, and a height of $1\frac{1}{2}$ feet. Unit cubes with side lengths of $\frac{1}{2}$ foot are added to completely fill the prism with no space remaining. What is the volume, in cubic feet, of the right rectangular prism?

Show your work.



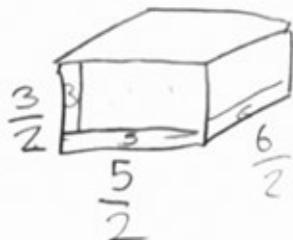
$$V = L \times W \times H$$

Answer 45 cubic feet

$$V = 2\frac{1}{2} \times 3 \times 1\frac{1}{2}$$

$$V = \frac{5}{2} \times \frac{6}{2} \times \frac{3}{2} = \frac{90}{2} = 45$$

How many $\frac{1}{2}$ -foot unit cubes can be added to fill the prism completely? Use what you know about unit cubes or the side lengths of prisms to show your work or explain your answer.



Answer 90 unit cubes

$$3 \times 5 \times 6 =$$

Score Point 2 (out of 3 points)

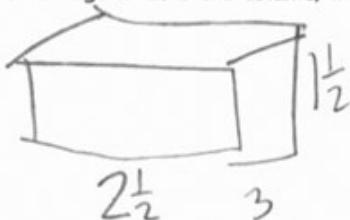
This response demonstrates a partial understanding of the mathematical concepts in the task. A correct procedure is followed to determine the volume of the rectangular prism ($V = 2\frac{1}{2} \times 3 \times 1\frac{1}{2}$); however, a calculation error results in an incorrect solution. A diagram of the prism is used to count the number of unit cubes that will fit on each side of the prism and then those numbers are multiplied to determine the correct total number of unit cubes per prism. This response contains an incorrect solution but provides sound procedures.

GUIDE PAPER 6

60

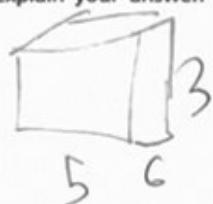
A right rectangular prism has a length of $2\frac{1}{2}$ feet, a width of 3 feet, and a height of $1\frac{1}{2}$ feet. Unit cubes with side lengths of $\frac{1}{2}$ foot are added to completely fill the prism with no space remaining. What is the volume, in cubic feet, of the right rectangular prism?

Show your work.



Answer 1125 cubic feet

How many $\frac{1}{2}$ -foot unit cubes can be added to fill the prism completely? Use what you know about unit cubes or the side lengths of prisms to show your work or explain your answer.



Answer 90?? unit cubes

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The volume of the rectangular prism is calculated correctly and a drawing of the rectangular prism with a label on each side is provided. Another diagram is provided and each side is labeled with a length of the prism and how many $\frac{1}{2}$ -foot unit cubes will fit on each side of the rectangular prism ($1\frac{1}{2} \rightarrow 3-\frac{1}{2}$ cubes, $3 \rightarrow 6-\frac{1}{2}$ cubes, $2\frac{1}{2} \rightarrow 5-\frac{1}{2}$ cubes); however, no additional operation is shown to support how the correct solution is obtained. The response appropriately addresses most, but not all aspects of the task.

GUIDE PAPER 7

60

A right rectangular prism has a length of $2\frac{1}{2}$ feet, a width of 3 feet, and a height of $1\frac{1}{2}$ feet. Unit cubes with side lengths of $\frac{1}{2}$ foot are added to completely fill the prism with no space remaining. What is the volume, in cubic feet, of the right rectangular prism?

Show your work.

$$\begin{array}{l} l = 2\frac{1}{2} \quad 2\frac{1}{2} \cdot 3 \cdot 1\frac{1}{2} = \\ w = 3 \quad \frac{5}{2} \cdot \frac{3}{1} \cdot \frac{3}{2} = \frac{45}{4} = 11\frac{1}{4} \\ h = 1\frac{1}{2} \end{array}$$

$$A_0 = \frac{1}{2}$$

$$11\frac{1}{4} + 1 = 12\frac{1}{4}$$

$$\begin{array}{r} 11 \\ 4 \overline{)45} \\ \underline{-4} \\ 5 \\ 4 \overline{)5} \\ \underline{-4} \\ 1 \end{array}$$

$$\begin{array}{r} 11 \\ 4 \overline{)44} \\ \underline{-4} \\ 4 \end{array}$$

Answer $12\frac{1}{4}$ cubic feet

How many $\frac{1}{2}$ -foot unit cubes can be added to fill the prism completely? Use what you know about unit cubes or the side lengths of prisms to show your work or explain your answer.

You would take one unit cube and divide that into 100, and you should get 200 unit cubes.

Answer 200 unit cubes

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The volume of the rectangular prism is correctly shown ($2\frac{1}{2} \times 3 \times 1\frac{1}{2}$) and a correct solution of $11\frac{1}{4}$ is calculated; however, an additional 1 is added to the answer resulting in an incorrect final solution of $12\frac{1}{4}$. The work shown for the number of unit cubes per prism is incorrect and incoherent. This response exhibits multiple flaws related to misunderstanding of important aspects of the task.

GUIDE PAPER 8

Additional

60

A right rectangular prism has a length of $2\frac{1}{2}$ feet, a width of 3 feet, and a height of $1\frac{1}{2}$ feet. Unit cubes with side lengths of $\frac{1}{2}$ foot are added to completely fill the prism with no space remaining. What is the volume, in cubic feet, of the right rectangular prism?

Show your work.

L-2.5

W-3

h 1.5

$$\begin{array}{r} 2 \\ \times 1.5 \\ \hline 12.5 \\ 25.0 \\ \hline 37.5 \end{array}$$

Answer 112.5 cubic feet

How many $\frac{1}{2}$ -foot unit cubes can be added to fill the prism completely? Use what you know about unit cubes or the side lengths of prisms to show your work or explain your answer.

$$\begin{array}{r} 26 \\ \times 10 \\ \hline 12 \\ 12 \\ \hline 0 \end{array}$$

Answer 26 unit cubes

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The volume of the rectangular prism is correctly determined; however, the misplacement of the decimal point leads to an incorrect final solution for the volume of the prism. The volume of the prism is incorrectly divided by the length of one of the unit cubes sides. This response exhibits multiple flaws related to misunderstanding of important aspects of the task.

GUIDE PAPER 9

60

A right rectangular prism has a length of $2\frac{1}{2}$ feet, a width of 3 feet, and a height of $1\frac{1}{2}$ feet. Unit cubes with side lengths of $\frac{1}{2}$ foot are added to completely fill the prism with no space remaining. What is the volume, in cubic feet, of the right rectangular prism?

Show your work.



Answer 11 1/4 cubic feet

How many $\frac{1}{2}$ -foot unit cubes can be added to fill the prism completely? Use what you know about unit cubes or the side lengths of prisms to show your work or explain your answer.

Answer 12 1/2 unit cubes

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The volume of the rectangular prism is calculated correctly and a drawing of the rectangular prism with a label on each side is provided; however, no operations are shown to support how the solution is obtained. This response contains the correct volume for the rectangular prism but required work is limited. The number of unit cubes per prism is incorrect and no work is provided.

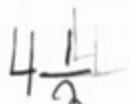
GUIDE PAPER 10

60

A right rectangular prism has a length of $2\frac{1}{2}$ feet, a width of 3 feet, and a height of $1\frac{1}{2}$ feet. Unit cubes with side lengths of $\frac{1}{2}$ foot are added to completely fill the prism with no space remaining. What is the volume, in cubic feet, of the right rectangular prism?

Show your work.

$$2\frac{1}{2} + 1\frac{1}{2} + \frac{1}{2} = 3\frac{3}{2}$$
$$\frac{5}{2} + \frac{3}{2} + \frac{1}{2} = \frac{9}{2} = 4\frac{1}{2}$$



Answer 4 1/2 cubic feet

How many $\frac{1}{2}$ -foot unit cubes can be added to fill the prism completely? Use what you know about unit cubes or the side lengths of prisms to show your work or explain your answer.

3

Answer 3 unit cubes

Score Point 0 (out of 3 points)

All of the given dimensions are improperly added together; holistically this response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task.

GUIDE PAPER 11

Additional

60

A right rectangular prism has a length of $2\frac{1}{2}$ feet, a width of 3 feet, and a height of $1\frac{1}{2}$ feet. Unit cubes with side lengths of $\frac{1}{2}$ foot are added to completely fill the prism with no space remaining. What is the volume, in cubic feet, of the right rectangular prism?

Show your work.

$$\frac{3}{2} \times \frac{5}{2} = \frac{15}{4}$$

=

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

Answer $3\frac{3}{4}$ cubic feet

How many $\frac{1}{2}$ -foot unit cubes can be added to fill the prism completely? Use what you know about unit cubes or the side lengths of prisms to show your work or explain your answer.

$$\frac{15}{4} \times \frac{1}{2} = \frac{15}{8}$$

=

$$1\frac{7}{8}$$

Answer $1\frac{7}{8}$ unit cubes

Score Point 0 (out of 3 points)

Although two of the given dimensions are properly multiplied, holistically this response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task.

EXEMPLARY RESPONSE

61

The table below shows the elevations at which different artifacts were found during an archeological dig.

Artifact	Elevation
arrow head	15 feet above sea level
bone	721 feet above sea level
clay bowl	sea level
necklace	462 feet above sea level
woven basket	1,200 feet below sea level

Write the name of each artifact and the elevation at which each artifact was found using a positive integer, zero, or negative integer.

arrow head = +15; bone = +721; clay bowl = 0; necklace = +462;

woven basket = -1200

Or other valid response

Explain how you determined if an elevation required a positive integer, zero, or negative integer.

Artifacts found above sea level have a positive integer;

artifacts found at sea level are zero; artifacts found below

sea level have a negative integer. Or other valid response

GUIDE PAPER 1

Additional

61

The table below shows the elevations at which different artifacts were found during an archeological dig.

Artifact	Elevation
arrow head	15 feet above sea level
bone	721 feet above sea level
clay bowl	sea level
necklace	462 feet above sea level
woven basket	1,200 feet below sea level

Write the name of each artifact and the elevation at which each artifact was found using a positive integer, zero, or negative integer.

Arrow head= 15 ft
Bone=721 ft
Clay bowl=0 ft
Necklace=462 ft
Woven basket= -1200 ft

Explain how you determined if an elevation required a positive integer, zero, or negative integer.

To find the answers to this problem you need to know that above sea level means that the numbers are positive so you don't add anything to the beginning of the number. Below sea level means the number is negative so you put a negative sign in front of the number. At sea level means that you make the number zero because it is like the starting point and it isn't negative or positive.

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The artifacts are listed correctly with a positive integer for above sea level, zero for at sea level and a negative integer for below sea level with a correct explanation of how the student determined if the integers are positive or negative or zero. This response indicates that the student has used mathematically sound procedures.

GUIDE PAPER 2

61

The table below shows the elevations at which different artifacts were found during an archeological dig.

Artifact	Elevation
arrow head	15 feet above sea level
bone	721 feet above sea level
clay bowl	sea level
necklace	462 feet above sea level
woven basket	1,200 feet below sea level

Write the name of each artifact and the elevation at which each artifact was found using a positive integer, zero, or negative integer.

-1,200, 0, +15, +462, +721

Explain how you determined if an elevation required a positive integer, zero, or negative integer.

If a elevation requires a positive interger it has to say above sea level, for it to be zero it has to say sea level, and if it is a negative interger it has to say below sea level

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The elevations are listed correctly with a plus or negative sign as indicated and a zero for sea level. This response contains sufficient work to demonstrate a thorough understanding of the mathematical concepts.

GUIDE PAPER 3

61

The table below shows the elevations at which different artifacts were found during an archeological dig.

Artifact	Elevation
arrow head	15 feet above sea level
bone	721 feet above sea level
clay bowl	sea level
necklace	462 feet above sea level
woven basket	1,200 feet below sea level

Write the name of each artifact and the elevation at which each artifact was found using a positive integer, zero, or negative integer.

Arrow Head: 15 ft
Bone: 721 ft
Clay Bowl: 0 ft
Necklace: 462 ft
Woven Basket: -1,200 ft

Explain how you determined if an elevation required a positive integer, zero, or negative integer.

I determined if an elevation required a positive integer, zero, or negative integer by looking at the elevation. If the elevation is below sea level it has a negative integer. If the elevation is above sea level it has a positive integer. If the elevation is on sea level it has a zero for its elevation.

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The artifacts are listed correctly with a positive integer for above sea level, zero for at sea level and a negative integer for below sea level with a correct explanation of how the student determined if the integers were positive, negative or zero. This response indicates that the student has used mathematically sound procedures.

GUIDE PAPER 4

61

The table below shows the elevations at which different artifacts were found during an archeological dig.

Artifact	Elevation
arrow head	15 feet above sea level
bone	721 feet above sea level
clay bowl	sea level
necklace	462 feet above sea level
woven basket	1,200 feet below sea level

Write the name of each artifact and the elevation at which each artifact was found using a positive integer, zero, or negative integer.

arrow
head +15

bone +721

clay bowl 0

necklace +462

woven basket -1,200

Explain how you determined if an elevation required a positive integer, zero, or negative integer.

The words above , below or sea level .

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The artifacts are listed correctly with a positive integer for above sea level, zero for at sea level and a negative integer for below sea level. The explanation is incomplete as to how the student determined if it was a positive, negative or zero integer. This response appropriately addresses most, but not all aspects of the task.

GUIDE PAPER 5

- 61 The table below shows the elevations at which different artifacts were found during an archeological dig.

Artifact	Elevation
arrow head	15 feet above sea level
bone	721 feet above sea level
clay bowl	sea level
necklace	462 feet above sea level
woven basket	1,200 feet below sea level

Write the name of each artifact and the elevation at which each artifact was found using a positive integer, zero, or negative integer.

arrow head:15ft.
bone:721ft.
clay bowl:0ft.
necklace:-462ft.
woven basket:-1,200ft.

Explain how you determined if an elevation required a positive integer, zero, or negative integer.

Sea level is equal to 0 so ,anything above sea level is positive and anything below than sea level is negative.

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. All of the artifacts are listed correctly with the exception of the necklace, which should have a positive sign by the integer. The explanation provides sound reasoning on how the negative, positive and zero are determined. This response contains an incorrect solution but provides sound reasoning and explanation.

GUIDE PAPER 6

- 61 The table below shows the elevations at which different artifacts were found during an archeological dig.

Artifact	Elevation
arrow head	15 feet above sea level
bone	721 feet above sea level
clay bowl	sea level
necklace	462 feet above sea level
woven basket	1,200 feet below sea level

Write the name of each artifact and the elevation at which each artifact was found using a positive integer, zero, or negative integer.

Arrow Head 15 Feet Bone 721 Feet Clay Bowl 0 Feet Necklace 462 Feet Woven Basket -1,200 Feet

Explain how you determined if an elevation required a positive integer, zero, or negative integer.

Below Sea level means a negative integer and above sea level means a positive integer.

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The artifacts are listed correctly with a positive integer for above sea level, zero for at sea level and a negative integer for below sea level. The explanation is incomplete as it does not address the zero at sea level. This response appropriately addresses most, but not all aspects of the task.

GUIDE PAPER 7

61

The table below shows the elevations at which different artifacts were found during an archeological dig.

Artifact	Elevation
arrow head	15 feet above sea level
bone	721 feet above sea level
clay bowl	sea level
necklace	462 feet above sea level
woven basket	1,200 feet below sea level

Write the name of each artifact and the elevation at which each artifact was found using a positive integer, zero, or negative integer.

(Arrow Head: +15ft); (Bone:+721ft); (Clay Bowl:0ft); (Necklace:+462ft); (Woven Basket:-1,200ft)

Explain how you determined if an elevation required a positive integer, zero, or negative integer.

(NO STUDENT RESPONSE GIVEN)

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The artifacts are listed correctly with a positive integer for above sea level, zero for at sea level and a negative integer for below sea level; however, the explanation is missing. This response contains the correct solution but required work is limited.

GUIDE PAPER 8

Additional

61

The table below shows the elevations at which different artifacts were found during an archeological dig.

Artifact	Elevation
arrow head	15 feet above sea level
bone	721 feet above sea level
clay bowl	sea level
necklace	462 feet above sea level
woven basket	1,200 feet below sea level

Write the name of each artifact and the elevation at which each artifact was found using a positive integer, zero, or negative integer.

CLAy bowl 0,arrow head -15,bone 721,necklace 462

Explain how you determined if an elevation required a positive integer, zero, or negative integer.

if it was below sea leval it was a negative integer.if it was above sea level it was a positive integer.

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The clay bowl, bone, and necklace artifacts are all listed correctly; however, the arrow head incorrectly has a negative sign and the woven basket is missing altogether. The explanation has correctly identified below as negative and above as positive; however, at sea level is not addressed. This response exhibits multiple flaws related to misunderstanding of important aspects of the task.

GUIDE PAPER 9

61

The table below shows the elevations at which different artifacts were found during an archeological dig.

Artifact	Elevation
arrow head	15 feet above sea level
bone	721 feet above sea level
clay bowl	sea level
necklace	462 feet above sea level
woven basket	1,200 feet below sea level

Write the name of each artifact and the elevation at which each artifact was found using a positive integer, zero, or negative integer.

arrow head=+15
bone=+721
clay bowl=0
necklace=-462
woven basket=-1,200

Explain how you determined if an elevation required a positive integer, zero, or negative integer.

by the text telling me below or above sea level. 0 meant on sea level

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. All of the artifacts are listed correctly with the exception of the necklace, which should have a positive sign by the integer. The explanation for how the zero is determined is correct; however, the explanation for how the positive or negative integers are determined is incomplete. This response addresses some elements of the task correctly but reaches an inadequate solution and provides reasoning that is incomplete.

GUIDE PAPER 10

61

The table below shows the elevations at which different artifacts were found during an archeological dig.

Artifact	Elevation
arrow head	15 feet above sea level
bone	721 feet above sea level
clay bowl	sea level
necklace	462 feet above sea level
woven basket	1,200 feet below sea level

Write the name of each artifact and the elevation at which each artifact was found using a positive integer, zero, or negative integer.

0-0

Explain how you determined if an elevation required a positive integer, zero, or negative integer.

sea level

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 response is incoherent and incorrect.

GUIDE PAPER 11

Additional

61

The table below shows the elevations at which different artifacts were found during an archeological dig.

Artifact	Elevation
arrow head	15 feet above sea level
bone	721 feet above sea level
clay bowl	sea level
necklace	462 feet above sea level
woven basket	1,200 feet below sea level

Write the name of each artifact and the elevation at which each artifact was found using a positive integer, zero, or negative integer.

15 above sea level arrow head 721 above sea level bone 462 above sea level necklace sea level clay bowl 1,200 below sea level woven basket

Explain how you determined if an elevation required a positive integer, zero, or negative integer.

on the chart it says if it is below sea level or above sea level or at sea level

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 response only copies the chart from the prompt.