



***New York State
Testing Program***

2022

Mathematics Test

Grade 6

Scoring Leader Materials

Training Set

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

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

2-Point Holistic Rubric

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

3-Point Holistic Rubric

3 Points	<p>A 3-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 Points	<p>A 2-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 1-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 Points*	<p>A 0-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).

2022 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 space, the student should still receive full credit.
3. If students are directed to show work or provide an explanation, a correct answer with **no** work shown or **no** explanation provided, 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. If the student provides more than one response, but does not indicate which response is to be considered the correct response and none have been crossed out, the student shall not receive full credit.
8. If the student makes a conceptual error (that is an error in understanding rather than an arithmetic or computational error), that student shall not receive more than 50% credit.
9. Trial-and-error responses are **not** subject to Scoring Policy #6 above, since crossing out is part of the trial-and-error process.
10. 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.
11. In questions requiring number sentences, the number sentences must be written horizontally.
12. When measuring angles with a protractor, there is a +/- 5 degrees deviation allowed of the true measure.
13. 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.

Two students, Student A and Student B, claim to know the correct representation of the expression $\frac{9}{y}(3t)$.

- Student A represents the expression as the product of 9 and y times the product of 3 and t .
- Student B represents the expression as the quotient of 9 and y times the sum of 3 and t .

Both students' claims are incorrect. What makes each representation incorrect?

Explain your answer.

EXEMPLARY RESPONSE

39

Two students, Student A and Student B, claim to know the correct representation of the expression $\frac{9}{y}(3t)$.

- Student A represents the expression as the product of 9 and y times the product of 3 and t .
- Student B represents the expression as the quotient of 9 and y times the sum of 3 and t .

Both students' claims are incorrect. What makes each representation incorrect?

Explain your answer.

Student A's claim is incorrect because $\frac{9}{y}$ is division, and it should be represented as "the quotient of 9 and y ."

and

Student B's claim is incorrect because $3t$ is multiplication, and it should be represented as "the product of 3 and t ."

or other valid explanation

Two students, Student A and Student B, claim to know the correct representation of the expression $\frac{9}{y}(3t)$.

- Student A represents the expression as the product of 9 and y times the product of 3 and t .
- Student B represents the expression as the quotient of 9 and y times the sum of 3 and t .

Both students' claims are incorrect. What makes each representation incorrect?

Explain your answer.

In student A's expression it said the product of 9 and y which is $9y$, and it should be the quotient of 9 and y which is $9/y$. Student B's expression said the sum of 3 and t which is $3+t$, it should have been the product of 3 and t , making it be $3t$.

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The location of each mistake is correctly identified, and the mistakes are correctly explained. The explanation is complete and correct.

GUIDE PAPER 2

39

Two students, Student A and Student B, claim to know the correct representation of the expression $\frac{9}{y}(3t)$.

- Student A represents the expression as the product of 9 and y times the product of 3 and t .
- Student B represents the expression as the quotient of 9 and y times the sum of 3 and t .

Both students' claims are incorrect. What makes each representation incorrect?

Explain your answer.

The students' claims are incorrect because student A read the first part of the expression wrong while student B read the second part of the expression wrong. The correct representation was the quotient of 9 and y times the product of 3 and t .

$$\frac{9}{y}(3t)$$

The quotient of 9 and y times the product of 3 and t .

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The location of each mistake is correctly identified, and a correct representation of the expression is provided. The explanation is complete and correct.

GUIDE PAPER 3

39

Two students, Student A and Student B, claim to know the correct representation of the expression $\frac{9}{y}(3t)$.

- Student A represents the expression as the product of 9 and y times the product of 3 and t .
- Student B represents the expression as the quotient of 9 and y times the sum of 3 and t .

Both students' claims are incorrect. What makes each representation incorrect?

Explain your answer.

Student A is wrong because $\frac{9}{y}(3t)$ is the quotient of 9 and y times the product of 3 and t . Student B is wrong because Student B represents $\frac{9}{y}(3t)$ as the quotient of 9 and y times the sum of 3 and t when the actual expression is the quotient of 9 and y times the product of 3 and t .

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The location of each mistake is correctly identified, and the mistakes are correctly explained. The explanation is complete and correct.

GUIDE PAPER 4

39

Two students, Student A and Student B, claim to know the correct representation of the expression $\frac{9}{y}(3t)$.

- Student A represents the expression as the product of 9 and y times the product of 3 and t .
- Student B represents the expression as the quotient of 9 and y times the sum of 3 and t .

Both students' claims are incorrect. What makes each representation incorrect?

Explain your answer.

They both are incorrect. The statement would be the quotient of 9 and y times the product of 3 and t . This is because $\frac{9}{y}$ means $9 \div y$ and $(3t)$ means $3 \cdot t$. The expression is, $9 \div y \cdot 3 \cdot t$.

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. Although a correct representation of the expression is provided, the explanation is incomplete: the specific location of each student's mistake is not sufficiently identified. This response correctly addresses only some elements of the task.

GUIDE PAPER 5

39

Two students, Student A and Student B, claim to know the correct representation of the

expression $\frac{9}{y}(3t)$.

- Student A represents the expression as the product of 9 and y times the product of 3 and t .
- Student B represents the expression as the quotient of 9 and y times the sum of 3 and t .

Both students' claims are incorrect. What makes each representation incorrect?

Explain your answer.

The thing that makes both student's claims incorrect is that they represented the answer incorrect. Student A should have put the "total" instead of the word "product" at first. Student B should have put the "product" instead of the "sum".

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The mistake in Student B's claim is correctly identified and explained; however, Student A's mistake is incorrectly explained. This response correctly addresses only some elements of the task.

GUIDE PAPER 6

39

Two students, Student A and Student B, claim to know the correct representation of the expression $\frac{9}{y}(3t)$.

- Student A represents the expression as the product of 9 and y times the product of 3 and t .
- Student B represents the expression as the quotient of 9 and y times the sum of 3 and t .

Both students' claims are incorrect. What makes each representation incorrect?

Explain your answer.

Both of them are wrong because when 2 numbers are in a fraction form you have to divide them. So the expression would look like.

9 divided by y times the product of 3 and t .

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. A correct representation of the expression is provided; however, the error of incorrectly representing $\frac{9}{y}$ term is not associated with Student A, and the specific location of Student B's error is not identified. This response correctly addresses only some elements of the task.

GUIDE PAPER 7

39

Two students, Student A and Student B, claim to know the correct representation of the expression $\frac{9}{y}(3t)$.

- Student A represents the expression as the product of 9 and y times the product of 3 and t .
- Student B represents the expression as the quotient of 9 and y times the sum of 3 and t .

Both students' claims are incorrect. What makes each representation incorrect?

Explain your answer.

The representation that makes each of the both students incorrect is that both of them have to multiply the 3 and the t to the 9 and the y . if they had make that correction probaly their answer would be right.

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 location of errors is not identified, and the explanation is vague and insufficiently explains the errors. Holistically, this response shows no overall understanding.

Two students, Student A and Student B, claim to know the correct representation of the expression $\frac{9}{y}(3t)$.

- Student A represents the expression as the product of 9 and y times the product of 3 and t .
- Student B represents the expression as the quotient of 9 and y times the sum of 3 and t .

Both students' claims are incorrect. What makes each representation incorrect?

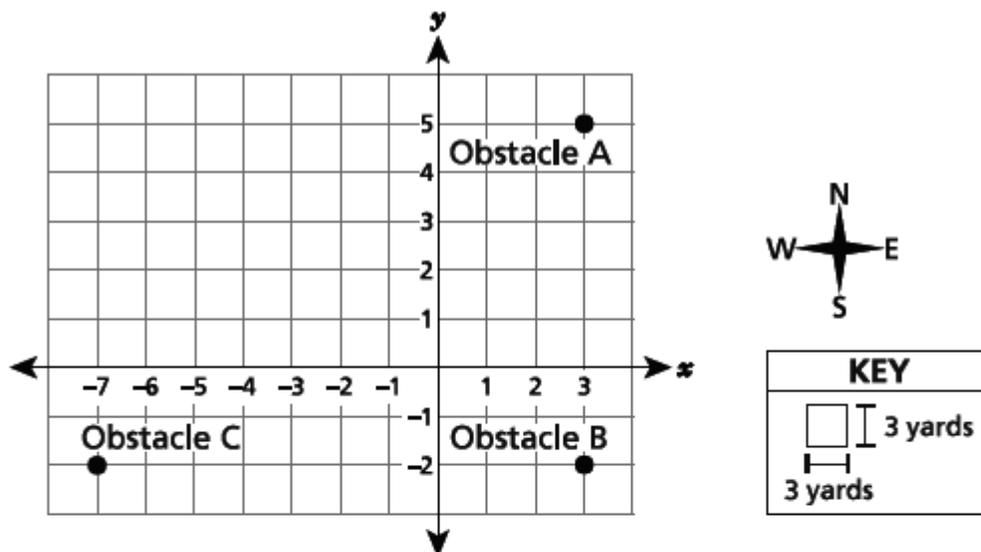
Explain your answer.

What makes each claim because $\frac{9}{y}$ times the product of 3 and t is not right nor is 9 and y times the sum of 3 and t .

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 mistakes are not identified, and the explanation only restates the prompt that both claims are incorrect.

A track coach creates an obstacle course for his team. The coach plots the locations of three obstacles on the coordinate plane shown below.



Each unit on the coordinate plane represents 3 yards. A student starts at Obstacle A, then runs south to Obstacle B, and then runs west to Obstacle C. What is the total distance, in yards, the student runs to get from Obstacle A to Obstacle C?

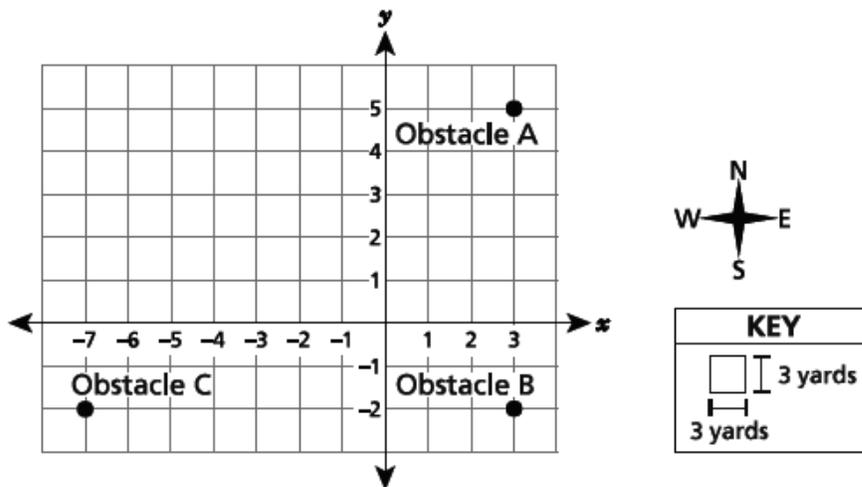
Show your work.

Answer _____ yards

EXEMPLARY RESPONSE

40

A track coach creates an obstacle course for his team. The coach plots the locations of three obstacles on the coordinate plane shown below.



Each unit on the coordinate plane represents 3 yards. A student starts at Obstacle A, then runs south to Obstacle B, and then runs west to Obstacle C. What is the total distance, in yards, the student runs to get from Obstacle A to Obstacle C?

Show your work.

$$A \text{ to } B: 5 + |-2| = 7 \text{ units}$$

$$7 \times 3 = 21 \text{ yards}$$

$$B \text{ to } C: 3 + |-7| = 10 \text{ units}$$

$$10 \times 3 = 30 \text{ yards}$$

$$A \text{ to } C: 30 + 21 = 51 \text{ yards}$$

or

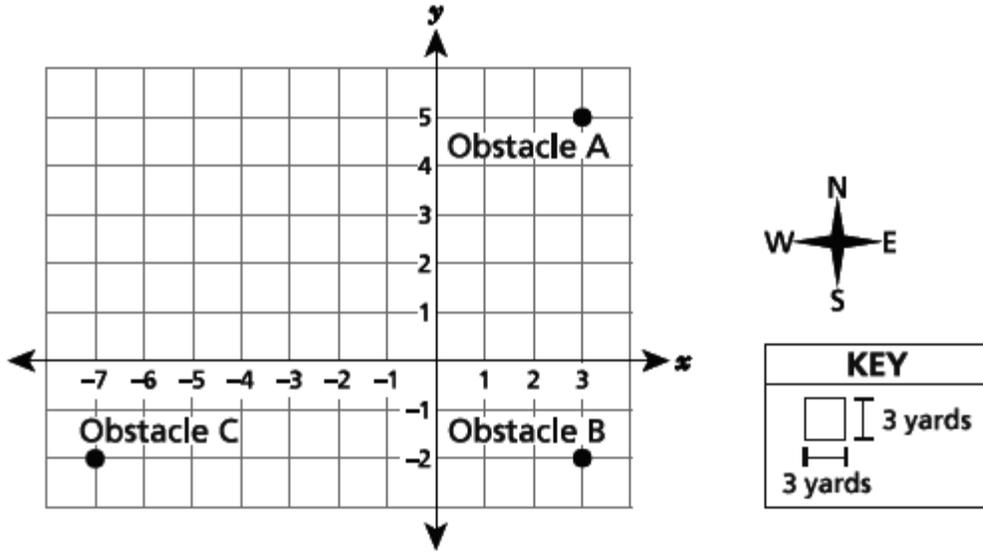
$$A \text{ to } C: 5 + 2 + 3 + 7 = 17 \text{ units}$$

$$17 \times 3 = 51 \text{ yards}$$

or other valid process

Answer 51 yards

A track coach creates an obstacle course for his team. The coach plots the locations of three obstacles on the coordinate plane shown below.



Each unit on the coordinate plane represents 3 yards. A student starts at Obstacle A, then runs south to Obstacle B, and then runs west to Obstacle C. What is the total distance, in yards, the student runs to get from Obstacle A to Obstacle C?

Show your work.

The distance from A (3,5) to B (3,-2) is 7. Each unit is 3, so do 7×3 which = 21. Obstacle C (-7,-2) from distance B = 10. Now do 10×3 and you get 30. So, do the distance from A to B, add the distance from B to C, and you get, 51 yards

Answer yards

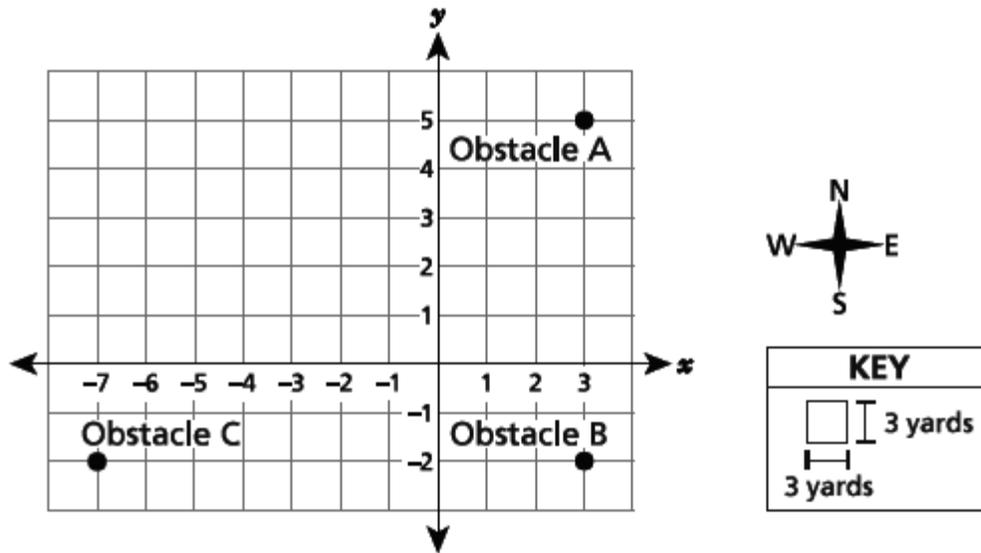
Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The lengths of segments AB and BC are correctly calculated and added to determine the total distance. This response is complete and correct.

GUIDE PAPER 3

40

A track coach creates an obstacle course for his team. The coach plots the locations of three obstacles on the coordinate plane shown below.



Each unit on the coordinate plane represents 3 yards. A student starts at Obstacle A, then runs south to Obstacle B, and then runs west to Obstacle C. What is the total distance, in yards, the student runs to get from Obstacle A to Obstacle C?

Show your work.

$$17 \times 3 = 51 \quad 17 = \text{units} \quad 3 = \text{each unit}$$

Answer yards

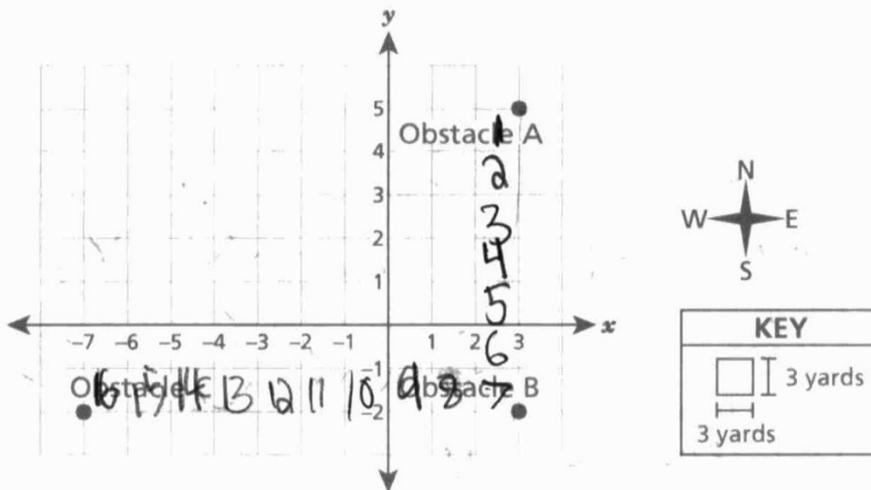
Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The number of grid units from Obstacle A to Obstacle C is correctly determined from the graph and multiplied by the length of each unit in yards to determine the total distance. This response contains sufficient work to show a thorough understanding.

GUIDE PAPER 4

40

A track coach creates an obstacle course for his team. The coach plots the locations of three obstacles on the coordinate plane shown below.



Each unit on the coordinate plane represents 3 yards. A student starts at Obstacle A, then runs south to Obstacle B, and then runs west to Obstacle C. What is the total distance, in yards, the student runs to get from Obstacle A to Obstacle C?

Show your work.

3 yards
 x 16 of them
 48

The student ran
 48 yards in total
 distance

16
 x 3
 48

Answer 48 yards

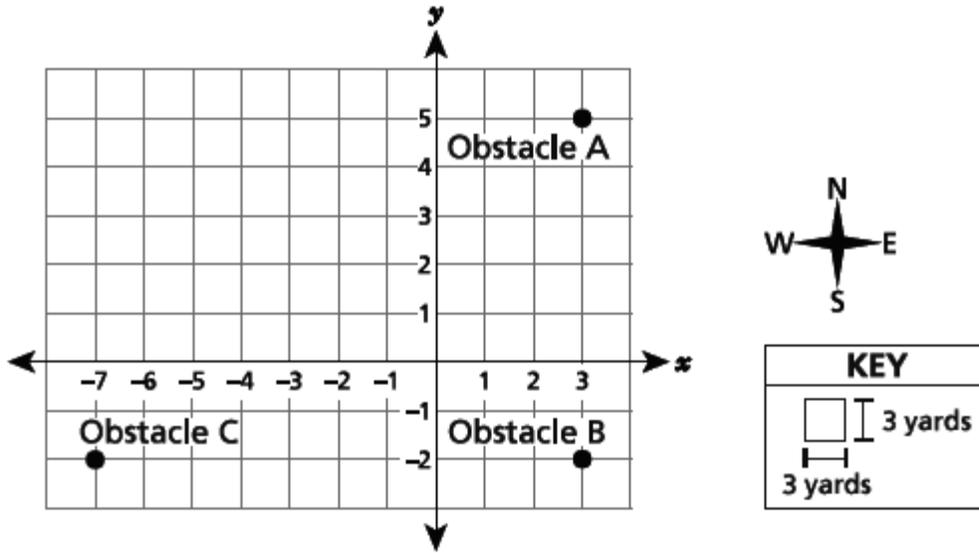
Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The number of grid units between Obstacle A and Obstacle C is miscounted; however, the result is correctly converted to yards to determine the total distance. This response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 5

40

A track coach creates an obstacle course for his team. The coach plots the locations of three obstacles on the coordinate plane shown below.



Each unit on the coordinate plane represents 3 yards. A student starts at Obstacle A, then runs south to Obstacle B, and then runs west to Obstacle C. What is the total distance, in yards, the student runs to get from Obstacle A to Obstacle C?

Show your work.

obstacle a to c = 7 spaces 1 space = 3 yards so $7 \times 3 = 21$ yards or the distance from Obstacle a to B. For obstacle B to C it is also 7 spaces or 21 yards away from these obstacles. To get the answer we have to add 21 yards by 21 yards and get 42 yards.

Answer yards

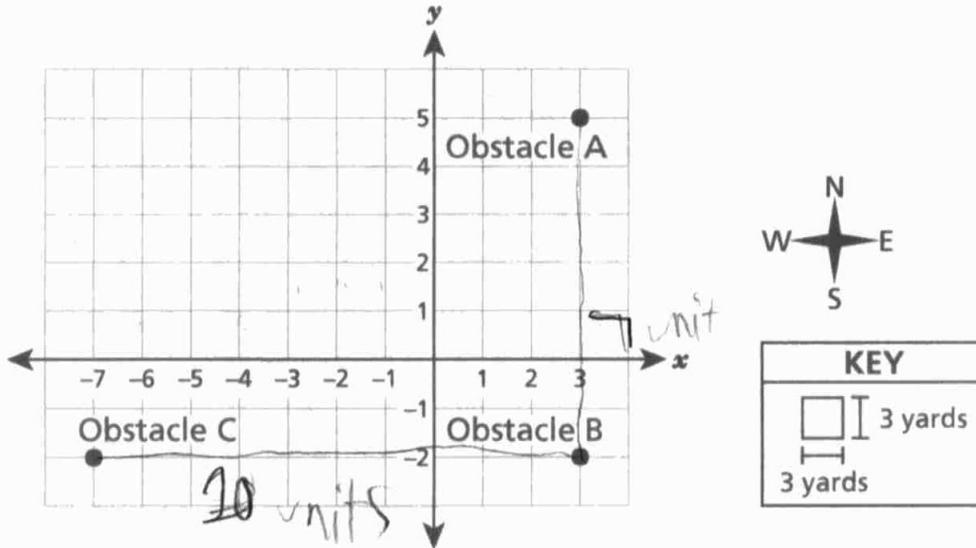
Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The length of segment AB is correctly calculated. The number of grid units in segment BC is miscounted; however, the result is correctly converted to yards and added to the other distance to determine the total distance. This response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 6

40

A track coach creates an obstacle course for his team. The coach plots the locations of three obstacles on the coordinate plane shown below.



Each unit on the coordinate plane represents 3 yards. A student starts at Obstacle A, then runs south to Obstacle B, and then runs west to Obstacle C. What is the total distance, in yards, the student runs to get from Obstacle A to Obstacle C?

Show your work.

$$\begin{array}{r} 10 + 7 \\ \hline 17 \end{array}$$

Answer 17 yards

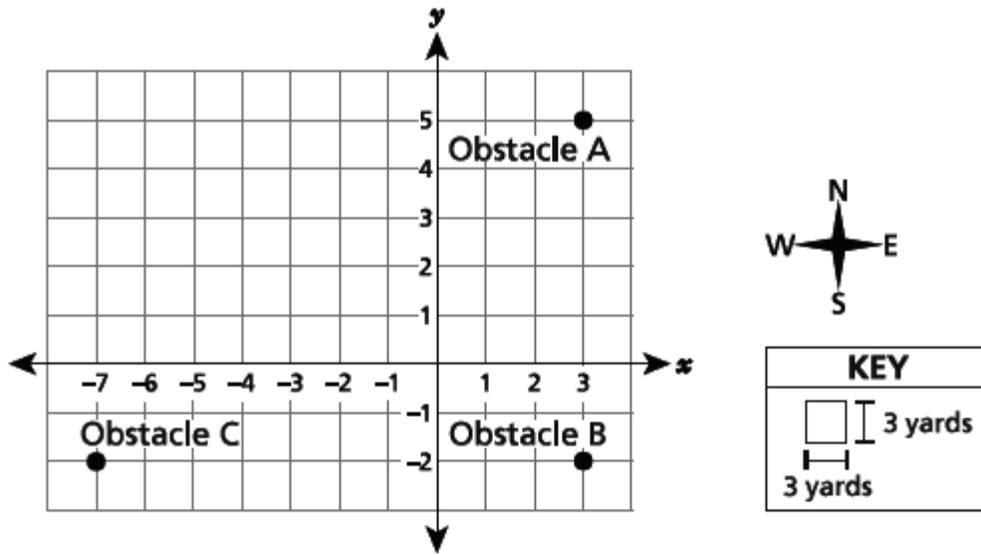
Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The number of grid units between Obstacle A and Obstacle C is correctly calculated; however, the result is not converted to yards. This response correctly addresses only some elements of the task.

GUIDE PAPER 7

40

A track coach creates an obstacle course for his team. The coach plots the locations of three obstacles on the coordinate plane shown below.



Each unit on the coordinate plane represents 3 yards. A student starts at Obstacle A, then runs south to Obstacle B, and then runs west to Obstacle C. What is the total distance, in yards, the student runs to get from Obstacle A to Obstacle C?

Show your work.

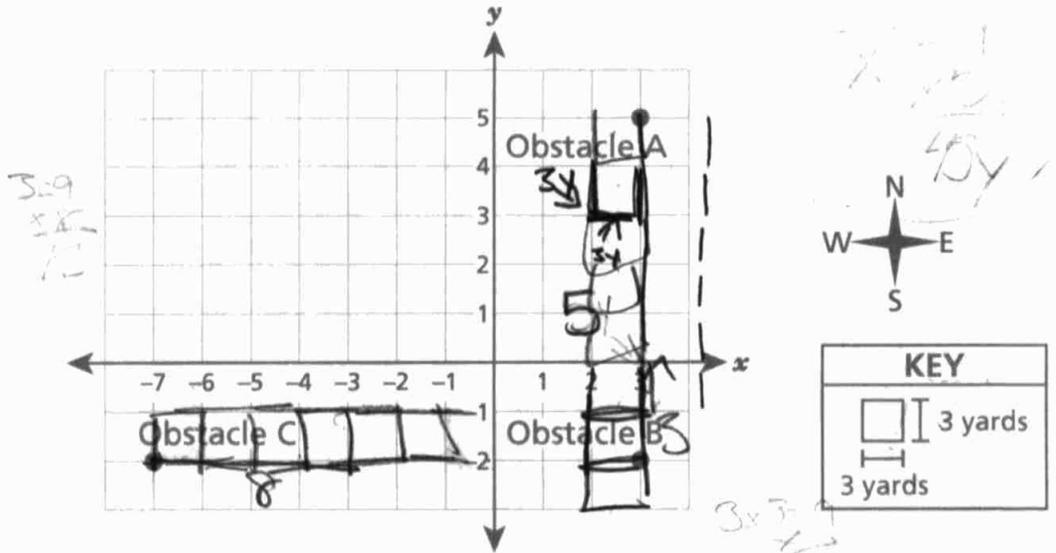
A to B = 8 yrds
b to c = 10 yrds
8+10 = 18 yards

Answer yards

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 number of grid units from A to B is miscounted and the conversion to yards is not addressed. Holistically, this response shows no overall understanding.

A track coach creates an obstacle course for his team. The coach plots the locations of three obstacles on the coordinate plane shown below.



Each unit on the coordinate plane represents 3 yards. A student starts at Obstacle A, then runs south to Obstacle B, and then runs west to Obstacle C. What is the total distance, in yards, the student runs to get from Obstacle A to Obstacle C?

Show your work.

$$\begin{array}{r} 72 \\ + 27 \\ \hline 99 \end{array}$$

$$\begin{array}{r} 3 \times 3 = 9 \\ \times 8 \\ \hline 72 \end{array}$$

$$\begin{array}{r} 3 \times 3 = 9 \\ \times 3 \\ \hline 27 \end{array}$$

$$\begin{array}{r} 3 \times 3 = 9 \\ \times 5 \\ \hline 45 \end{array}$$

Answer 144 yards

$$\begin{array}{r} 99 \\ + 45 \\ \hline 144 \end{array}$$

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 areas are inappropriately calculated and added. An incorrect solution is obtained using an incorrect procedure.

A restaurant owner orders new plates and spoons based on the information below.

- plates are sold in packages of 9
- spoons are sold in packages of 12

The restaurant owner orders an equal number of plates and spoons. What is the **least** number of packages of plates and packages of spoons she should order to have an equal number of plates and spoons?

Show your work.

Answer _____ packages of plates

_____ packages of spoons

EXEMPLARY RESPONSE

41

A restaurant owner orders new plates and spoons based on the information below.

- plates are sold in packages of 9
- spoons are sold in packages of 12

The restaurant owner orders an equal number of plates and spoons. What is the **least** number of packages of plates and packages of spoons she should order to have an equal number of plates and spoons?

Show your work.

Multiples of 9: 9, 18, 27, 36

Multiples of 12: 12, 24, 36

LCM is 36

So, 4 packages of plates

3 packages of spoons

or

Prime factors of 9: 3, 3

Prime factors of 12: 2, 2, 3

$LCM = 3 \times 3 \times 2 \times 2 = 36$

$36 \div 9 = 4$ packages of plates

$36 \div 12 = 3$ packages of spoons

or other valid process

Answer 4 packages of plates

3 packages of spoons

41

A restaurant owner orders new plates and spoons based on the information below.

- plates are sold in packages of 9
- spoons are sold in packages of 12

The restaurant owner orders an equal number of plates and spoons. What is the **least** number of packages of plates and packages of spoons she should order to have an equal number of plates and spoons?

Show your work.

9 18 27 36
12 24 36

$$12 \times 3 = 36$$

$$9 \times 4 = 36$$

$$36 \div 12 = 3$$

$$36 \div 9 = 4$$

Answer

packages of plates

packages of spoons

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The multiples of 9 and 12 are correctly listed and the number of packages of plates and spoons is correctly determined using a sound procedure.

GUIDE PAPER 2

41

A restaurant owner orders new plates and spoons based on the information below.

- plates are sold in packages of 9
- spoons are sold in packages of 12

The restaurant owner orders an equal number of plates and spoons. What is the **least** number of packages of plates and packages of spoons she should order to have an equal number of plates and spoons?

Show your work.

9 12
18 24
27 36
36

Answer 4 packages of plates

3 packages of spoons

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The multiples of 9 and 12 are correctly listed and the number of packages of plates and spoons is correctly determined. This response is complete and correct.

GUIDE PAPER 3

41

A restaurant owner orders new plates and spoons based on the information below.

- plates are sold in packages of 9
- spoons are sold in packages of 12

The restaurant owner orders an equal number of plates and spoons. What is the **least** number of packages of plates and packages of spoons she should order to have an equal number of plates and spoons?

Show your work.

$$9 \times 4 = 36$$
$$12 \times 3 = 36$$

4 packs of plates
3 packs of spoons

Answer 4 packages of plates

3 packages of spoons

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The number of packages of plates and spoons is correctly determined using multiplication. The trial-and-error work shows full understanding that the least common multiple has to be determined, and correctly identifies the solutions from the written multiplication facts. This response contains sufficient work to show a thorough understanding.

GUIDE PAPER 4

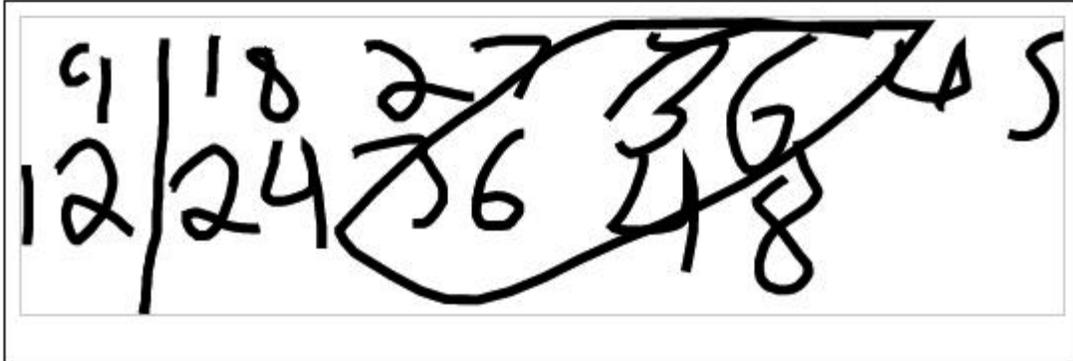
41

A restaurant owner orders new plates and spoons based on the information below.

- plates are sold in packages of 9
- spoons are sold in packages of 12

The restaurant owner orders an equal number of plates and spoons. What is the **least** number of packages of plates and packages of spoons she should order to have an equal number of plates and spoons?

Show your work.



Answer packages of plates
 packages of spoons

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The multiples of 9 and 12 are correctly listed; however, the count of packages inappropriately starts with the second package for both plates and spoons, leading to incorrect solutions. This response correctly addresses only some elements of the task.

GUIDE PAPER 5

41

A restaurant owner orders new plates and spoons based on the information below.

- plates are sold in packages of 9
- spoons are sold in packages of 12

The restaurant owner orders an equal number of plates and spoons. What is the **least** number of packages of plates and packages of spoons she should order to have an equal number of plates and spoons?

Show your work.

$$9 \times 4 = 36$$

$$12 \times 3 = 36$$

Answer 36 packages of plates

36 packages of spoons

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The least common multiple is correctly determined using multiplication; however, the number of packages of plates and spoons is not identified. This response correctly addresses only some elements of the task.

GUIDE PAPER 6

41

A restaurant owner orders new plates and spoons based on the information below.

- plates are sold in packages of 9
- spoons are sold in packages of 12

The restaurant owner orders an equal number of plates and spoons. What is the **least** number of packages of plates and packages of spoons she should order to have an equal number of plates and spoons?

Show your work.

9	12
18	24
24	

she should order 3 packages of plates and 2 packages of spoons which will be the least amount of a equal amount of plates and spoons.

Answer

9	3
packages of plates	
18	
24	

packages of plates

12	2
packages of spoons	
24	

packages of spoons

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. Although the list of multiples of 9 contains an incorrect third term, the two written lists are correctly used to determine the least common multiple and the number of packages of plates and spoons. This response contains incorrect solutions but applies a mathematically appropriate process.

GUIDE PAPER 7

41

A restaurant owner orders new plates and spoons based on the information below.

- plates are sold in packages of 9
- spoons are sold in packages of 12

The restaurant owner orders an equal number of plates and spoons. What is the **least** number of packages of plates and packages of spoons she should order to have an equal number of plates and spoons?

Show your work.

9 18 27 36 45 54 63 72
12 24 36 48 60 72
24=24

Answer is 24

Answer

24

packages of plates

24

packages of spoons

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although the response contains two correct lists of multiples, the least common multiple is incorrectly determined, and the number of packages of plates and spoons is not addressed. Holistically, the work is not sufficient to show any understanding.

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A restaurant owner orders new plates and spoons based on the information below.

- plates are sold in packages of 9
- spoons are sold in packages of 12

The restaurant owner orders an equal number of plates and spoons. What is the **least** number of packages of plates and packages of spoons she should order to have an equal number of plates and spoons?

Show your work.

Answer 4 packages of plates
 3 packages of spoons

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 two correct solutions are not supported with any work. Per Scoring Policy #3, this response receives no credit.

A cereal box has dimensions of 12 inches, $7\frac{3}{4}$ inches, and 2 inches. A pastry box has dimensions of $3\frac{2}{3}$ inches, $3\frac{1}{2}$ inches, and $2\frac{1}{3}$ inches. What is the difference in volume, in cubic inches, between the two boxes?

Show your work.

Answer _____ cubic inches

EXEMPLARY RESPONSE

42

A cereal box has dimensions of 12 inches, $7\frac{3}{4}$ inches, and 2 inches. A pastry box has dimensions of $3\frac{2}{3}$ inches, $3\frac{1}{2}$ inches, and $2\frac{1}{3}$ inches. What is the difference in volume, in cubic inches, between the two boxes?

Show your work.

$$\begin{aligned}\text{CB volume} &= 12 \times 7\frac{3}{4} \times 2 \\ &= 12 \times 3\frac{1}{4} \times 2 \\ &= 74\frac{4}{4} = 186 \text{ cubic inches}\end{aligned}$$

$$\begin{aligned}\text{PB volume} &= 3\frac{2}{3} \times 3\frac{1}{2} \times 2\frac{1}{3} \\ &= 11\frac{1}{3} \times 7\frac{1}{2} \times 7\frac{1}{3} \\ &= 539\frac{1}{18} = 29\frac{17}{18} = 29.9\overline{4} \text{ cubic inches}\end{aligned}$$

$$\begin{aligned}\text{CB} - \text{PB} &= 186 - 29\frac{17}{18} \\ &= 156\frac{1}{18} = 156.0\overline{5} \text{ cubic inches}\end{aligned}$$

or other valid process

Answer 156 $\frac{1}{18}$ cubic inches

A cereal box has dimensions of 12 inches, $7\frac{3}{4}$ inches, and 2 inches. A pastry box has dimensions of $3\frac{2}{3}$ inches, $3\frac{1}{2}$ inches, and $2\frac{1}{3}$ inches. What is the difference in volume, in cubic inches, between the two boxes?

Show your work.

$$v=lwh$$

$$v=12 \times 7\frac{3}{4} \times 2$$

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

$$v=186$$

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

$$v=8\frac{1}{6} \times 3\frac{2}{3}$$

$$v=29\frac{17}{18}$$

$$186 - 29\frac{17}{18} = 156\frac{1}{18}$$

Answer

the difference is
156 $\frac{1}{18}$

cubic inches

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The volumes of the two boxes are correctly calculated and the difference in volume is correctly determined. This response is complete and correct.

GUIDE PAPER 2

42

A cereal box has dimensions of 12 inches, $7\frac{3}{4}$ inches, and 2 inches. A pastry box has dimensions of $3\frac{2}{3}$ inches, $3\frac{1}{2}$ inches, and $2\frac{1}{3}$ inches. What is the difference in volume, in cubic inches, between the two boxes?

Show your work.

The student's work is contained within a rectangular box. On the left, there are two hand-drawn 3D boxes. The first box has dimensions labeled as 12 (length), $7\frac{3}{4}$ (width), and 2 (height). The second box has dimensions labeled as $3\frac{2}{3}$ (length), $3\frac{1}{2}$ (width), and $2\frac{1}{3}$ (height). To the right of the first box, the volume calculation is shown: $V = lwh$, $V = 12 \cdot 7\frac{3}{4} \cdot 2$, and $V = 186$. Below this, a subtraction problem is written: 186 minus $29\frac{17}{18}$ equals $156\frac{1}{18}$. To the right of the second box, another volume calculation is shown: $V = lwh$, $V = 3\frac{2}{3} \cdot 3\frac{1}{2} \cdot 2\frac{1}{3}$, and $V = 29\frac{17}{18}$. A vertical line is drawn at the bottom right of the work area.

Answer

$$156\frac{1}{18}$$

cubic inches

Score Point 2 (out of 2 points)

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

GUIDE PAPER 3

42

A cereal box has dimensions of 12 inches, $7\frac{3}{4}$ inches, and 2 inches. A pastry box has dimensions of $3\frac{2}{3}$ inches, $3\frac{1}{2}$ inches, and $2\frac{1}{3}$ inches. What is the difference in volume, in cubic inches, between the two boxes?

Show your work.

CB $V = lwh$
 $V = 12 \cdot 7.75 \cdot 2$
 $V = 186$

186 in^3

Subtract

PB
 $V = lwh$
 $V = \frac{11}{3} \cdot \frac{7}{2} \cdot \frac{7}{3} = \frac{539}{18}$

$$\begin{array}{r} 185\frac{18}{18} \\ - 29\frac{17}{18} \\ \hline 156\frac{1}{18} \end{array}$$

Answer $156\frac{1}{18}$ cubic inches

Score Point 2 (out of 2 points)

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

GUIDE PAPER 4

42

A cereal box has dimensions of 12 inches, $7\frac{3}{4}$ inches, and 2 inches. A pastry box has dimensions of $3\frac{2}{3}$ inches, $3\frac{1}{2}$ inches, and $2\frac{1}{3}$ inches. What is the difference in volume, in cubic inches, between the two boxes?

Show your work.

cb) $\frac{12}{1} \times \frac{2}{1} = \frac{24}{1} \times \frac{31}{4} = \frac{744}{4} = 186$

$$\begin{array}{r} 186 \\ 4 \overline{) 744} \\ \underline{4} \\ 34 \\ \underline{32} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

pb) $\frac{11}{3} \times \frac{7}{2} = \frac{77}{6} \times \frac{7}{3} = \frac{539}{18} = 29.9\bar{4}$

$$\begin{array}{r} 75.910 \\ - 29.9\bar{4} \\ \hline 156.0\bar{6} \end{array}$$

Answer 156.06 cubic inches

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The volumes of the two boxes are correctly calculated, and the volume of the pastry box is written correctly in both fraction and decimal forms. Although the repeating decimal symbol is shown in the subtraction, the answer is inappropriately rounded (should be 156.05). This response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 5

42

A cereal box has dimensions of 12 inches, $7\frac{3}{4}$ inches, and 2 inches. A pastry box has dimensions of $3\frac{2}{3}$ inches, $3\frac{1}{2}$ inches, and $2\frac{1}{3}$ inches. What is the difference in volume, in cubic inches, between the two boxes?

Show your work.

Cereal box $12 \times 7\frac{3}{4} \times 2$

$$\frac{3}{1} \times \frac{12}{1} \times \frac{31}{4} = \frac{93}{1} \times \frac{2}{2} = \frac{186}{2}$$

Pastry box $3\frac{2}{3} \times 3\frac{1}{2}$

$$\frac{11}{3} \times \frac{7}{2} = \frac{77}{6} = 15\frac{2}{3}$$

$$15\frac{2}{3} \times 2\frac{1}{3}$$

$$\frac{77}{5} \times \frac{7}{3} = \frac{539}{15} = 35\frac{14}{15}$$

$$\begin{array}{r} 186.000 \\ - 35.933 \\ \hline 150.067 \end{array}$$

$$\begin{array}{r} 4 \\ \times 77 \\ \hline 539 \end{array}$$

$$\begin{array}{r} 15 \\ 5 \overline{) 77} \\ \underline{51} \\ 26 \\ \underline{25} \\ 1 \end{array}$$

$$15 \overline{) 539} = 35\frac{14}{15} = 35.933$$

$$\begin{array}{r} 35 \\ 15 \overline{) 539} \\ \underline{45} \\ 89 \\ \underline{75} \\ 14 \end{array}$$

Answer 150.067 cubic inches

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The volume of the cereal box is correctly calculated. An error is made when calculating the volume of the pastry box ($1\frac{1}{3} \times \frac{7}{2} \neq \frac{77}{5}$), resulting in an incorrect volume. The obtained answers are subtracted to determine the difference in volume; however, the pastry box volume is inappropriately truncated or rounded (35.933) when written in the decimal form ($35\frac{14}{15} \neq 35.933$). This response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 6

42

A cereal box has dimensions of 12 inches, $7\frac{3}{4}$ inches, and 2 inches. A pastry box has dimensions of $3\frac{2}{3}$ inches, $3\frac{1}{2}$ inches, and $2\frac{1}{3}$ inches. What is the difference in volume, in cubic inches, between the two boxes?

Show your work.

$$\frac{12}{1} \times \frac{31}{4} \times \frac{2}{1} = \frac{744}{4}$$

$$\frac{11}{3} \times \frac{7}{2} \times \frac{7}{3} = \frac{539}{18}$$

Divide 744 over 539 you will get $\frac{180}{4}$

Answer

180 over 4 cubic inches.

cubic inches

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The two volumes are correctly calculated; however, the rest of the work is incorrect. This response correctly addresses only some elements of the task.

GUIDE PAPER 7

42

A cereal box has dimensions of 12 inches, $7\frac{3}{4}$ inches, and 2 inches. A pastry box has dimensions of $3\frac{2}{3}$ inches, $3\frac{1}{2}$ inches, and $2\frac{1}{3}$ inches. What is the difference in volume, in cubic inches, between the two boxes?

Show your work.

$$3\frac{2}{3} \times 3\frac{1}{2} = \frac{11}{3} \times \frac{7}{2} = \frac{77}{6} + 2\frac{1}{3} =$$

$$\frac{77}{6} \times \frac{7}{3} = \frac{539}{18}$$

~~$$\begin{array}{r} 218 \\ \times 3 \\ \hline 654 \\ 654 \\ \hline 654 \end{array}$$~~

$$\begin{array}{r} 18 \\ \times 2 \\ \hline 36 \end{array}$$

~~$$\begin{array}{r} 418 \\ \times 6 \\ \hline 1028 \end{array}$$~~

$$\begin{array}{r} 518 \\ \times 7 \\ \hline 6 \end{array}$$

~~$$\begin{array}{r} \times 26 \\ 18 \overline{) 539} \\ \underline{36} \\ 1379 \\ \underline{1028} \\ 351 \end{array}$$~~

Answer 26 cubic inches

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although the volume of the pastry box is correctly calculated, the volume of the cereal box and the difference between the two are not addressed. Holistically, this response shows no overall understanding of the task.

42

A cereal box has dimensions of 12 inches, $7\frac{3}{4}$ inches, and 2 inches. A pastry box has dimensions of $3\frac{2}{3}$ inches, $3\frac{1}{2}$ inches, and $2\frac{1}{3}$ inches. What is the difference in volume, in cubic inches, between the two boxes?

Show your work.

the difference between the boxes is that one is a holl but the other one is a fration. =

Answer

CB = 186 and
PB = 29 17/18

cubic inches

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although the volumes of the two boxes are correctly stated, there is no work to support the obtained answers. The difference in volume is not calculated.

Two students evaluate the expression $17(4 + 15)$.

- Student A evaluates the expression by adding the product of 17 and 4 to the product of 17 and 15.
- Student B evaluates the expression by determining the product of 17 and 19.

Is each student's evaluation correct or incorrect?

Explain your answer.

EXEMPLARY RESPONSE

43

Two students evaluate the expression $17(4 + 15)$.

- Student A evaluates the expression by adding the product of 17 and 4 to the product of 17 and 15.
- Student B evaluates the expression by determining the product of 17 and 19.

Is each student's evaluation correct or incorrect?

Explain your answer.

Both students are correct.

Student A uses the distributive property.

$$(17 \times 4) + (17 \times 15) = 68 + 255 = 323$$

and

Student B follows the order of operations to get the same answer.

$$17 \times 19 = 323$$

or other valid explanation

Two students evaluate the expression $17(4 + 15)$.

- Student A evaluates the expression by adding the product of 17 and 4 to the product of 17 and 15.
- Student B evaluates the expression by determining the product of 17 and 19.

Is each student's evaluation correct or incorrect?

Explain your answer.

Problem

$$17(4 + 15)$$

Answer- 323

Student A's work

$$17(4 + 15)$$

$$17(4) + 17(15)$$

$$68 + 255$$

$$323$$

Student B's work

$$17(4 + 15)$$

$$17(19)$$

$$323$$

Both student's evaluation is correct. Student A spearted the problem into two different mutiplication problems and added the two products they found to get their answer. This gave them the right answer. Student B first added what was in the parentheses and then mutiplied it by 17 to get their answer. This also gave them the right answer, and the same one as Student A's. In conclusion, both used methods to solve the expression that were correct.

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. Both evaluations are correctly identified to be correct. The explanation is complete and correct.

GUIDE PAPER 2

43

Two students evaluate the expression $17(4 + 15)$.

- Student A evaluates the expression by adding the product of 17 and 4 to the product of 17 and 15.
- Student B evaluates the expression by determining the product of 17 and 19.

Is each student's evaluation correct or incorrect?

Explain your answer.

Student A's evaluation is correct because the answer to the problem is 323, and student B's evaluation is also correct.

A

$$\begin{array}{r} 17(4+15) \\ \quad \quad \quad \curvearrowright \\ 68+255 \\ \hline 323 \end{array}$$

B

$$\begin{array}{r} 17(4+15) \\ 17 \cdot 19 \\ \hline 323 \end{array}$$

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. Both evaluations are correctly identified to be correct, and a correct mathematical explanation of each method is provided to show that the answer is the same.

GUIDE PAPER 3

43

Two students evaluate the expression $17(4 + 15)$.

- Student A evaluates the expression by adding the product of 17 and 4 to the product of 17 and 15.
- Student B evaluates the expression by determining the product of 17 and 19.

Is each student's evaluation correct or incorrect?

Explain your answer.

Both of them are correct
Student A solved it using the distributive property
Student B solved it using order of operations

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. Both evaluations are correctly identified to be correct. The explanation is sufficient to show a thorough understanding.

GUIDE PAPER 4

43

Two students evaluate the expression $17(4 + 15)$.

- Student A evaluates the expression by adding the product of 17 and 4 to the product of 17 and 15.
- Student B evaluates the expression by determining the product of 17 and 19.

Is each student's evaluation correct or incorrect?

Explain your answer.

Both students are correct but did two different ways to get the correct answer.

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. Both evaluations are correctly identified to be correct; however, the explanation is incomplete because the two methods are not sufficiently explained. This response correctly addresses only some elements of the task.

GUIDE PAPER 5

43

Two students evaluate the expression $17(4 + 15)$.

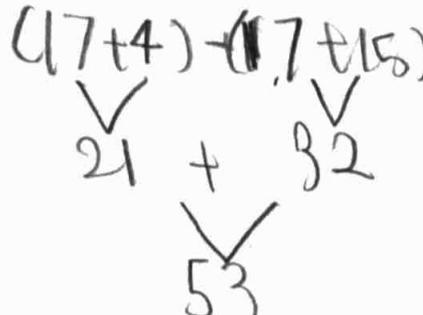
- Student A evaluates the expression by adding the product of 17 and 4 to the product of 17 and 15.
- Student B evaluates the expression by determining the product of 17 and 19.

Is each student's evaluation correct or incorrect?

Explain your answer.

Student B. is correct because Student B. does $17(4+15) = 323$.

Student B. $17(4+15)$ Student A. $(17+4) + (17+15)$



Student B's work: $17 + 19 = 323$

Student A's work: $(17+4) + (17+15) = 21 + 32 = 53$

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. Student B's evaluation is correctly identified to be correct, and a correct mathematical explanation of this method is provided; however, the explanation of Student A's work is incorrect. This response correctly addresses only some elements of the task.

GUIDE PAPER 6

43

Two students evaluate the expression $17(4 + 15)$.

- Student A evaluates the expression by adding the product of 17 and 4 to the product of 17 and 15.
- Student B evaluates the expression by determining the product of 17 and 19.

Is each student's evaluation correct or incorrect?

Explain your answer.

Student A evaluation is correct because you have to multiply 17 and 4, and also have to multiply 17 and 15 then add the two together.

$$17(4+15)$$

$$\begin{array}{r} 68 + 255 \\ \hline 323 \end{array}$$

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. Student A's evaluation is correctly identified to be correct, and a correct explanation of this method is provided; however, Student B's work is not explained. This response correctly addresses only some elements of the task.

GUIDE PAPER 7

43

Two students evaluate the expression $17(4 + 15)$.

- Student A evaluates the expression by adding the product of 17 and 4 to the product of 17 and 15.
- Student B evaluates the expression by determining the product of 17 and 19.

Is each student's evaluation correct or incorrect?

Explain your answer.

$$\begin{array}{l} \text{Student A: } 17+4= 21 \quad 17+15= 32 \\ \quad \quad \quad 21+32=53 \end{array}$$

$$\begin{array}{l} \text{Student B: } \quad 4+15= 19 \\ \quad \quad \quad 17+19= 36 \end{array}$$

Student B is correct because he used Pemdass

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 explanation of Student A's work is incorrect. Although the response refers to "*Pemdass*" when describing Student B's work, the mathematical part of the explanation shows no overall understanding.

Two students evaluate the expression $17(4 + 15)$.

- Student A evaluates the expression by adding the product of 17 and 4 to the product of 17 and 15.
- Student B evaluates the expression by determining the product of 17 and 19.

Is each student's evaluation correct or incorrect?

Explain your answer.

A correct

B incorrect

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 answer is provided with no explanation. Per Scoring Policy #3, this response receives no credit.

Ryan delivers flowers to two customers. He drives for 12 minutes at an average speed of 40 miles per hour to reach his first customer. He then drives for 15 minutes at an average speed of 50 miles per hour to reach his second customer. During the 27 minutes of driving time, how many total miles does Ryan drive?

Show your work.

Answer _____ miles

EXEMPLARY RESPONSE

44

Ryan delivers flowers to two customers. He drives for 12 minutes at an average speed of 40 miles per hour to reach his first customer. He then drives for 15 minutes at an average speed of 50 miles per hour to reach his second customer. During the 27 minutes of driving time, how many total miles does Ryan drive?

Show your work.

$$60 \div 12 = 5$$

$$60 \div 15 = 4$$

$$40 \div 5 = 8 \text{ miles}$$

$$50 \div 4 = 12.5 \text{ miles}$$

$$8 + 12.5 = 20.5 \text{ miles}$$

or

$$40 \div 60 = \frac{2}{3} \text{ miles/min}$$

$$50 \div 60 = \frac{5}{6} \text{ miles/min}$$

$$\frac{2}{3} \times 12 = 8 \text{ miles}$$

$$\frac{5}{6} \times 15 = 12.5 \text{ miles}$$

$$8 + 12.5 = 20.5 \text{ miles}$$

or

$$60 \div 40 = 1.5 \text{ min/mile}$$

$$60 \div 50 = 1.2 \text{ min/mile}$$

$$12 \div 1.5 = 8 \text{ miles}$$

$$15 \div 1.2 = 12.5 \text{ miles}$$

$$8 + 12.5 = 20.5 \text{ miles}$$

or other valid process

Answer 20.5 miles

Ryan delivers flowers to two customers. He drives for 12 minutes at an average speed of 40 miles per hour to reach his first customer. He then drives for 15 minutes at an average speed of 50 miles per hour to reach his second customer. During the 27 minutes of driving time, how many total miles does Ryan drive?

Show your work.

$$\begin{array}{r} \frac{40 \text{ miles}}{60 \text{ min}} \div 5 = \frac{8 \text{ miles}}{12 \text{ min}} \\ \\ \frac{50 \text{ miles}}{60 \text{ min}} \div 4 = \frac{12.5 \text{ miles}}{15 \text{ min}} \\ \\ \begin{array}{r} + 12.5 \\ + 8.0 \\ \hline 20.5 \text{ miles} \end{array} \end{array}$$

Answer miles

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The two distances are correctly calculated using ratios. The total distance traveled is correctly determined. This response is complete and correct.

GUIDE PAPER 2

44

Ryan delivers flowers to two customers. He drives for 12 minutes at an average speed of 40 miles per hour to reach his first customer. He then drives for 15 minutes at an average speed of 50 miles per hour to reach his second customer. During the 27 minutes of driving time, how many total miles does Ryan drive?

Show your work.

$$15 \text{ mins at } 50 \text{ mph} = 12.5 \text{ miles in } 15 \text{ mins}$$

$$12 \text{ mins at } 40 \text{ mph} = 8 \text{ miles in } 12 \text{ mins}$$

$$60 \div 15 = 4$$

$$50 \div 4 = 12.5$$

$$60 \div 12 = 5$$

$$40 \div 5 = 8$$

$$\begin{array}{r} 12.5 \\ + 8 \\ \hline 20.5 \end{array}$$

Answer 20 $\frac{1}{2}$ miles

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The total distance traveled is correctly determined using sound procedures. This response is complete and correct.

GUIDE PAPER 3

44

Ryan delivers flowers to two customers. He drives for 12 minutes at an average speed of 40 miles per hour to reach his first customer. He then drives for 15 minutes at an average speed of 50 miles per hour to reach his second customer. During the 27 minutes of driving time, how many total miles does Ryan drive?

Show your work.

$$\begin{aligned} 15 + 12 &= 27 \\ 12 &= \frac{50}{1} \times \frac{1}{4} = 12.5 \\ 40 &= \frac{40}{1} \times \frac{1}{3} = 8 \text{ miles} \\ &+ 12.5 \text{ miles} \\ &= 20.5 \end{aligned}$$

Answer 20.5 miles

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. The two distances are correctly calculated by multiplying the speed by the time traveled in hours. The total distance is correctly determined. This response contains sufficient work to show a thorough understanding.

GUIDE PAPER 4

44

Ryan delivers flowers to two customers. He drives for 12 minutes at an average speed of 40 miles per hour to reach his first customer. He then drives for 15 minutes at an average speed of 50 miles per hour to reach his second customer. During the 27 minutes of driving time, how many total miles does Ryan drive?

Show your work.

~~Step 1~~
 ~~$40 \div 12 = 3.33\bar{3}$~~
 ~~$50 \div 15 = 3.38\bar{3}$~~
~~Step 2~~
~~1~~

Step 1
 $40 \div 60 = 0.66\bar{6}$
 $50 \div 60 = 0.83\bar{3}$

Step 2
 $12 \times 0.66\bar{6} = 7.992$
 $15 \times 0.83\bar{3} = 12.495$

Step 3
 7.992
 $+ 12.495$

 20.487

20.487 miles

Answer 20.487 miles

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The number of miles traveled per minute is correctly calculated for the two intervals; however, truncated values of these answers are used to multiply by the number of minutes, resulting in incorrect distances (7.992 and 12.495). The two distances are correctly added to determine the solution. This response contains an incorrect solution but applies a mathematically appropriate process. Per Scoring Policy #6, the crossed out response should not be scored.

GUIDE PAPER 5

44

Ryan delivers flowers to two customers. He drives for 12 minutes at an average speed of 40 miles per hour to reach his first customer. He then drives for 15 minutes at an average speed of 50 miles per hour to reach his second customer. During the 27 minutes of driving time, how many total miles does Ryan drive?

Show your work.

$$\begin{array}{l} 60 \text{ min} \div 12 = 5 \\ 40 \div 5 = 8 \text{ miles} \\ 60 \div 15 = 4 \\ 50 \div 4 = \underline{12.5} \end{array} \quad 16.5$$

Answer

16.5

miles

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The two distances are correctly calculated by dividing the speed by the corresponding number of times 12 and 15 minutes go into 60 minutes. A conceptual error is made when determining the total distance: the number of times (4) instead of miles is added to the other distance. This response correctly addresses only some elements of the task.

GUIDE PAPER 6

44

Ryan delivers flowers to two customers. He drives for 12 minutes at an average speed of 40 miles per hour to reach his first customer. He then drives for 15 minutes at an average speed of 50 miles per hour to reach his second customer. During the 27 minutes of driving time, how many total miles does Ryan drive?

Show your work.

8 and 12.5

$$8+12.5=20.5$$

Answer

20.5

miles

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. The total distance traveled is correctly determined; however, the work shown is limited. This response contains the correct solution, but the required work is incomplete.

GUIDE PAPER 7

44

Ryan delivers flowers to two customers. He drives for 12 minutes at an average speed of 40 miles per hour to reach his first customer. He then drives for 15 minutes at an average speed of 50 miles per hour to reach his second customer. During the 27 minutes of driving time, how many total miles does Ryan drive?

Show your work.

- 12 min. 40 mph
40 m for every 60 min!

$$\begin{array}{r} 12 \overline{)60} \\ \underline{5} \\ 5 \end{array}$$

5 | 40

$$\begin{array}{r} 8 \text{ m} \\ + 15 \text{ m} \\ \hline 23 \text{ m} \end{array}$$

- 15 min 50 mph
3.33?

$$\begin{array}{r} 15 \overline{)50} \\ \underline{45} \\ 50 \\ \underline{45} \\ 50 \end{array}$$

Answer 23 miles

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although one of the distances is correctly calculated, the rest of the work uses incorrect procedures: dividing miles per hour by minutes, and adding miles and minutes. Holistically, this response shows no overall understanding.

Ryan delivers flowers to two customers. He drives for 12 minutes at an average speed of 40 miles per hour to reach his first customer. He then drives for 15 minutes at an average speed of 50 miles per hour to reach his second customer. During the 27 minutes of driving time, how many total miles does Ryan drive?

Show your work.

$$40 \div 12 = 3.3$$

$$50 \div 15 = 3.3$$

$$3.3 + 3.3 = 6.6$$

Answer

He drove 6.6
miles.

miles

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 work contains the incorrect procedures of dividing miles per hour by minutes and adding the answers to determine the solution. Holistically, this response shows no understanding of units.

Johnny is 21 years old. He is 3 times as old as Becky. Write and solve an equation to determine Becky's age, a .

Show your work.

Answer $a =$ _____

EXEMPLARY RESPONSE

45

Johnny is 21 years old. He is 3 times as old as Becky. Write and solve an equation to determine Becky's age, a .

Show your work.

$$3a = 21 \quad \text{or} \quad a = 21/3$$

$$a = 7 \text{ years old}$$

or other valid process

Answer $a = \underline{7}$

45

Johnny is 21 years old. He is 3 times as old as Becky. Write and solve an equation to determine Becky's age, a .

Show your work.

$$21 \div 3 = a$$

$$a \times 3 = 21$$

$$\begin{array}{r|l} 3 & 21 \\ -15 & \\ \hline & 6 \\ -6 & \\ \hline & 0 \end{array}$$

Answer $a =$ 7

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. Two correct equations are written, and Becky's age is correctly determined. This response is complete and correct.

GUIDE PAPER 2

45

Johnny is 21 years old. He is 3 times as old as Becky. Write and solve an equation to determine Becky's age, a .

Show your work.

$$21 \div 3 = a$$

$$21 \div 3 = 7$$

$$7 \times 3 = 21$$

Answer

$a =$

7

Score Point 2 (out of 2 points)

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

GUIDE PAPER 3

45

Johnny is 21 years old. He is 3 times as old as Becky. Write and solve an equation to determine Becky's age, a .

Show your work.

$$\frac{21}{a} = 3$$

$$a = 7$$

Answer $a =$ 7

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. A correct equation is written, and it is correctly solved to determine the solution. This response contains sufficient work to show a thorough understanding.

GUIDE PAPER 4

45

Johnny is 21 years old. He is 3 times as old as Becky. Write and solve an equation to determine Becky's age, a .

Show your work.

Johnny = 21 years old

Becky = $21 \div 3 = 7$ years old

Answer $a =$

Becky is 7 years
old.

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. Becky's age is correctly determined; however, the written equation does not have a variable. Using "*Becky*" for a variable is insufficient to show understanding of how to write an algebraic equation. This response correctly addresses only some elements of the task.

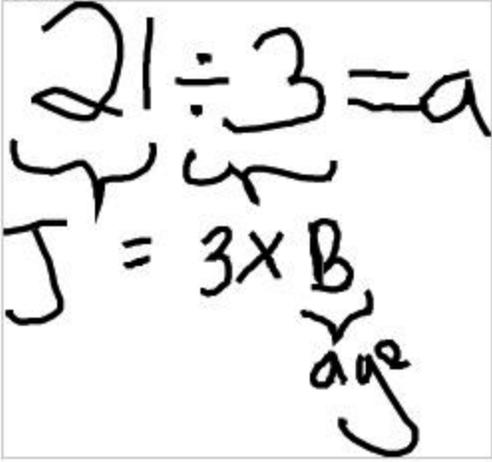
GUIDE PAPER 5

45

Johnny is 21 years old. He is 3 times as old as Becky. Write and solve an equation to determine Becky's age, a .

Show your work.

Johnny ~ 21 (3 times B's age)
 $21/3 = a$



$J = 3 \times B$
age

Answer $a =$

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. A correct equation is written; however, Becky's age is not calculated. This response correctly addresses only some elements of the task.

GUIDE PAPER 6

45

Johnny is 21 years old. He is 3 times as old as Becky. Write and solve an equation to determine Becky's age, a .

Show your work.

$$7 \times 3 = 21$$

$$21 \div 3 = 7$$

Answer $a =$ 7

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts and procedures in the task. Becky's age is correctly determined; however, the written equations do not have a variable. This response correctly addresses only some elements of the task.

GUIDE PAPER 7

45

Johnny is 21 years old. He is 3 times as old as Becky. Write and solve an equation to determine Becky's age, a .

Show your work.

j= johnnys age
B=becky
23j/b

Answer $a =$

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although the correct solution is provided, the work contains an incorrect procedure and does not support the calculated solution.

45

Johnny is 21 years old. He is 3 times as old as Becky. Write and solve an equation to determine Becky's age, a .

Show your work.

$$\begin{array}{r} 21 \\ \times 3 \\ \hline 63 \end{array}$$

Answer $a =$ 63

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 solution is obtained using an incorrect procedure.

An office supply store sells boxes of pencils. Each box contains 160 pencils. Write an equation that represents the total number of pencils, y , in x boxes.

Equation _____

If $x = 12$ for one day of sales, use your equation to find the total number of pencils the supply store sells.

Show your work.

Answer _____ pencils

EXEMPLARY RESPONSE

46

An office supply store sells boxes of pencils. Each box contains 160 pencils. Write an equation that represents the total number of pencils, y , in x boxes.

Equation $y = 160x$ or other equivalent equation

If $x = 12$ for one day of sales, use your equation to find the total number of pencils the supply store sells.

Show your work.

$$y = 160 \times 12$$

$$y = 1,920$$

Answer 1,920 pencils

An office supply store sells boxes of pencils. [Each box contains 160 pencils] Write an equation that represents the total number of pencils, y , in x boxes.]

Equation $x \cdot 160 = y$

If $x = 12$ for one day of sales, use your equation to find the total number of pencils the supply store sells.

Show your work.

$$\begin{array}{r} 160 \\ \times 12 \\ \hline 320 \\ 1600 \\ \hline 1920 \end{array}$$

$$(12) \cdot 160 = y$$

$$1,920 = y$$

Answer 1,920 pencils

Score Point 3 (out of 3 points)

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

GUIDE PAPER 2

46

An office supply store sells boxes of pencils. Each box contains 160 pencils. Write an equation that represents the total number of pencils, y , in x boxes.

Equation

$$y/x=160$$

If $x = 12$ for one day of sales, use your equation to find the total number of pencils the supply store sells.

Show your work.

$$160 \times 12 = 1920$$

Answer

1920

pencils

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. A correct equation is written, and the number of pencils is correctly determined using a sound procedure.

GUIDE PAPER 3

46

An office supply store sells boxes of pencils. Each box contains 160 pencils. Write an equation that represents the total number of pencils, y , in x boxes.

Equation $y = x160$

If $x = 12$ for one day of sales, use your equation to find the total number of pencils the supply store sells.

Show your work.

$$\begin{array}{r} 160 \\ \times 12 \\ \hline 320 \\ 1600 \\ \hline 1920 \end{array}$$

Answer 1920 pencils

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts and procedures in the task. A correct equation is written, and the number of pencils is correctly determined using a sound procedure.

GUIDE PAPER 4

46

An office supply store sells boxes of pencils. Each box contains 160 pencils. Write an equation that represents the total number of pencils, y , in x boxes.

Equation $160y = x$

If $x = 12$ for one day of sales, use your equation to find the total number of pencils the supply store sells.

Show your work.

$$\begin{array}{r} 160 \\ \times 12 \\ \hline 1920 \end{array}$$

Answer 1920 pencils

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts and procedures in the task. The number of pencils is correctly determined; however, the written equation is incorrect: x and y variables are transposed. This response reflects some minor misunderstanding of the underlying mathematical concepts and procedures.

GUIDE PAPER 5

46

An office supply store sells boxes of pencils. Each box contains 160 pencils. Write an equation that represents the total number of pencils, y , in x boxes.

Equation $y = x \times 160$

If $x = 12$ for one day of sales, use your equation to find the total number of pencils the supply store sells.

Show your work.

there are 1,920 pencils were sold.

Answer $1,920$ pencils were sold. pencils

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts and procedures in the task. Although a correct equation is written and the number of pencils is correctly calculated, the work is incomplete to show how the solution is obtained. This response appropriately addresses most, but not all, aspects of the task.

GUIDE PAPER 6

46

An office supply store sells boxes of pencils. Each box contains 160 pencils. Write an equation that represents the total number of pencils, y , in x boxes.

Equation

$$y \times x$$

If $x = 12$ for one day of sales, use your equation to find the total number of pencils the supply store sells.

Show your work.

$$160 \times 12 = 1920$$

Answer

the suplie store
sells 1920 pensils
in one day.

pencils

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts and procedures in the task. The number of pencils is correctly calculated using a sound procedure; however, an incorrect expression is provided for the equation. This response appropriately addresses most, but not all, aspects of the task.

GUIDE PAPER 7

46

An office supply store sells boxes of pencils. Each box contains 160 pencils. Write an equation that represents the total number of pencils, y , in x boxes.

Equation $160 = y \cdot x$

If $x = 12$ for one day of sales, use your equation to find the total number of pencils the supply store sells.

Show your work.

$$\begin{aligned} 160 &= y \cdot 12 \\ x &= 12 \\ 160 \cdot 12 &= (1,920) \end{aligned}$$

Answer 1,920 pencils

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts and procedures in the task. Although the number of pencils is correctly calculated, the work shows confusion when using an incorrect equation to calculate the correct solution. This response reflects a lack of essential understanding of the underlying mathematical concepts.

An office supply store sells boxes of pencils. Each box contains 160 pencils. Write an equation that represents the total number of pencils, y , in x boxes.

Equation

If $x = 12$ for one day of sales, use your equation to find the total number of pencils the supply store sells.

Show your work.

$60y=1x$
 $y=12x$
 $160 \times 12=1920$

Answer for one day of
12 there is 1920
pencils in each
box. pencils

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts and procedures in the task. Although the number of pencils is correctly calculated, the two equations using variables x and y are incorrect, and the solution is incorrectly interpreted. This response exhibits multiple flaws related to misunderstanding of important aspects of the task.

GUIDE PAPER 9

46

An office supply store sells boxes of pencils. Each box contains 160 pencils. Write an equation that represents the total number of pencils, y , in x boxes.

Equation

$$x \times 160y$$

If $x = 12$ for one day of sales, use your equation to find the total number of pencils the supply store sells.

Show your work.

$$12 \times 160y = 1920 \text{ pencils}$$

Answer

$12 \times 160y$
 $= 1920$ pencils
the supply store
sold 1920 pencils
in the on day of
sales.

pencils

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts and procedures in the task. Although the number of pencils is correctly determined, the work shows confusion of how to use a variable when calculating the correct solution. This response reflects a lack of essential understanding of the underlying mathematical concepts.

GUIDE PAPER 10

46

An office supply store sells boxes of pencils. Each box contains 160 pencils. Write an equation that represents the total number of pencils, y , in x boxes.

Equation

$$160y=1x$$

If $x = 12$ for one day of sales, use your equation to find the total number of pencils the supply store sells.

Show your work.

$$1x \times 12=12x$$

$$120 \times 12=1440$$

Answer

1440

pencils

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. An incorrect equation is written with variables x and y transposed. An irrelevant equation is written in the work area and an incorrect value of 120 is used when determining a solution. Holistically, this response shows no overall understanding.

An office supply store sells boxes of pencils. Each box contains 160 pencils. Write an equation that represents the total number of pencils, y , in x boxes.

Equation _____

If $x = 12$ for one day of sales, use your equation to find the total number of pencils the supply store sells.

Show your work.

$$160 + 12$$

$$x = 148$$

Answer 148 pencils

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. An incorrect solution is obtained using an incorrect procedure. The work shows no understanding.

