

Name: \_\_\_\_\_



# New York State *Testing Program*

---

## 2017 Common Core Mathematics Test Book 1

Grade **5**

May 2–4, 2017

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.

# Grade 5 Mathematics Reference Sheet

## CONVERSIONS

1 mile = 5,280 feet

1 mile = 1,760 yards

1 pound = 16 ounces

1 ton = 2,000 pounds

1 cup = 8 fluid ounces

1 pint = 2 cups

1 quart = 2 pints

1 gallon = 4 quarts

1 liter = 1,000 cubic centimeters

---

## FORMULAS

**Right Rectangular Prism**

---

$V = Bh$  or  $V = lwh$

---

**1**

What part of the expression below should be calculated first?

$$8 + \{22 \times [15 + (14 \times 2)]\}$$

- A  $8 + 22$
- B  $22 \times 15$
- C  $14 \times 2$
- D  $15 + 14$

**2**

Tara baked  $6\frac{1}{2}$  dozen cookies. She sold  $3\frac{2}{6}$  dozen of the cookies she made.

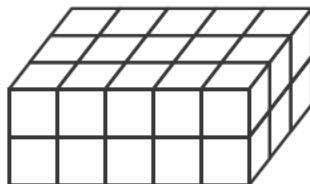
How many dozens of cookies does Tara have remaining?

- A  $3\frac{1}{6}$
- B  $3\frac{1}{4}$
- C  $3\frac{3}{8}$
- D  $3\frac{5}{6}$

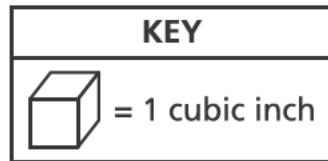
**GO ON**

**3**

Prism A is shown below. The height of Prism B is 2 times the height of Prism A. The length and width of both prisms are the same.



Prism A



What is the volume, in cubic inches, of Prism B?

- A 20
- B 44
- C 45
- D 60

**4**

Which decimal is equivalent to  $\frac{41}{100}$ ?

- A 41.0
- B 4.10
- C 0.41
- D 0.041

**GO ON**

**6**

What number is equivalent to the expanded form shown below?

$$(2 \times 100) + (3 \times 1) + \left(4 \times \frac{1}{10}\right) + \left(3 \times \frac{1}{1,000}\right)$$

- A 203.043
- B 203.403
- C 230.430
- D 230.403

**7**

Which phrase is represented by the expression  $5 \times (36 + 9)$ ?

- A the product of 36 and 5, increased by 9
- B the product of 36 and 9, multiplied by 5
- C the sum of 36 and 9, multiplied by 5
- D the sum of 36 and 5, increased by 9

**GO ON**

**8**

The value of the digit in the hundreds place in the number 653,841 is  $\frac{1}{10}$  the value of the digit in the thousands place in which number?

- A 748,917
- B 749,817
- C 784,917
- D 797,481

**9**

The table below lists the number of layers of centimeter cubes, along with the number of cubes in each layer, in each of four rectangular prisms.

#### LAYERS OF CUBES IN RECTANGULAR PRISMS

Prism	Number of Layers	Number of Cubes in Each Layer
R	3	8
S	5	5
T	6	5
U	7	4

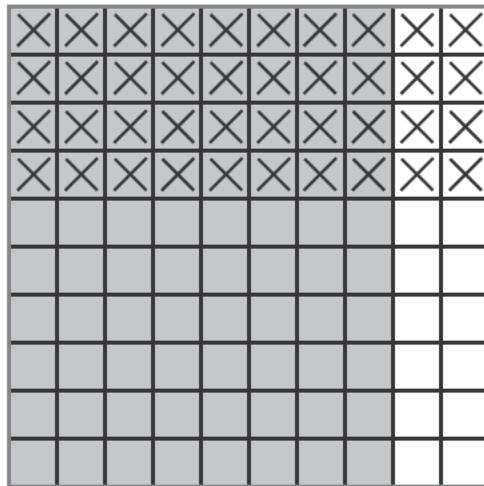
Which rectangular prism has the greatest volume?

- A Prism R
- B Prism S
- C Prism T
- D Prism U

**GO ON**

**12**

The decimal grid shown below is shaded and marked with Xs to model an expression.



Which expression could be modeled by this decimal grid?

- A  $0.08 \times 0.04$
- B  $0.08 \times 0.40$
- C  $0.80 \times 0.04$
- D  $0.80 \times 0.40$

**13**

What is the value of the expression  $\frac{1}{5} \div 4$ ?

- A  $\frac{20}{1}$
- B  $\frac{5}{4}$
- C  $\frac{4}{5}$
- D  $\frac{1}{20}$

**GO ON**

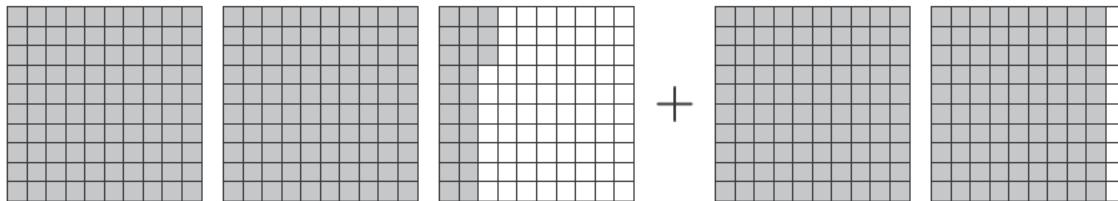
**14**

Mia buys 5 yards of ribbon to make bracelets. She needs 18 inches of ribbon to make 1 bracelet. How many bracelets can Mia make if she uses all the ribbon she buys?

- A 90
- B 10
- C 3
- D 2

**15**

The decimal grids below are shaded to model an expression.



What is the value of the expression modeled by the decimal grids?

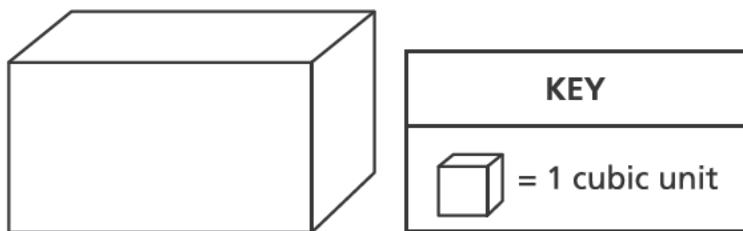
- A 3.29
- B 3.32
- C 4.10
- D 4.13

**GO ON**

**16** Which expression is equivalent to  $\frac{3}{5}$ ?

- A  $3 \times 5$
- B  $3 + 5$
- C  $3 \div 5$
- D  $3 - 5$

**17** Tyler completely filled the box shown below with unit cubes, with no gaps or overlaps.



He then counted the number of cubes that he used to fill the box. What type of measurement is represented by the number of cubes Tyler counted?

- A area
- B height
- C volume
- D perimeter

**GO ON**

**21** Each student in a class plays one of three sports: soccer, volleyball, or basketball.

- $\frac{3}{5}$  of the number of students play soccer
- $\frac{1}{4}$  of the number of students play volleyball

What fraction of the number of students play basketball?

A  $\frac{3}{20}$

B  $\frac{4}{9}$

C  $\frac{5}{9}$

D  $\frac{17}{20}$

**22** What is the value of 0.1561 rounded to the nearest tenth?

A 0.15

B 0.16

C 0.1

D 0.2

**STOP**

# Book 2



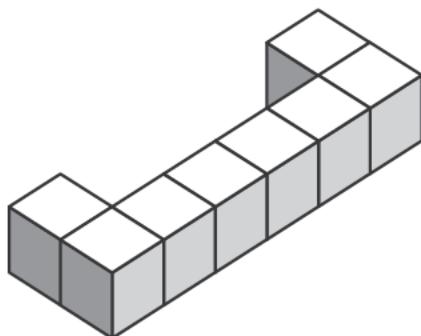
## TIPS FOR TAKING THE TEST

Here are some suggestions to help you do your best:

- Read each question carefully and think about the answer before choosing your response.
- You have been provided with mathematics tools (a ruler 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.

23

The figure below is made of unit cubes.



How many unit cubes need to be added to the figure so that it will have a total volume of 12 cubic units?

- A 1
- B 2
- C 4
- D 8

24

The operation symbol and the exponent are missing in the equation shown below.

$$7,320 \square 10^{\square} = 0.07320$$

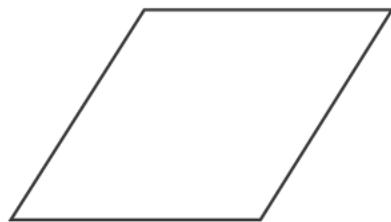
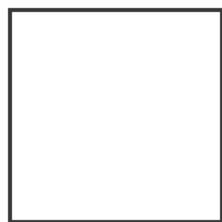
Which operation symbol and exponent should go in the boxes to make the equation true?

- A  $\times$  and 2
- B  $\div$  and 2
- C  $\times$  and 5
- D  $\div$  and 5

**GO ON**

25

A square and a rhombus are shown below.

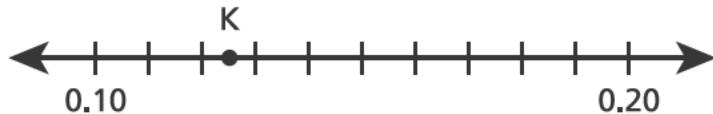


Which attribute is true of one of the shapes but **not** of both?

- A All angles are right angles.
- B All sides are the same length.
- C There are two sets of equal angles.
- D There are two sets of parallel sides.

26

Point K is shown on the number line below.



Which number sentence **best** describes the value represented by point K?

- A  $K > 0.13$
- B  $K < 0.13$
- C  $K = 0.15$
- D  $K = 0.35$

**GO ON**

**27**

The table below shows the distance some players hit a softball.

### SOFTBALL DISTANCES

Name	Distance
Amalia	36 inches
Nick	6 feet
Lila	108 inches

Pablo hit the softball 2 yards. Which player or players hit the softball the same distance as Pablo?

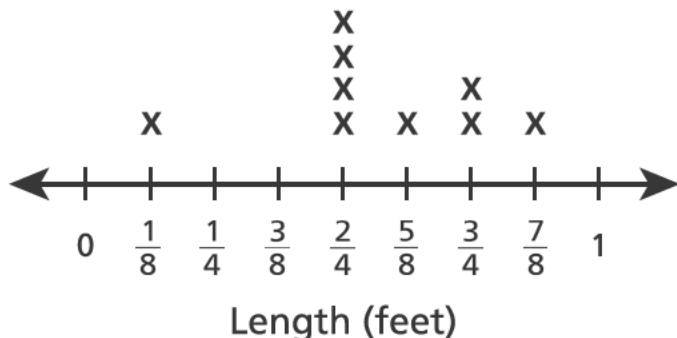
- A Amalia only
- B Nick only
- C Lila only
- D Amalia and Nick

**GO ON**

**28**

The line plot below shows the lengths of all the pieces of string Emma used for an art project. She cut all these pieces from one original piece of string.

### PIECES OF STRING



Emma had 1 foot of string left over. How long, in feet, was the original piece of string?

- A  $1\frac{6}{8}$
- B  $1\frac{7}{8}$
- C  $3\frac{7}{8}$
- D  $6\frac{1}{8}$

**29**

For which values of  $k$  would the product of  $\frac{k}{3} \times 12$  be greater than 12?

- A for any value of  $k$  less than 1 but greater than 0
- B for any value of  $k$  less than 3 but greater than 1
- C for any value of  $k$  equal to 3
- D for any value of  $k$  greater than 3

**GO ON**

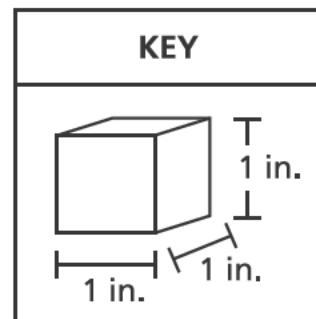
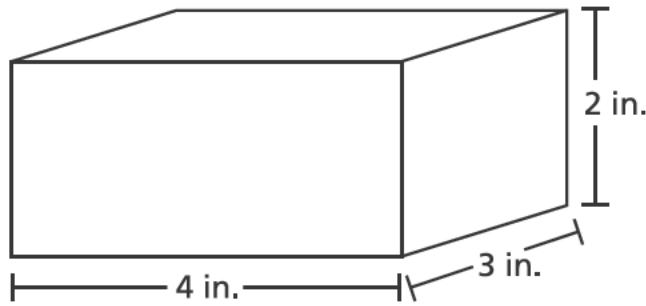
**32**

Each day last week, Ms. Wilson walked  $\frac{3}{4}$  mile. What is the total distance, in miles, that Ms. Wilson walked in 4 days?

- A 1
- B 2
- C 3
- D 4

**33**

A right rectangular prism is shown below. The volume of the prism is determined by using unit cubes.



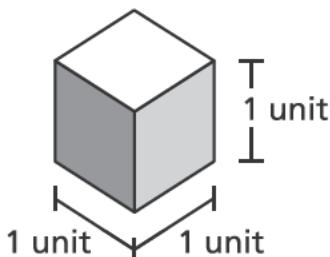
Which statement describes how to determine the volume of the prism in cubic units?

- A Add the length, width, and height:  $4 + 3 + 2$ .
- B Add the length and width and then multiply by the height:  $(4 + 3) \times 2$ .
- C Determine the area of the base and add the number of layers of cubes:  $(4 \times 3) + 2$ .
- D Determine the area of the base and multiply by the number of layers of cubes:  $(4 \times 3) \times 2$ .

**GO ON**

**36**

What is the volume of the cube shown below?



- A 1 cubic unit
- B 3 cubic units
- C 4 cubic units
- D 6 cubic units

**37**

During a hike, 3 friends equally shared  $\frac{1}{2}$  pound of trail mix. What amount of trail mix, in pounds, did each friend receive?

- A  $\frac{1}{6}$
- B  $\frac{3}{2}$
- C  $3\frac{1}{2}$
- D 6

**GO ON**

**41** Which expression has a value greater than  $\frac{1}{2}$ ?

A  $\frac{1}{2} \times \frac{4}{5}$

B  $\frac{1}{2} \times \frac{4}{4}$

C  $\frac{1}{2} \times \frac{5}{5}$

D  $\frac{1}{2} \times \frac{5}{4}$

**42** A science teacher has 0.4 liter of seawater. She gives each of her 22 students a container and a 5-milliliter spoon. She then asks her students to put two spoonfuls of seawater into their containers. How many milliliters of seawater will be left after all 22 students have filled their containers?

A 70

B 180

C 290

D 780

**GO ON**

**43**

What is the value of the expression below?

$$\frac{1}{25} \div 74$$

A  $\frac{1}{1,850}$

B 1,850

C  $\frac{25}{74}$

D  $2\frac{24}{25}$

**44**

Which phrase best describes a figure with dimensions of 2 units by 2 units by 4 units and a volume of 16 cubic units?

A a solid figure that can be filled with 16 cubes that each measure 1 cubic unit

B a solid figure that can be filled with 1 cube that measures 16 units on each edge

C a solid figure that can be covered with 16 squares that each measure 1 square unit

D a solid figure that can be covered with 1 square that measures 16 units on each edge

**GO ON**

**45**

Susan determined that the expression below is equal to 7.59.

$$15.91 - 8.32$$

Which expression can Susan use to check her answer?

- A  $8.32 - 7.59$
- B  $8.32 + 7.59$
- C  $15.91 + 8.32$
- D  $15.91 + 7.59$

**STOP**

# Book 3



## TIPS FOR TAKING THE TEST

Here are some suggestions to help you do your best:

- Read each question carefully and think about the answer before writing your response.
- You have been provided with mathematics tools (a ruler 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.
- Be sure to show your work when asked.

**46**

Harry's fitness trainer recommends that Harry drink 8 fluid ounces of water 8 times a day. Harry has a water bottle that holds  $1\frac{1}{4}$  pints of water when filled. Today, he has filled the water bottle three times and drank all of the water each time. Harry claims that he drank the total amount of water recommended by his fitness trainer. Explain why Harry's claim is not true.

**Answer**

---

---

---

**GO ON**

**47**

Rodney bought a 25-pound bag of dog food. His dog ate  $10\frac{2}{5}$  pounds of the food in the first month and  $10\frac{4}{5}$  pounds of the food in the second month. How much dog food, in pounds, was remaining in the bag at the end of the two months?

*Show your work.*

**Answer** \_\_\_\_\_ pounds

**GO ON**

**48**

Sixteen students in a drama club want to attend a play. The ticket price is \$35 for each student, and the transportation and meals for everyone will cost \$960.

To pay for the trip, the students design sweatshirts to sell for a profit of \$19 per sweatshirt. If each student sells the same number of sweatshirts, how many sweatshirts must each student sell so that there will be enough money to pay for the entire cost of the trip?

*Show your work.*

**Answer** \_\_\_\_\_ sweatshirts

**GO ON**

**49**

Jessie set up a lemonade stand for three days.

- On Saturday, she sold  $10\frac{2}{3}$  gallons of lemonade.
- On Sunday, she sold  $3\frac{1}{3}$  gallons more than she sold on Saturday.
- On Monday, she sold  $2\frac{2}{3}$  gallons less than she sold on Sunday.

How many gallons of lemonade did Jessie sell on Monday?

*Show your work.*

*Answer* \_\_\_\_\_ gallons

**GO ON**

**50**

Three students performed a science experiment using salt and a beaker. The beaker contained 530.2 grams of salt before the experiment started. During the experiment, each of the 3 students removed 47.36 grams of salt from the beaker.

How much salt, in grams, was left in the beaker at the end of the experiment?

*Show your work.*

*Answer* \_\_\_\_\_ grams

**GO ON**

**51**

The dimensions of Mr. Tai's living room are  $10 \text{ feet} \times 18 \text{ feet} \times 8 \text{ feet}$ , and the dimensions of his family room are  $14 \text{ feet} \times 20 \text{ feet} \times 8 \text{ feet}$ . What is the total volume, in cubic feet, of the two rooms?

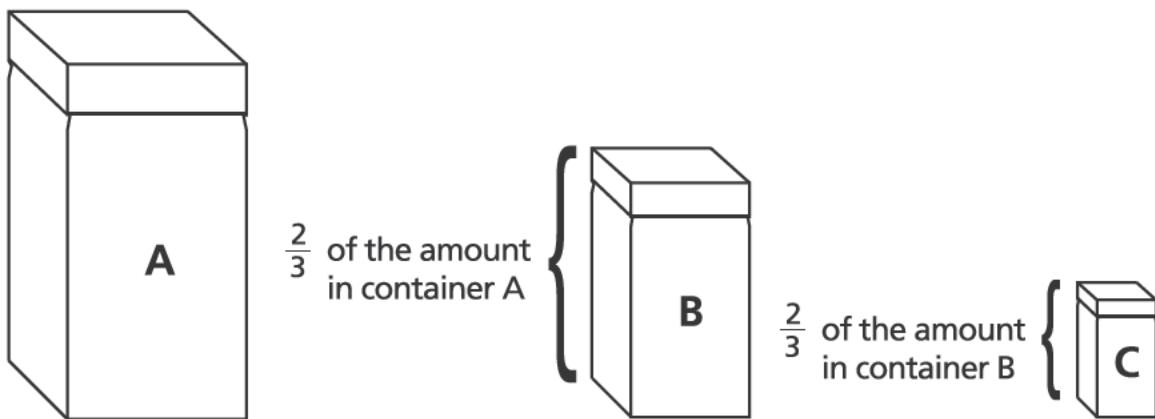
*Show your work.*

*Answer* \_\_\_\_\_ cubic feet

**GO ON**

52

The diagram below shows a set of three different-sized containers Tanner used for storing dry goods. The largest container held  $12\frac{3}{4}$  cups of dry goods.



What was the total amount, in cups, of dry goods that Tanner could store in all three containers?

*Show your work.*

Answer \_\_\_\_\_ cups

**GO ON**

**53**

A juice company produced 8,064 cartons of juice in 21 days. Each day, they produced the same number of cartons and delivered those cartons to 16 area coffee shops. The cartons were delivered in cases of six cartons per case, and each coffee shop received an equal number of cases in each delivery. How many cases were delivered to each coffee shop each day?

*Show your work.*

*Answer* \_\_\_\_\_ cases

**GO ON**

**54**

For 4 weeks in June, Cameron biked  $3\frac{1}{4}$  miles each week and swam  $2\frac{1}{2}$  miles each week. For 3 weeks in July, he biked  $4\frac{3}{4}$  miles each week and swam  $3\frac{1}{2}$  miles each week.

How much greater was the total distance Cameron biked and swam in July compared to the total distance he biked and swam in June?

*Show your work.*

**Answer** \_\_\_\_\_ mile(s)

**GO ON**

55

The table below shows part of the operating budget of a small dairy farm for last year. The only expense not listed in the table is maintenance.

**LAST YEAR'S  
OPERATING BUDGET**

Expense	Fraction of Budget
Food	$\frac{1}{3}$
Housing	$\frac{1}{3}$
Medical Care	$\frac{1}{4}$

This year, the managers of the farm will change the fraction of the budget for housing to  $\frac{1}{8}$  but will leave the fraction of the budget for food and medical care the same.

Again, the remaining portion of the budget will be for maintenance expenses. What is the difference between the fraction of the budget for maintenance this year and last year?

*Show your work.*

*Answer* \_\_\_\_\_

**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 5**

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)	
<b>Book 1</b>										
1	Multiple Choice	C	1	CCSS.Math.Content.5.OA.A.1	Operations and Algebraic Thinking		0.85			
2	Multiple Choice	A	1	CCSS.Math.Content.5.NF.A.1	Number and Operations—Fractions		0.82			
3	Multiple Choice	D	1	CCSS.Math.Content.5.MD.C.4	Measurement and Data		0.76			
4	Multiple Choice	C	1	CCSS.Math.Content.4.NF.C.6	Number and Operations in Base Ten		0.75			
6	Multiple Choice	B	1	CCSS.Math.Content.5.NBT.A.3a	Number and Operations in Base Ten		0.71			
7	Multiple Choice	C	1	CCSS.Math.Content.5.OA.A.2	Operations and Algebraic Thinking		0.71			
8	Multiple Choice	A	1	CCSS.Math.Content.5.NBT.A.1	Number and Operations in Base Ten		0.40			
9	Multiple Choice	C	1	CCSS.Math.Content.5.MD.C.5b	Measurement and Data		0.74			
12	Multiple Choice	D	1	CCSS.Math.Content.5.NBT.B.7	Number and Operations in Base Ten		0.40			
13	Multiple Choice	D	1	CCSS.Math.Content.5.NF.B.7a	Number and Operations—Fractions		0.65			
14	Multiple Choice	B	1	CCSS.Math.Content.5.MD.A.1	Measurement and Data		0.49			
15	Multiple Choice	D	1	CCSS.Math.Content.5.NBT.B.7	Number and Operations in Base Ten		0.75			
16	Multiple Choice	C	1	CCSS.Math.Content.5.NF.B.3	Number and Operations—Fractions		0.70			
17	Multiple Choice	C	1	CCSS.Math.Content.5.MD.C.3a	Measurement and Data		0.66			
21	Multiple Choice	A	1	CCSS.Math.Content.5.NF.A.2	Number and Operations—Fractions		0.63			
22	Multiple Choice	D	1	CCSS.Math.Content.5.NBT.A.4	Number and Operations in Base Ten		0.51			
<b>Book 2</b>										
23	Multiple Choice	C	1	CCSS.Math.Content.5.MD.C.3b	Measurement and Data		0.88			
24	Multiple Choice	D	1	CCSS.Math.Content.5.NBT.A.2	Number and Operations in Base Ten		0.46			
25	Multiple Choice	A	1	CCSS.Math.Content.5.G.B.3	Geometry		0.59			
26	Multiple Choice	B	1	CCSS.Math.Content.5.NBT.A.3b	Number and Operations in Base Ten		0.68			

### Released Questions on EngageNY

**Grade 5**

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)	
27	Multiple Choice	B	1	CCSS.Math.Content.4.MD.A.1	Measurement and Data		0.61			
28	Multiple Choice	D	1	CCSS.Math.Content.5.MD.B.2	Measurement and Data		0.52			
29	Multiple Choice	D	1	CCSS.Math.Content.5.NF.B.5b	Number and Operations—Fractions		0.59			
32	Multiple Choice	C	1	CCSS.Math.Content.5.NF.B.4	Number and Operations—Fractions		0.77			
33	Multiple Choice	D	1	CCSS.Math.Content.5.MD.C.5a	Measurement and Data		0.79			
36	Multiple Choice	A	1	CCSS.Math.Content.5.MD.C.3a	Measurement and Data		0.73			
37	Multiple Choice	A	1	CCSS.Math.Content.5.NF.B.7	Number and Operations—Fractions		0.58			
41	Multiple Choice	D	1	CCSS.Math.Content.5.NF.B.5a	Number and Operations—Fractions		0.61			
42	Multiple Choice	B	1	CCSS.Math.Content.5.MD.A.1	Measurement and Data		0.45			
43	Multiple Choice	A	1	CCSS.Math.Content.5.NF.B.7a	Number and Operations—Fractions		0.60			
44	Multiple Choice	A	1	CCSS.Math.Content.5.MD.C.3b	Measurement and Data		0.64			
45	Multiple Choice	B	1	CCSS.Math.Content.5.NBT.B.7	Number and Operations in Base Ten		0.76			

**Book 3**

46	Constructed Response		2	CCSS.Math.Content.5.MD.A.1	Measurement and Data			0.57	0.29
47	Constructed Response		2	CCSS.Math.Content.5.NF.A.2	Number and Operations—Fractions			1.00	0.50
48	Constructed Response		2	CCSS.Math.Content.5.NBT.B.6	Number and Operations in Base Ten			0.56	0.28
49	Constructed Response		2	CCSS.Math.Content.5.NF.A.2	Number and Operations—Fractions			1.03	0.51
50	Constructed Response		2	CCSS.Math.Content.5.NBT.B.7	Number and Operations in Base Ten			0.98	0.49
51	Constructed Response		2	CCSS.Math.Content.5.MD.C.5b	Measurement and Data			1.30	0.65
52	Constructed Response		3	CCSS.Math.Content.5.NF.B.6	Number and Operations—Fractions			0.58	0.19
53	Constructed Response		3	CCSS.Math.Content.5.NBT.B.6	Number and Operations in Base Ten			1.18	0.39
54	Constructed Response		3	CCSS.Math.Content.5.NF.B.6	Number and Operations—Fractions	CCSS.Math.Content.5.NF.A.1		1.12	0.37
55	Constructed Response		3	CCSS.Math.Content.5.NF.A.2	Number and Operations—Fractions			1.25	0.42

\*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**

<b>2 Point</b>	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"><li>• indicates that the student has completed the task correctly, using mathematically sound procedures</li><li>• contains sufficient work to demonstrate a thorough understanding of the mathematical concepts and/or procedures</li><li>• may contain inconsequential errors that do not detract from the correct solution and the demonstration of a thorough understanding</li></ul>
<b>1 Point</b>	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"><li>• correctly addresses only some elements of the task</li><li>• may contain an incorrect solution but applies a mathematically appropriate process</li><li>• may contain the correct solution but required work is incomplete</li></ul>
<b>0 Point*</b>	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:

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

## **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

**46**

Harry's fitness trainer recommends that Harry drink 8 fluid ounces of water 8 times a day. Harry has a water bottle that holds  $1\frac{1}{4}$  pints of water when filled. Today, he has filled the water bottle three times and drank all of the water each time. Harry claims that he drank the total amount of water recommended by his fitness trainer. Explain why Harry's claim is not true.

Recommended amount of water:  $8\text{ oz.} \times 8 \text{ times a day} = 64 \text{ fl. oz. a day}$

One pint equals 16 ounces:  $64 \div 16 = 4$  pints recommended per day

Harry drinks  $1\frac{1}{4}$  pints of water three times:  $1\frac{1}{4} \times 3 = 3\frac{3}{4}$  pints of water

Harry should drink an additional  $\frac{1}{4}$  pint of water

Or other valid response

## GUIDE PAPER 1

Additional

46

Harry's fitness trainer recommends that Harry drink 8 fluid ounces of water 8 times a day. Harry has a water bottle that holds  $1\frac{1}{4}$  pints of water when filled. Today, he has filled the water bottle three times and drank all of the water each time. Harry claims that he drank the total amount of water recommended by his fitness trainer. Explain why Harry's claim is not true.

**Answer**

Harry's claim is not true because  
eight fluid oz 8 times a day is 4 pints.  
If he drank  $1\frac{1}{4}$  pints 3 times he only  
drank  $3\frac{3}{4}$  pt, he needs to drink  $\frac{1}{4}$  of a pint  
more of water.

$$8 \text{ fl oz} \times 8 = 8 \text{ cups} = 4 \text{ pt}$$

$$8 \text{ fl oz} = 1 \text{ cup}$$

$$\begin{array}{r} 1\frac{1}{4} \\ 1\frac{1}{4} \\ + 1\frac{1}{4} \\ \hline 3\frac{3}{4} \text{ pt} \end{array}$$

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total number of pints recommended per day is correctly identified and compared to the number of pints that Harry drank in a day. This response is complete and correct using mathematically sound procedures.

## GUIDE PAPER 2

46

Harry's fitness trainer recommends that Harry drink 8 fluid ounces of water 8 times a day. Harry has a water bottle that holds  $1\frac{1}{4}$  pints of water when filled. Today, he has filled the water bottle three times and drank all of the water each time. Harry claims that he drank the total amount of water recommended by his fitness trainer. Explain why Harry's claim is not true.

**Answer**

Because he would only have drunk 60 ounces of water not the 64 he needs.

$$1 \text{ pint} = 16 \text{ fl oz}$$
$$\begin{array}{r} \times 3 \\ \hline 48 \\ + 12 \\ \hline 60 \end{array}$$
$$4 \overline{)16} \quad \begin{array}{r} \times 3 \\ \hline 12 \end{array}$$

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total number of fluid ounces recommended to drink per day is correctly identified and appropriately compared to the total number of actual fluid ounces Harry drank in a day. This response is complete and correct using mathematically sound procedures.

## GUIDE PAPER 3

46

Harry's fitness trainer recommends that Harry drink 8 fluid ounces of water 8 times a day. Harry has a water bottle that holds  $1\frac{1}{4}$  pints of water when filled. Today, he has filled the water bottle three times and drank all of the water each time. Harry claims that he drank the total amount of water recommended by his fitness trainer. Explain why Harry's claim is not true.

**Answer**

No, because he drank  $3\frac{3}{4}$  pints of water not 4, which ~~is~~ what which his trainer recommends.

$$\begin{array}{r} \frac{1}{4} \times \frac{3}{4} = \frac{3}{16} \\ 1\frac{1}{4} \times 3 \\ \hline \frac{3}{16} \end{array} \quad \begin{array}{r} \frac{3}{16} \times 8 \\ \hline 64 \end{array}$$

$$8 \overline{) 64} \quad 8 \text{ cups}$$

u p+

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total number of pints recommended per day is correctly identified and correctly compared to the number of pints that Harry drank in one day. This response is complete and correct using mathematically sound procedures.

## GUIDE PAPER 4

46

Harry's fitness trainer recommends that Harry drink 8 fluid ounces of water

8 times a day. Harry has a water bottle that holds  $1\frac{1}{4}$  pints of water when filled.

Today, he has filled the water bottle three times and drank all of the water each time.

Harry claims that he drank the total amount of water recommended by his fitness trainer. Explain why Harry's claim is not true.

**Answer**

Harry's claim is not true because Harry's

fitness trainer wanted him to drink 64 fluid

ounces, or 8 pints of water each day-

$1\frac{1}{4} \text{ pints} \times 3 = 3\frac{3}{4} \text{ pints}$ , which is not enough water.

Therefore, Harry's claim is not true.

Must drink - 64 fl oz. =  $8\frac{3}{4}$  pints

He drank -  $3\frac{3}{4}$  pint

$$\begin{array}{r} 2\frac{1}{4} \\ \times 3 \\ \hline 6\frac{3}{4} \end{array}$$

Diagram of a water bottle with four sections labeled "PP".

$$4 \overline{)15} \quad \begin{array}{r} 3\frac{3}{4} \\ - 12 \\ \hline 3 \end{array}$$

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The total number of fluid ounces recommended per day and the total number of pints that Harry drank in a day is correctly identified; however, there is an incorrect conversion of fluid ounces to pints for the recommended daily amount. The response correctly addresses only some elements of the task.

## GUIDE PAPER 5

46

Harry's fitness trainer recommends that Harry drink 8 fluid ounces of water 8 times a day. Harry has a water bottle that holds  $1\frac{1}{4}$  pints of water when filled. Today, he has filled the water bottle three times and drank all of the water each time. Harry claims that he drank the total amount of water recommended by his fitness trainer. Explain why Harry's claim is not true.

**Answer**

Harry's claim is incorrect, because his fitness trainer said to drink 8 fluid ounces 8 times a day, which would be 64 and he only got 48 fluid ounces.

$$8 \times 8 = 64$$

$$4 \times 3 = 12$$

12 fluid ounces / 8 fluid ounces = 1.5

$$\begin{aligned} 1\frac{1}{4} - \frac{5}{4} &= \frac{4}{4} = 1 \text{ pint} + 3 \text{ pints} = 4 \text{ pints} \\ \frac{5}{4} \times \frac{3}{1} &= \frac{15}{4} = 3\frac{3}{4} \text{ pints} = 4 \text{ cups} \\ 10 \text{ fluid} &\quad 10 \text{ cups} = 48 \text{ fluid} \\ 8 \times 6 &= 48 \text{ fluid} \quad \text{ounces} \end{aligned}$$

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The total number of fluid ounces recommended per day is correctly identified; however, the total fluid ounces that Harry drank in one day is not identified correctly, and only 3 pints are accounted for and not the additional  $\frac{3}{4}$  of a pint. This response correctly addresses only some elements of the task.

## GUIDE PAPER 6

46

Harry's fitness trainer recommends that Harry drink 8 fluid ounces of water 8 times a day. Harry has a water bottle that holds  $1\frac{1}{4}$  pints of water when filled. Today, he has filled the water bottle three times and drank all of the water each time. Harry claims that he drank the total amount of water recommended by his fitness trainer. Explain why Harry's claim is not true.

**Answer**

If 1 pint is 2 cups, 3 times it's 6 cups. But 3 one-fourths is  $\frac{3}{4}$ .  $6 + \frac{3}{4} = 6\frac{3}{4}$ . However  $6\frac{3}{4}$  in fluid ounces is  $54$  fluid ounces. But he needs 64 fluid ounces.  $54 < 64$ .

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The total fluid ounces recommended per day is correctly identified and a correct comparison is made between what Harry drank and the recommended amount; however, the actual amount of water Harry consumed is incorrect. This response correctly addresses only some elements of the task.

## GUIDE PAPER 7

46

Harry's fitness trainer recommends that Harry drink 8 fluid ounces of water

8 times a day. Harry has a water bottle that holds  $1\frac{1}{4}$  pints of water when filled.

Today, he has filled the water bottle three times and drank all of the water each time.

Harry claims that he drank the total amount of water recommended by his fitness trainer. Explain why Harry's claim is not true.

**Answer**

Harry's claim is not true. He is not true because  
I multiplied  $3 \times 1\frac{1}{4}$  and got  $3\frac{1}{4}$ .

$$\begin{array}{r} 1\frac{1}{4} \\ \times 3 \\ \hline 3\frac{1}{4} \end{array}$$

**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 number of pints that Harry drank in one day is identified, it is incorrect. The recommended amount is not addressed and no comparison is made.

## GUIDE PAPER 8

Additional

46

Harry's fitness trainer recommends that Harry drink 8 fluid ounces of water 8 times a day. Harry has a water bottle that holds  $1\frac{1}{4}$  pints of water when filled. Today, he has filled the water bottle three times and drank all of the water each time. Harry claims that he drank the total amount of water recommended by his fitness trainer. Explain why Harry's claim is not true.

**Answer**

Harry's claim is not true because he drank less than his doctor had told him he had to. 1 pint equals 2 cups. 1 cup = 8 fluid ounces. Harry drank  $3\frac{1}{4}$  pints of water. Harry was supposed to have 1 cup 8 times a day.  
1 cup = 8 fluid ounces  
1 pint = 2 cups

### 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 response copies some of the relevant conversions from the reference sheet, but the amount of water Harry drank is incorrectly identified and the recommended amount is not calculated.

## EXEMPLARY RESPONSE

47

Rodney bought a 25-pound bag of dog food. His dog ate  $10\frac{2}{5}$  pounds of the food in the first month and  $10\frac{4}{5}$  pounds of the food in the second month. How much dog food, in pounds, was remaining in the bag at the end of the two months?

*Show your work.*

$$10\frac{2}{5} + 10\frac{4}{5} = 20\frac{6}{5} \text{ or } 21\frac{1}{5}$$

$$25 - 21\frac{1}{5} = 24\frac{5}{5} - 21\frac{1}{5} = 3\frac{4}{5}$$

Or other valid response

Answer  $\underline{\hspace{2cm}}$   $3\frac{4}{5}$  pounds

## GUIDE PAPER 1

Additional

47

Rodney bought a 25-pound bag of dog food. His dog ate  $10\frac{2}{5}$  pounds of the food in the first month and  $10\frac{4}{5}$  pounds of the food in the second month. How much dog food, in pounds, was remaining in the bag at the end of the two months?

Show your work.

$$10\frac{2}{5} + 10\frac{4}{5} = 20\frac{6}{5} = 21\frac{1}{5}$$

$$25 - 21\frac{1}{5} =$$

$$\frac{125}{5} - \frac{106}{5} = \frac{19}{5} = \underline{\underline{3\frac{4}{5}}}$$

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

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total amount of dog food consumed for the two months is correctly calculated and the difference between the amount purchased and the amount consumed is correctly determined using mathematically sound procedures.

## GUIDE PAPER 2

47

Rodney bought a 25-pound bag of dog food. His dog ate  $10\frac{2}{5}$  pounds of the food in the first month and  $10\frac{4}{5}$  pounds of the food in the second month. How much dog food, in pounds, was remaining in the bag at the end of the two months?

Show your work.

$$\frac{54}{5} + \frac{52}{5} = \frac{106}{5}$$

$$21\frac{2}{5}$$

*Carry over*

$$\begin{array}{r} 21\frac{2}{5} \\ 5 \overline{)106} \\ -10 \\ \hline 6 \\ -5 \\ \hline 1 \\ -1 \\ \hline 0 \end{array}$$

$$25 - 21\frac{2}{5}$$

$$\frac{125}{5} - \frac{106}{5} =$$

$$\begin{array}{r} 125 \\ -106 \\ \hline 19 \end{array} \quad \begin{array}{r} 25 \\ \times 5 \\ \hline 125 \end{array}$$

$$\frac{19}{5} = \boxed{3\frac{4}{5}}$$

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

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total amount of dog food consumed for the two months is correctly calculated and the difference between the amount purchased and the amount consumed is correctly determined using mathematically sound procedures.

## GUIDE PAPER 3

47

Rodney bought a 25-pound bag of dog food. His dog ate  $10\frac{2}{5}$  pounds of the food in the first month and  $10\frac{4}{5}$  pounds of the food in the second month. How much dog food, in pounds, was remaining in the bag at the end of the two months?

Show your work.

$$\begin{array}{r} 25 \frac{5}{5} \\ - 10 \frac{4}{5} \\ \hline 14 \frac{1}{5} \end{array} \quad \begin{array}{r} 14 \frac{1}{5} \\ - 10 \frac{4}{5} \\ \hline 3 \frac{1}{5} \text{ lbs} \\ \uparrow \\ \text{answer} \end{array}$$

Answer  $3\frac{1}{5}$  pounds

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total amount of dog food consumed for the two months is correctly calculated and the difference between the amount purchased and the amount consumed is correctly determined using mathematically sound procedures.

## GUIDE PAPER 4

47

Rodney bought a 25-pound bag of dog food. His dog ate  $10\frac{2}{5}$  pounds of the food in the first month and  $10\frac{4}{5}$  pounds of the food in the second month. How much dog food, in pounds, was remaining in the bag at the end of the two months?

Show your work.

$$\begin{array}{r} 25 \\ - 10 \frac{2}{5} \\ \hline 14 \frac{3}{5} \\ - 10 \frac{4}{5} \\ \hline 4 \frac{3}{5} \end{array}$$

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

### Score Point 1 (out of 2 points)

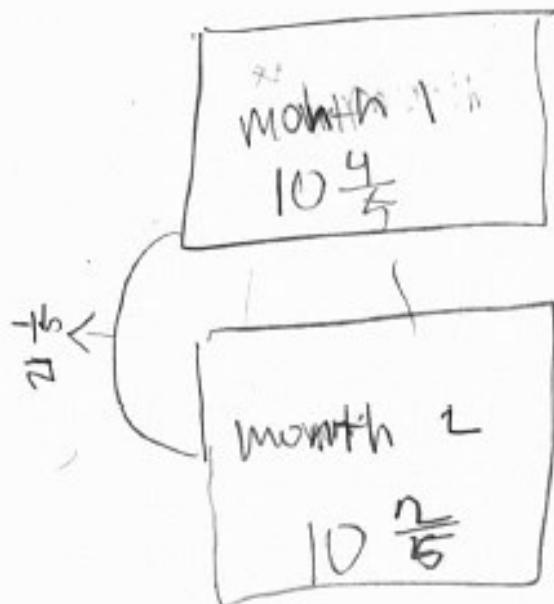
This response demonstrates only a partial understanding of the mathematical concepts in the task. The response starts with the total amount of dog food purchased and subtracts the amount consumed in the first month and then the amount consumed in the second month; however, a calculation error occurs in the subtraction operation for the first month. This response contains an incorrect solution but applies a mathematically appropriate process.

## GUIDE PAPER 5

47

Rodney bought a 25-pound bag of dog food. His dog ate  $10\frac{2}{5}$  pounds of the food in the first month and  $10\frac{4}{5}$  pounds of the food in the second month. How much dog food, in pounds, was remaining in the bag at the end of the two months?

Show your work.



Answer  $2\frac{1}{5}$  pounds

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The total amount of dog food consumed during the two months is correctly determined; however, the difference between the amount purchased and the amount consumed is not addressed. This response correctly addresses only some elements of the task.

## GUIDE PAPER 6

47

Rodney bought a 25-pound bag of dog food. His dog ate  $10\frac{2}{5}$  pounds of the food in the first month and  $10\frac{4}{5}$  pounds of the food in the second month. How much dog food, in pounds, was remaining in the bag at the end of the two months?

Show your work.

/

$$\begin{array}{r} 10\frac{2}{5} \\ + 10\frac{4}{5} \\ \hline 20\frac{6}{5} = 21\frac{1}{5} \end{array}$$

Answer  $3\frac{1}{5}$  pounds

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The total amount of dog food consumed during the two months is appropriately determined; however, the work to determine the difference between the purchased amount and consumed amount is not provided. This response contains the correct solution but required work is incomplete.

## GUIDE PAPER 7

47

Rodney bought a 25-pound bag of dog food. His dog ate  $10\frac{2}{5}$  pounds of the food in the first month and  $10\frac{4}{5}$  pounds of the food in the second month. How much dog food, in pounds, was remaining in the bag at the end of the two months?

Show your work.

$$\begin{array}{r} 10 \frac{4}{5} \\ - 10 \frac{4}{5} \\ \hline \frac{2}{5} \end{array}$$

Answer  $\frac{2}{5}$  pounds

**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 difference between the amounts of dog food consumed in the two months is irrelevant to the task.

## GUIDE PAPER 8

Additional

47

Rodney bought a 25-pound bag of dog food. His dog ate  $10\frac{2}{5}$  pounds of the food in the first month and  $10\frac{4}{5}$  pounds of the food in the second month. How much dog food, in pounds, was remaining in the bag at the end of the two months?

Show your work.

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

### 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, as per Scoring Policy #3, if students are directed to show work, a correct answer with no work shown receives no credit.

## EXEMPLARY RESPONSE

48

Sixteen students in a drama club want to attend a play. The ticket price is \$35 for each student, and the transportation and meals for everyone will cost \$960.

To pay for the trip, the students design sweatshirts to sell for a profit of \$19 per sweatshirt. If each student sells the same number of sweatshirts, how many sweatshirts must each student sell so that there will be enough money to pay for the entire cost of the trip?

*Show your work.*

$$\$960 + 16 (\$35) = \text{Cost of trip for all 16 students}$$

$$\$960 + \$560 = \$1520 \text{ cost of trip for all 16 students}$$

$$\$1520 \div 16 = \$95 \text{ cost per student}$$

$$\$95 \div \$19 = 5 \text{ sweatshirts each student must sell}$$

Or other valid response

*Answer* \_\_\_\_\_ 5 sweatshirts

# GUIDE PAPER 1

Additional

48

Sixteen students in a drama club want to attend a play. The ticket price is \$35 for each student, and the transportation and meals for everyone will cost \$960.

To pay for the trip, the students design sweatshirts to sell for a profit of \$19 per sweatshirt. If each student sells the same number of sweatshirts, how many sweatshirts must each student sell so that there will be enough money to pay for the entire cost of the trip?

Show your work.

Step 1	Step 2	Step 3	Step 4
$\begin{array}{r} 35 \\ \times 16 \\ \hline 210 \\ +350 \\ \hline 560 \end{array}$	$\begin{array}{r} 560 \\ +960 \\ \hline 1520 \end{array}$	$\begin{array}{r} 1911520 \\ -1520 \\ \hline 0 \end{array}$	$\begin{array}{r} 16180 \\ -80 \\ \hline 0 \end{array}$

5 sweatshirts

Answer 5 sweatshirts

## Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total amount of money needed to attend the play is correctly calculated and used to correctly determine the number of sweatshirts that each student needs to sell using mathematically sound procedures.

## GUIDE PAPER 2

48

Sixteen students in a drama club want to attend a play. The ticket price is \$35 for each student, and the transportation and meals for everyone will cost \$960.

To pay for the trip, the students design sweatshirts to sell for a profit of \$19 per sweatshirt. If each student sells the same number of sweatshirts, how many sweatshirts must each student sell so that there will be enough money to pay for the entire cost of the trip?

Show your work.

$$\begin{array}{r} \$35 \\ \times 16 \\ \hline \$560 \end{array}$$

$$\begin{array}{r} \$960 \\ + 560 \\ \hline \$1520 \end{array}$$

$$\begin{array}{r} 16 \overline{) 1520} \\ -144 \\ \hline 80 \\ -80 \\ \hline 0 \end{array} \quad \begin{array}{r} 19 \overline{) 95} \\ -95 \\ \hline 0 \end{array}$$

Answer \_\_\_\_\_

5 sweatshirts each

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total amount of money needed to attend the play is correctly calculated and used to determine the correct number of sweatshirts that each student needs to sell.

## GUIDE PAPER 3

48

Sixteen students in a drama club want to attend a play. The ticket price is \$35 for each student, and the transportation and meals for everyone will cost \$960.

To pay for the trip, the students design sweatshirts to sell for a profit of \$19 per sweatshirt. If each student sells the same number of sweatshirts, how many sweatshirts must each student sell so that there will be enough money to pay for the entire cost of the trip?

Show your work.

$$\begin{array}{r} \$60 \\ + 35 \\ \hline \$95 \text{ total} \end{array}$$

$$\begin{array}{r} \$60 \\ 16 \overline{) 960} \\ - 960 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 16 \text{ students} \\ \times \$60 \\ \hline \$960 \end{array}$$

$$\begin{array}{r} 19 \\ \times 5 \\ \hline 95 \end{array}$$

$$\begin{array}{r} 5 \\ 19 \overline{) 95} \\ - 95 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 19 \overline{) 28515} \\ - 19 \\ \hline \$16 \end{array}$$

~~19 left over~~  
~~9 pieces~~

~~5~~  
+ 0 left over  
~~(5)~~

Answer

5

sweatshirts each

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total cost for transportation and meals is correctly divided among all students and that amount is then added to the price of one ticket to determine the total cost per student. The cost for one student is correctly divided by the profit from one sweatshirt to determine the correct number of sweatshirts that each student must sell.

## GUIDE PAPER 4

48

Sixteen students in a drama club want to attend a play. The ticket price is \$35 for each student, and the transportation and meals for everyone will cost \$960.

To pay for the trip, the students design sweatshirts to sell for a profit of \$19 per sweatshirt. If each student sells the same number of sweatshirts, how many sweatshirts must each student sell so that there will be enough money to pay for the entire cost of the trip?

*Step 1*

Show your work.

$$\begin{array}{r} \$35 \text{ money for tickets} \\ \times 16 \text{ students} \\ \hline \$210 \\ + 350 \\ \hline \$560 \rightarrow \text{amount of money for all tickets} \end{array}$$

*Step 2*

$$\begin{array}{r} \$560 \rightarrow \text{money for tickets} \\ + \$960 \rightarrow \text{money for transportation meals} \\ \hline \$1520 \rightarrow \text{money that needs to be paid} \end{array}$$

$$\begin{array}{r} 4 \\ 19 \quad 5 \\ \times 5 \quad \times 6 \\ \hline 95 \quad 114 \\ 19 \quad 19 \\ \hline 133 \quad 152 \end{array}$$

in total

$$\begin{array}{r} \$1520 \\ \overline{- 152} \\ \hline 0000 \\ \overline{- 0} \\ \hline 0 \end{array}$$

*Step 3*

T shirts  
lost+money needed

Number of shirts needed to be sold

Answer 80 sweatshirts

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The total amount of money needed for all students to attend the play and the total number of sweatshirts that need to be sold by all students is correctly calculated; however, the number of sweatshirts that need to be sold by one student is not determined. This response correctly addresses only some elements of the task.

## GUIDE PAPER 5

48

- 16 Sixteen students in a drama club want to attend a play. The ticket price is \$35 for each student, and the transportation and meals for everyone will cost \$960.

To pay for the trip, the students design sweatshirts to sell for a profit of \$19 per sweatshirt. If each student sells the same number of sweatshirts, how many sweatshirts must each student sell so that there will be enough money to pay for the entire cost of the trip?

Show your work.

$$\begin{array}{r} 16 \\ \times 35 \\ \hline 80 \\ 48 \\ \hline 560 \end{array}$$

$$\begin{array}{r} \$560 \rightarrow \text{tickets} \\ + \$960 \rightarrow \text{transportation \& meals} \\ \hline \$1520 \rightarrow \text{Total cost} \end{array}$$

Answer \_\_\_\_\_ sweatshirts

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The total amount of money needed for all students to attend the play is correctly calculated; however, the number of sweatshirts that need to be sold is not addressed. This response correctly addresses only some elements of the task.

## GUIDE PAPER 6

48

Sixteen students in a drama club want to attend a play. The ticket price is \$35 for each student, and the transportation and meals for everyone will cost \$960.

To pay for the trip, the students design sweatshirts to sell for a profit of \$19 per sweatshirt. If each student sells the same number of sweatshirts, how many sweatshirts must each student sell so that there will be enough money to pay for the entire cost of the trip?

**Show your work.**

$$\begin{array}{r} 3 \\ 35 \\ \times 16 \\ \hline 210 \\ +35 \\ \hline 560 \\ +960 \\ \hline 1520 \end{array}$$

$$\begin{array}{r} 80 \\ 19 \overline{)1520} \\ -15 \\ \hline 20 \\ -19 \\ \hline 10 \\ -10 \\ \hline 0 \end{array} \qquad \begin{array}{r} 6 \\ 19 \\ \times 7 \\ \hline 133 \\ +19 \\ \hline 152 \end{array}$$

**Answer** 80 sweatshirts

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The total amount of money needed for all students to attend the play and the total number of sweatshirts that need to be sold by all students is correctly calculated; however, the number of sweatshirts that need to be sold by one student is not determined. This response correctly addresses only some elements of the task.

## GUIDE PAPER 7

48

Sixteen students in a drama club want to attend a play. The ticket price is \$35 for each student, and the transportation and meals for everyone will cost \$960.

To pay for the trip, the students design sweatshirts to sell for a profit of \$19 per sweatshirt. If each student sells the same number of sweatshirts, how many sweatshirts must each student sell so that there will be enough money to pay for the entire cost of the trip?

Show your work.

$$\begin{array}{r} 50 \\ 19 \overline{) 960} \\ -95 \\ \hline 10 \end{array} \quad \begin{array}{r} 354 \\ 19 \times 4 \\ 19 \times 6 \\ \hline 76 \\ 114 \\ \hline 95 \\ 0 \\ \hline 10 \end{array}$$

Answer 50 sweatshirts

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 shown is incoherent and incorrect.

## GUIDE PAPER 8

Additional

48

Sixteen students in a drama club want to attend a play. The ticket price is \$35 for each student, and the transportation and meals for everyone will cost \$960.

To pay for the trip, the students design sweatshirts to sell for a profit of \$19 per sweatshirt. If each student sells the same number of sweatshirts, how many sweatshirts must each student sell so that there will be enough money to pay for the entire cost of the trip?

Show your work.

$$\begin{array}{r} \$19 \\ \times 16 \\ \hline \$35 \\ + 35 \\ \hline \$80 \\ \times 80 \\ \hline 480 \\ \hline 560 \end{array} \quad \begin{array}{r} \$960 \\ \times 16 \\ \hline 5760 \\ \hline 9600 \\ \hline 15360 \end{array}$$

$$\begin{array}{r} 15,360 \\ + 560 \\ \hline 15,920 \end{array}$$

$$\begin{array}{r} 995 \text{ per sweatshirt} \\ 16 \overline{) 15920} \\ 144 \\ \hline 152 \\ 144 \\ \hline 80 \\ 80 \\ \hline 0 \end{array}$$

Answer 995 sweatshirts

### Score Point 0 (out of 2 points)

Holistically, this response is not sufficient to demonstrate even a limited understanding of the concepts in the task. Although the ticket price is correctly multiplied by the 16 students, the transportation and meal cost is also multiplied by 16. This incorrect total is divided by 16 to determine the cost per student; however, it is provided as the solution. The number of sweatshirts to be sold is not addressed.

## EXEMPLARY RESPONSE

49

Jessie set up a lemonade stand for three days.

- On Saturday, she sold  $10\frac{2}{3}$  gallons of lemonade.
- On Sunday, she sold  $3\frac{1}{3}$  gallons more than she sold on Saturday.
- On Monday, she sold  $2\frac{2}{3}$  gallons less than she sold on Sunday.

How many gallons of lemonade did Jessie sell on Monday?

Show your work.

Lemonade sold on Saturday:  $10\frac{2}{3}$  gallons

Lemonade sold on Sunday:  $10\frac{2}{3} + 3\frac{1}{3} = 13\frac{3}{3}$  gallons = 14 gallons

Lemonade sold on Monday:  $13\frac{3}{3} - 2\frac{2}{3} = 11\frac{1}{3}$  gallons

Or other valid response

Answer  $11\frac{1}{3}$  gallons

## GUIDE PAPER 1

Additional

49

Jessie set up a lemonade stand for three days.

- On Saturday, she sold  $10\frac{2}{3}$  gallons of lemonade.
- On Sunday, she sold  $3\frac{1}{3}$  gallons more than she sold on Saturday.
- On Monday, she sold  $2\frac{2}{3}$  gallons less than she sold on Sunday.

How many gallons of lemonade did Jessie sell on Monday?

Show your work.

$$\begin{array}{r} 10\frac{2}{3} \\ + 3\frac{1}{3} \\ \hline 13\frac{3}{3} = 14 \end{array}$$

$$\begin{array}{r} 13\frac{3}{3} \\ - 2\frac{2}{3} \\ \hline 11\frac{1}{3} \end{array}$$

Answer  $11\frac{1}{3}$  gallons

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The number of gallons of lemonade sold on Monday is calculated correctly using mathematically sound procedures.

## GUIDE PAPER 2

49

Jessie set up a lemonade stand for three days.

- On Saturday, she sold  $10\frac{2}{3}$  gallons of lemonade.
- On Sunday, she sold  $3\frac{1}{3}$  gallons more than she sold on Saturday.
- On Monday, she sold  $2\frac{2}{3}$  gallons less than she sold on Sunday.

How many gallons of lemonade did Jessie sell on Monday?

Show your work.

$$\begin{array}{r} 10 \frac{2}{3} \\ + 3 \frac{1}{3} \\ \hline 13 \frac{3}{3} = 14 \end{array}$$

$\cancel{14 \frac{3}{3}}$

$\cancel{14 \frac{3}{3}} - \cancel{2 \frac{2}{3}} = \underline{\underline{11 \frac{1}{3}}}$  gallons

Sold on Monday  
eleven and  $\frac{1}{3}$  gallons were sold on Monday

Answer  $11\frac{1}{3}$  gallons

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The number of gallons of lemonade sold on Monday is calculated correctly using mathematically sound procedures.

## GUIDE PAPER 3

49

Jessie set up a lemonade stand for three days.

- On Saturday, she sold  $10\frac{2}{3}$  gallons of lemonade.
- On Sunday, she sold  $3\frac{1}{3}$  gallons more than she sold on Saturday.
- On Monday, she sold  $2\frac{2}{3}$  gallons less than she sold on Sunday.

How many gallons of lemonade did Jessie sell on Monday?

Show your work.

*Sat*

$$10\frac{2}{3} + 3\frac{1}{3} = 13\frac{3}{3}$$
$$= 14 \text{ gallons}$$

*on Sunday*

$$\begin{array}{r} 14 - 2\frac{2}{3} \\ \hline 12 \end{array}$$

*leave out*

$$12 - \frac{2}{3} = \frac{3}{3} - \frac{2}{3} = \frac{1}{3}$$

Answer  $11\frac{1}{3}$  gallons

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The number of gallons of lemonade sold on Monday is calculated correctly using mathematically sound procedures.

## GUIDE PAPER 4

49

Jessie set up a lemonade stand for three days.

- On Saturday, she sold  $10\frac{2}{3}$  gallons of lemonade.
- On Sunday, she sold  $3\frac{1}{3}$  gallons more than she sold on Saturday.
- On Monday, she sold  $2\frac{2}{3}$  gallons less than she sold on Sunday.

How many gallons of lemonade did Jessie sell on Monday?

Show your work.

(A)  $10\frac{2}{3} = \frac{32}{3}$      $3\frac{1}{3} = \frac{10}{3}$

$$\frac{32}{3} + \frac{10}{3} = \frac{42}{3} = 14$$

~~$\begin{array}{r} 14 \\ \times 3 \\ \hline 42 \end{array}$~~      $2\frac{2}{3} = \frac{8}{3} - \frac{14}{3} = \frac{-6}{3} = -2$

$$\begin{array}{r} 14 \\ - 2 \\ \hline 12 \end{array}$$

Answer 12 gallons

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The amount of lemonade sold on Sunday is correctly calculated; however, the calculation for the amount of lemonade sold on Monday contains multiple errors and results in an incorrect solution. The response correctly addresses only some elements of the task.

## GUIDE PAPER 5

49

Jessie set up a lemonade stand for three days.

- On Saturday, she sold  $10\frac{2}{3}$  gallons of lemonade.
- On Sunday, she sold  $3\frac{1}{3}$  gallons more than she sold on Saturday.
- On Monday, she sold  $2\frac{2}{3}$  gallons less than she sold on Sunday.

How many gallons of lemonade did Jessie sell on Monday?

Show your work.

$$\begin{array}{r} 10\frac{2}{3} \\ + 3\frac{1}{3} \\ \hline 13\frac{3}{3} = 14 \end{array}$$

$$\begin{array}{r} 13\frac{3}{3} \\ - 2\frac{2}{3} \\ \hline 11\frac{5}{3} = 12\frac{2}{3} \end{array}$$

Answer  $12\frac{2}{3}$  gallons

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The amount of lemonade sold on Sunday is correctly calculated and the operation to calculate the amount of lemonade sold on Monday is correct; however, the fractional portions of the mixed numbers are added instead of subtracted. The response contains an incorrect solution but applies a mathematically appropriate process.

## GUIDE PAPER 6

49

Jessie set up a lemonade stand for three days.

- On Saturday, she sold  $10\frac{2}{3}$  gallons of lemonade.
- On Sunday, she sold  $3\frac{1}{3}$  gallons more than she sold on Saturday.
- On Monday, she sold  $2\frac{2}{3}$  gallons less than she sold on Sunday.

How many gallons of lemonade did Jessie sell on Monday?

Show your work.

$$\begin{array}{r} 14 \\ 10\frac{2}{3} \\ + 3\frac{1}{3} \\ \hline 13\frac{3}{3} \end{array} \quad \begin{array}{r} 2\frac{2}{3} \\ \hline 16\frac{2}{3} \end{array}$$
$$13\frac{3}{3} \rightarrow 13 + \frac{3}{3} = 13 + 1 = 14$$

Answer  $16\frac{2}{3}$  gallons

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The amount of lemonade sold on Sunday is correctly calculated; however, the amount of lemonade sold on Monday is calculated as  $2\frac{2}{3}$  gallons more than on Sunday rather than  $2\frac{2}{3}$  gallons less than on Sunday. This response correctly addresses only some elements of the task.

## GUIDE PAPER 7

49

Jessie set up a lemonade stand for three days.

- On Saturday, she sold  $10\frac{2}{3}$  gallons of lemonade.
- On Sunday, she sold  $3\frac{1}{3}$  gallons more than she sold on Saturday.
- On Monday, she sold  $2\frac{2}{3}$  gallons less than she sold on Sunday.

How many gallons of lemonade did Jessie sell on Monday?

Show your work.

$$\begin{array}{r} 10 \\ + 3 \\ \hline 15 \end{array} \quad \begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array} \quad \begin{array}{r} 2 \\ - 2 \\ \hline 0 \end{array} = \frac{5}{3}$$

$$15 \frac{5}{3}$$

Answer  $5\frac{5}{3}$  gallons

Score Point 0 (out of 2 points)

Although some elements may contain correct mathematical procedures, holistically this response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. The whole numbers and fractional portions are added together for an incorrect solution.

## GUIDE PAPER 8

Additional

49

Jessie set up a lemonade stand for three days.

- On Saturday, she sold  $10\frac{2}{3}$  gallons of lemonade.
- On Sunday, she sold  $3\frac{1}{3}$  gallons more than she sold on Saturday.
- On Monday, she sold  $2\frac{2}{3}$  gallons less than she sold on Sunday.

How many gallons of lemonade did Jessie sell on Monday?

Show your work.

$$2\frac{2}{3} - 3\frac{1}{3} = 1\frac{1}{3}$$

Answer  $1\frac{1}{3}$  gallons

### 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 subtraction shown in the work is irrelevant and incorrect.

## EXEMPLARY RESPONSE

50

Three students performed a science experiment using salt and a beaker. The beaker contained 530.2 grams of salt before the experiment started. During the experiment, each of the 3 students removed 47.36 grams of salt from the beaker.

How much salt, in grams, was left in the beaker at the end of the experiment?

*Show your work.*

$$3 \times 47.36 = 142.08$$

$$530.2 - 142.08 = 388.12$$

Or other valid response

*Answer* 388.12 grams

## GUIDE PAPER 1

Additional

50

Three students performed a science experiment using salt and a beaker. The beaker contained 530.2 grams of salt before the experiment started. During the experiment, each of the 3 students removed 47.36 grams of salt from the beaker.

How much salt, in grams, was left in the beaker at the end of the experiment?

Show your work.

$$\begin{array}{r} \text{Start } 530.2 \\ \times \quad 3 \\ \hline 1420.8 \end{array}$$

$$\begin{array}{r} 12 \\ 4736 \\ \times 30 \\ \hline 14208 \\ - 14208 \\ \hline 388.12 \end{array}$$

Answer 388.12 grams

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total amount of salt removed during the experiment is correctly calculated and subtracted from the total starting amount of salt to determine the correct solution using mathematically sound procedures.

## GUIDE PAPER 2

50

Three students performed a science experiment using salt and a beaker. The beaker contained 530.2 grams of salt before the experiment started. During the experiment, each of the 3 students removed 47.36 grams of salt from the beaker.

How much salt, in grams, was left in the beaker at the end of the experiment?

Show your work.

$$\begin{array}{r} 452^{\cancel{3}} \quad 41 \\ - 530.20 \quad 10 \\ \hline - 47.36 \\ \hline 482^{\cancel{2}} \quad 414 \\ - 47.36 \\ \hline 435^{\cancel{2}} \quad 48 \\ - 47.36 \\ \hline 388.12 \end{array}$$

Answer 388.12 grams

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The amount of salt removed by each student is correctly subtracted three times from the total amount of salt at the beginning of the experiment to correctly determine the solution using mathematically sound procedures.

## GUIDE PAPER 3

50

Three students performed a science experiment using salt and a beaker. The beaker contained 530.2 grams of salt before the experiment started. During the experiment, each of the 3 students removed 47.36 grams of salt from the beaker.

How much salt, in grams, was left in the beaker at the end of the experiment?

Show your work.

Step 1:

$$\begin{array}{r} 2 \ 1 \ 1 \\ 2 \ 47.36 \\ \times \quad 3 \\ \hline 142.08 \end{array}$$



Ch

$$\begin{array}{r} 47.36 \\ 3 \overline{) 142.08} \\ -12 \\ \hline 22 \\ -21 \\ \hline 10 \\ -9 \\ \hline 1 \\ -1 \\ \hline 0 \end{array}$$

Step 2:

$$\begin{array}{r} 12 \ 10 \ 1 \ 10 \\ 4530.20 \\ -142.08 \\ \hline 388.12 \end{array}$$



Ch

$$\begin{array}{r} 388.12 \\ +142.08 \\ \hline 530.20 \end{array}$$

Answer 388.12 grams

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total amount of salt removed during the experiment is correctly calculated and subtracted from the total starting amount of salt to determine the correct solution using mathematically sound procedures.

## GUIDE PAPER 4

50

Three students performed a science experiment using salt and a beaker. The beaker contained 530.2 grams of salt before the experiment started. During the experiment, each of the 3 students removed 47.36 grams of salt from the beaker.

How much salt, in grams, was left in the beaker at the end of the experiment?

Show your work.

Three students

beaker = 530.2 grams

3 students removed 47.36 grams

$$\begin{array}{r} \text{1st student} \\ 4530.20 \\ - 47.36 \\ \hline 482.84 \end{array}$$

$$\begin{array}{r} \text{2nd student} \\ 482.84 \\ - 47.36 \\ \hline 435.48 \end{array}$$

$$\begin{array}{r} \text{3rd student} \\ 388.02 \\ - 47.36 \\ \hline 388.02 \end{array}$$

Answer 388.02 grams

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The amount of salt removed by each student is correctly subtracted three times from the total amount of salt at the beginning of the experiment; however, there is a transcription error from the work for the second student to the work for the third student ( $435.48 \rightarrow 435.38$ ) resulting in an incorrect final solution. The response contains an incorrect solution but applies a mathematically appropriate process.

## GUIDE PAPER 5

50

Three students performed a science experiment using salt and a beaker. The beaker contained 530.2 grams of salt before the experiment started. During the experiment, each of the 3 students removed 47.36 grams of salt from the beaker.

How much salt, in grams, was left in the beaker at the end of the experiment?

Show your work.

$$\begin{array}{r} 47.36 \\ \times 3 \\ \hline 149.08 \end{array}$$

$$\begin{array}{r} 530.2 \\ - 149.08 \\ \hline 381.12 \end{array}$$

Answer 381.12 grams

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The total amount of salt removed during the experiment by all three students is calculated; however, a calculation error occurs resulting in an incorrect total amount of salt removed. The result is then correctly subtracted from the total starting amount of salt to determine the solution. The response contains an incorrect solution but applies a mathematically appropriate process.

## GUIDE PAPER 6

50

Three students performed a science experiment using salt and a beaker. The beaker contained 530.2 grams of salt before the experiment started. During the experiment, each of the 3 students removed 47.36 grams of salt from the beaker.

How much salt, in grams, was left in the beaker at the end of the experiment?

Show your work.

$$\begin{array}{r} 47.36 \\ \times 3 \\ \hline 142.08 \\ + 47.36 \\ \hline 378.08 \end{array}$$

$$\begin{array}{r} 47.36 \\ \times 3 \\ \hline 152.08 \end{array}$$

Answer 378.08 grams

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The amount of salt removed from the beaker is appropriately multiplied by 3 to account for the three students; however, a calculation error occurs. The result is then subtracted from the total starting amount of salt; however, another calculation error occurs, resulting in an incorrect solution. This response contains an incorrect solution but applies a mathematically appropriate process.

## GUIDE PAPER 7

50

Three students performed a science experiment using salt and a beaker. The beaker contained 530.2 grams of salt before the experiment started. During the experiment, each of the 3 students removed 47.36 grams of salt from the beaker.

How much salt, in grams, was left in the beaker at the end of the experiment?

*Show your work.*

$$\begin{array}{r} 530.20 \\ - 47.36 \\ \hline 577.56 \end{array}$$

*Answer* 577.56 grams

### 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 amount of salt removed by one student is inappropriately added to the total amount of salt in the beaker at the beginning of the experiment.

## GUIDE PAPER 8

Additional

50

Three students performed a science experiment using salt and a beaker. The beaker contained 530.2 grams of salt before the experiment started. During the experiment, each of the 3 students removed 47.36 grams of salt from the beaker.

How much salt, in grams, was left in the beaker at the end of the experiment?

Show your work.

$$\begin{array}{r} 530.20 \\ + 47.36 \\ \hline 576.56 \end{array}$$

360  
663  
9  
1266  
1569  
1672  
2175  
2478  
2781  
3084  
3387  
36  
39  
42  
45  
48  
51  
54  
57

$$\begin{array}{r} 019.2885\text{RI} \\ 3145\cancel{1}\cancel{6}.56 \\ \underline{-591} \\ 86 \downarrow \\ -84 \downarrow \\ \underline{25} \\ -24 \downarrow \\ \underline{16} \\ 15 \end{array}$$

19.2885<sub>RI</sub>

Answer 19.2885<sub>RI</sub> grams

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 addition and division operations used are irrelevant and incorrect.

## EXEMPLARY RESPONSE

51

The dimensions of Mr. Tai's living room are 10 feet  $\times$  18 feet  $\times$  8 feet, and the dimensions of his family room are 14 feet  $\times$  20 feet  $\times$  8 feet. What is the total volume, in cubic feet, of the two rooms?

*Show your work.*

$$\text{Living Room: } 10 \times 18 \times 8 = 1440 \text{ cubic feet}$$

$$\text{Family Room: } 14 \times 20 \times 8 = 2240 \text{ cubic feet}$$

$$1440 + 2240 = 3680 \text{ cubic feet}$$

Or other valid response

Answer 3680 cubic feet

## GUIDE PAPER 1

Additional

51

The dimensions of Mr. Tai's living room are 10 feet  $\times$  18 feet  $\times$  8 feet, and the dimensions of his family room are 14 feet  $\times$  20 feet  $\times$  8 feet. What is the total volume, in cubic feet, of the two rooms?

Show your work.

$$10 \times 18 \times 8 = 1,440$$

$$14 \times 20 \times 8 = 2,240$$

$$\begin{array}{r} 1,440 \\ + 2,240 \\ \hline 3,680 \end{array}$$

Answer 3680 cubic feet

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The dimensions of both rooms are correctly multiplied to determine their volumes and the results are appropriately added to determine the correct solution using mathematically sound procedures.

## GUIDE PAPER 2

51

The dimensions of Mr. Tai's living room are 10 feet  $\times$  18 feet  $\times$  8 feet, and the dimensions of his family room are 14 feet  $\times$  20 feet  $\times$  8 feet. What is the total volume, in cubic feet, of the two rooms?

Show your work.

$$\begin{array}{r} 10 \\ \times 18 \\ \hline 6180 \\ \times 8 \\ \hline 1440 \end{array} \qquad \begin{array}{r} 14 \\ \times 20 \\ \hline 00 \\ 1280 \\ \hline 6280 \\ \times 8 \\ \hline 2240 \end{array}$$
$$\begin{array}{r} 1440 \\ + 2240 \\ \hline 3680 \end{array}$$

Answer 3680 cubic feet

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The dimensions of both rooms are correctly multiplied to determine their volumes and the results are appropriately added to determine the correct solution using mathematically sound procedures.

## GUIDE PAPER 3

51

The dimensions of Mr. Tai's living room are 10 feet  $\times$  18 feet  $\times$  8 feet, and the dimensions of his family room are 14 feet  $\times$  20 feet  $\times$  8 feet. What is the total volume, in cubic feet, of the two rooms?

Show your work.

$$10 \times 18 \times 8 + 14 \times 20 \times 8$$

Answer

3680 cubic feet

### Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. A correct expression is provided and correctly evaluated to determine the total volume of both rooms using mathematically sound procedures.

## GUIDE PAPER 4

51

The dimensions of Mr. Tai's living room are 10 feet  $\times$  18 feet  $\times$  8 feet, and the dimensions of his family room are 14 feet  $\times$  20 feet  $\times$  8 feet. What is the total volume, in cubic feet, of the two rooms?

Show your work.

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

$$10\text{ft} \times 18\text{ft} \times 8\text{ft} = 1440\text{ft}^3$$

$$\begin{array}{r} 14\text{ft} \times 20\text{ft} \times 8\text{ft} = 200\text{ft}^3 \\ \underline{1440} \\ + 800 \\ \hline 2240\text{ft}^3 \end{array}$$

Answer 2240 cubic feet

### 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 living room is calculated correctly; however, a calculation error occurs in the multiplication operation for the volume of the family room. Both volumes are then appropriately added to determine the solution. This response contains an incorrect solution but applies a mathematically appropriate process.

## GUIDE PAPER 5

51

The dimensions of Mr. Tai's living room are 10 feet  $\times$  18 feet  $\times$  8 feet, and the dimensions of his family room are 14 feet  $\times$  20 feet  $\times$  8 feet. What is the total volume, in cubic feet, of the two rooms?

Show your work.

14FT $\times$ 20FT=280FT $\times$ 8FT=2,240FT=FAMILY ROOM 10FT $\times$ 18FT=180FT $\times$ 8=1,440FT=MR.TIAS ROOM

Answer

(NO STUDENT RESPONSE GIVEN)

cubic feet

### Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. All dimensions are appropriately multiplied and both individual room volumes are correctly determined; however, they are not added to calculate the total volume. The response correctly addresses only some elements of the task.

## GUIDE PAPER 6

51

The dimensions of Mr. Tai's living room are 10 feet  $\times$  18 feet  $\times$  8 feet, and the dimensions of his family room are 14 feet  $\times$  20 feet  $\times$  8 feet. What is the total volume, in cubic feet, of the two rooms?

Show your work.

$$10 \times 18 \times 8 = 1440. \quad 14 \times 20 \times 8 = 2300. \quad 2300 + 1440 = 3740 \text{ total cubic feet}$$

Answer

3740

cubic feet

### 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 living room is calculated correctly; however, a calculation error occurs in the multiplication operations for the volume of the family room. Both volumes are then appropriately added to determine the solution. This response contains an incorrect solution but applies a mathematically appropriate process.

## GUIDE PAPER 7

51

The dimensions of Mr. Tai's living room are 10 feet  $\times$  18 feet  $\times$  8 feet, and the dimensions of his family room are 14 feet  $\times$  20 feet  $\times$  8 feet. What is the total volume, in cubic feet, of the two rooms?

Show your work.

$$\begin{array}{r} 20 \\ \times 18 \\ \hline 160 \\ + 200 \\ \hline 360 \end{array}$$

$$\begin{array}{r} 10 \\ \times 6 \\ \hline 60 \\ + 80 \\ \hline 140 \end{array}$$

$$\begin{array}{r} 640 \\ + 360 \\ \hline 1000 \end{array}$$

Answer 1000 cubic 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 volumes are incorrectly calculated using only two dimensions each.

## GUIDE PAPER 8

Additional

51

The dimensions of Mr. Tai's living room are 10 feet  $\times$  18 feet  $\times$  8 feet, and the dimensions of his family room are 14 feet  $\times$  20 feet  $\times$  8 feet. What is the total volume, in cubic feet, of the two rooms?

Show your work.

the answer is 2240

Answer

2240

cubic feet

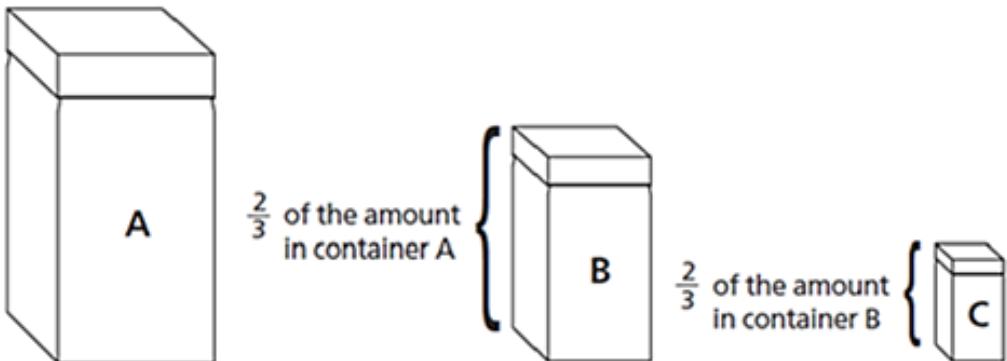
### Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. The solution is incorrect and no work is shown to demonstrate how it is obtained.

## EXEMPLARY RESPONSE

52

The diagram below shows a set of three different-sized containers Tanner used for storing dry goods. The largest container held  $12\frac{3}{4}$  cups of dry goods.



What was the total amount, in cups, of dry goods that Tanner could store in all three containers?

*Show your work.*

$$\text{Container B amount: } 12\frac{3}{4} \times \frac{2}{3} = 5\frac{1}{4} \times \frac{2}{3} = \frac{102}{12} = 8\frac{1}{2}$$

$$\text{Container C amount: } 8\frac{1}{2} \times \frac{2}{3} = \frac{17}{2} \times \frac{2}{3} = \frac{34}{6} = 5\frac{2}{3}$$

Total amount for all containers:

$$12\frac{3}{4} + 8\frac{1}{2} + 5\frac{2}{3} = \frac{153}{12} + \frac{102}{12} + \frac{68}{12} = \frac{323}{12} = 26\frac{11}{12}$$

Or other valid response

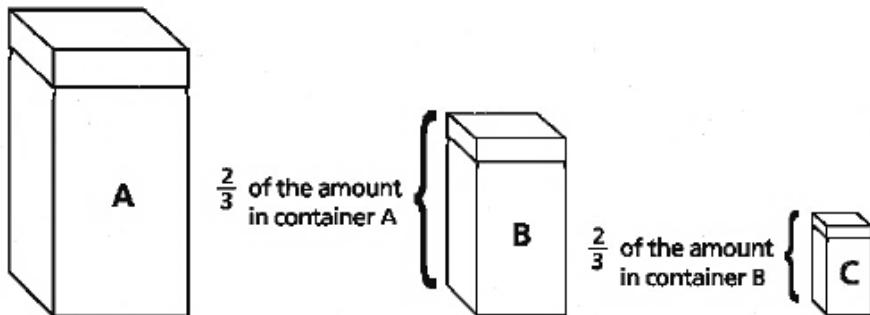
*Answer*  $26\frac{11}{12}$  cups.

## GUIDE PAPER 1

Additional

52

The diagram below shows a set of three different-sized containers Tanner used for storing dry goods. The largest container held  $12\frac{3}{4}$  cups of dry goods.



What was the total amount, in cups, of dry goods that Tanner could store in all three containers?

Show your work.

$$\begin{array}{l} \text{A: } 12\frac{3}{4} = \frac{51}{4} \\ \text{B: } \frac{51}{4} \times \frac{2}{3} = \frac{51}{2} = 25\frac{1}{2} \\ \text{C: } \frac{51}{2} \times \frac{2}{3} = \frac{51}{3} = 17 \\ \text{Total: } 12\frac{3}{4} + 25\frac{1}{2} + 17 = 52\frac{1}{2} = 26\frac{11}{12} \end{array}$$

Answer

$26\frac{11}{12}$

cups

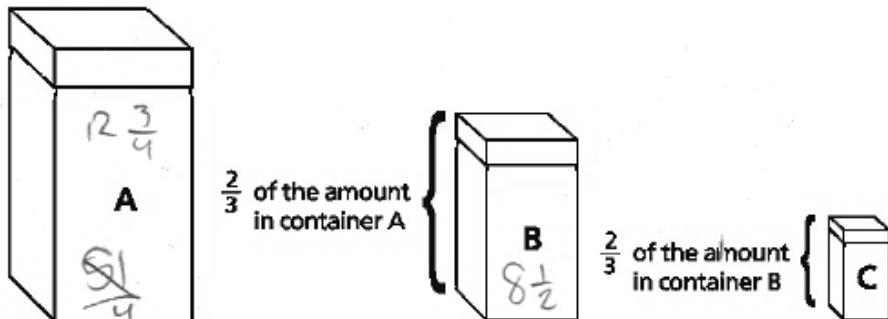
### Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. Appropriate and correct manipulations of fractions between improper and proper form along with multiplication and addition of the fractions is carried out to determine the correct solution using mathematically sound procedures.

## GUIDE PAPER 2

52

The diagram below shows a set of three different-sized containers Tanner used for storing dry goods. The largest container held  $12\frac{3}{4}$  cups of dry goods.



What was the total amount, in cups, of dry goods that Tanner could store in all three containers?

Show your work.

$$\begin{array}{r}
 \cancel{12\frac{3}{4}} + \cancel{12\frac{9}{12}} + \cancel{12\frac{3}{4}} \\
 \cancel{8\frac{1}{2}} + \cancel{8\frac{6}{12}} + \cancel{8\frac{1}{2}} \\
 \cancel{5\frac{1}{2}} + \cancel{5\frac{8}{12}} + \cancel{5\frac{1}{2}} \\
 \hline
 25\frac{23}{12} = 26\frac{11}{12}
 \end{array}$$

$$\begin{array}{r}
 \cancel{\frac{51}{4}} \times \cancel{\frac{2}{3}} = \cancel{\frac{102}{12}} = 8\frac{1}{2} \\
 \cancel{\frac{153}{152}} \times \cancel{\frac{2}{3}} = \cancel{\frac{306}{456}} = 19\frac{1}{8} \\
 \cancel{\frac{17}{2}} \times \cancel{\frac{2}{3}} = \cancel{\frac{34}{6}} = 5\frac{2}{3}
 \end{array}$$

**Answer**  $26\frac{11}{12}$  cups

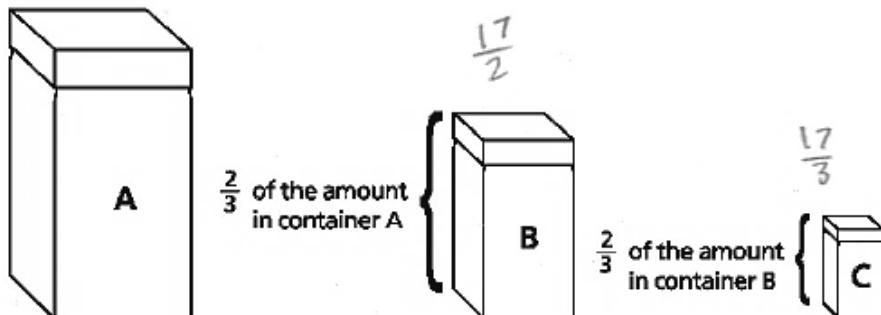
### Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. Appropriate and correct manipulations of fractions between improper and proper form along with multiplication and addition of the fractions is carried out to determine the correct solution using mathematically sound procedures.

## GUIDE PAPER 3

52

The diagram below shows a set of three different-sized containers Tanner used for storing dry goods. The largest container held  $12\frac{3}{4}$  cups of dry goods.



What was the total amount, in cups, of dry goods that Tanner could store in all three containers?

**Show your work.**

$$\begin{aligned}
 & \text{Container A: } 12\frac{3}{4} = \frac{51}{4} \\
 & \text{Container B: } \frac{2}{3} \times \frac{51}{4} = \frac{17}{2} \\
 & \text{Container C: } \frac{2}{3} \times \frac{17}{2} = \frac{17}{3} \\
 & \text{Total: } \frac{51}{4} + \frac{17}{2} + \frac{17}{3} = \frac{153}{12} + \frac{102}{12} + \frac{68}{12} = \frac{323}{12} = 26\frac{11}{12}
 \end{aligned}$$

**Answer**

$$26\frac{11}{12}$$

cups

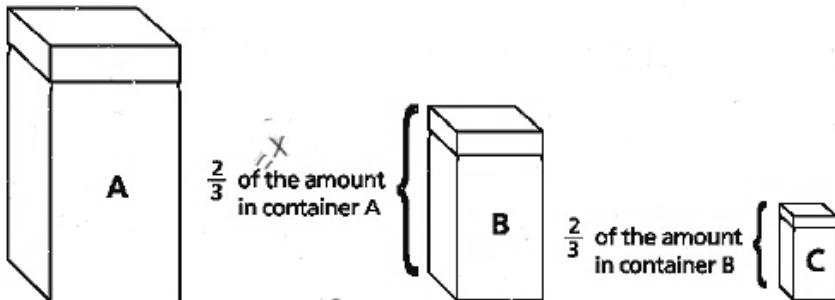
### Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. Appropriate and correct manipulations of fractions between improper and proper form along with multiplication and addition of the fractions is carried out to determine the correct solution using mathematically sound procedures.

## GUIDE PAPER 4

52

The diagram below shows a set of three different-sized containers Tanner used for storing dry goods. The largest container held  $12\frac{3}{4}$  cups of dry goods.



What was the total amount, in cups, of dry goods that Tanner could store in all three containers?

Show your work.

$$\begin{aligned} A &= 12\frac{3}{4} \quad B = 8\frac{1}{2} \quad C = 6\frac{1}{3} \\ 12\frac{3}{4} \times \frac{2}{3} &= 10\frac{2}{4} = 10\frac{1}{2} \\ 10\frac{1}{2} \times \frac{2}{3} &= 8\frac{1}{2} \\ 8\frac{1}{2} \times \frac{2}{3} &= 6\frac{2}{6} = 6\frac{1}{3} \\ 12\frac{3}{4} + 10\frac{1}{2} + 8\frac{1}{2} + 6\frac{1}{3} &= 37\frac{7}{12} \\ 37\frac{7}{12} &= 27\frac{7}{12} \end{aligned}$$

Answer

$27\frac{7}{12}$  cups of dry goods

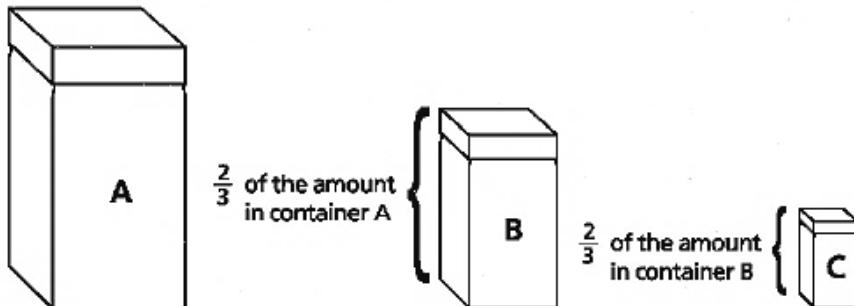
### Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The amount in container B is correctly determined. The operation to calculate the amount in container C is correctly provided; however, the value  $8\frac{1}{2}$  is incorrectly converted into an improper fraction ( $8\frac{1}{2} \rightarrow 19\frac{1}{2}$ ). The three amounts are then correctly added to determine the solution. This response contains an incorrect solution but provides sound procedures.

## GUIDE PAPER 5

52

The diagram below shows a set of three different-sized containers Tanner used for storing dry goods. The largest container held  $12\frac{3}{4}$  cups of dry goods.



What was the total amount, in cups, of dry goods that Tanner could store in all three containers?

**Show your work.**

$$\begin{aligned} A &= 12\frac{3}{4} = \frac{51}{4} \\ B &= 8\frac{1}{2} = \frac{17}{2} \\ C &= 5\frac{4}{6} = \frac{34}{6} \end{aligned}$$

$$\begin{aligned} \frac{51}{4} \times \frac{2}{3} &= \frac{102}{12} & \frac{17}{2} \times \frac{2}{3} &= \frac{34}{6} \\ - & \quad \frac{96}{06} & - & \quad \frac{34}{06} \\ \hline & \quad \frac{12}{06} & & \quad \frac{54}{06} \\ & \quad 1\frac{11}{12} & & \quad 5\frac{4}{6} \end{aligned}$$

$$\begin{array}{r} 12 \\ \times 8 \\ \hline 96 \\ + 12 \\ \hline 104 \end{array}$$

**Answer**  $1\frac{11}{12}$  cups

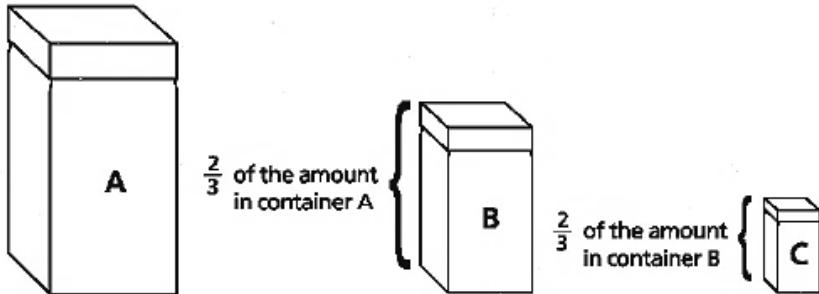
### Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The amounts for containers B and C are correctly calculated; however, when all three amounts in the containers are added to determine the solution only the fractional portions of each container are included. This response reflects some minor misunderstanding of the underlying mathematical procedures.

## GUIDE PAPER 6

52

The diagram below shows a set of three different-sized containers Tanner used for storing dry goods. The largest container held  $12\frac{3}{4}$  cups of dry goods.



What was the total amount, in cups, of dry goods that Tanner could store in all three containers?

$$A = 12\frac{1}{3} \checkmark \quad B = 8\frac{1}{2} \checkmark \quad C = 5\frac{2}{3} \checkmark$$

Show your work.

$$\begin{aligned} & \cancel{\frac{51}{3}} \cancel{\frac{1}{3}} \cancel{\frac{1}{3}} \quad \cancel{\frac{51}{6}} \cancel{\frac{1}{2}} \cancel{\frac{1}{2}} \\ & \frac{17}{18} \times \frac{12}{3} + \frac{17}{3} = 5\frac{2}{3} \checkmark \\ & 12\frac{1}{3} = 12\frac{2}{6} \\ & 8\frac{1}{2} = 8\frac{3}{6} \\ & 5\frac{2}{3} = 5\frac{4}{6} \\ & \underline{25\frac{9}{6}} \\ & 26\frac{1}{2} \checkmark \\ \text{Answer} & \quad 26\frac{1}{2} \quad \text{cups} \end{aligned}$$

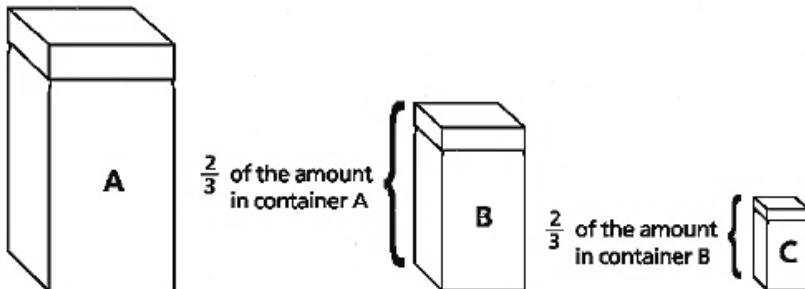
### Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The amounts for containers B and C are correctly determined. The amounts from all three containers are then correctly added to determine the total; however, a transcription error for the amount in container A ( $12\frac{3}{4} \rightarrow 12\frac{1}{3}$ ) results in an incorrect solution. This response contains an incorrect solution but provides sound procedures.

## GUIDE PAPER 7

52

The diagram below shows a set of three different-sized containers Tanner used for storing dry goods. The largest container held  $12\frac{3}{4}$  cups of dry goods.



What was the total amount, in cups, of dry goods that Tanner could store in all three containers?

**Show your work.**

$$\begin{aligned}
 & \begin{array}{r} 12 \\ \times 4 \\ \hline 48 \end{array} & A & B \\
 & 12\frac{3}{4} \times \frac{2}{3} = & & \begin{array}{r} 12 \\ + 8 \\ \hline 20 \\ \times 2 \\ \hline 40 \\ + 9 \\ \hline 49 \end{array} \\
 & \begin{array}{r} 51 \\ \times 2 \\ \hline 102 \end{array} & \frac{51}{4} \times \frac{2}{3} = \frac{102}{12} = & \begin{array}{r} 102 \\ - 96 \\ \hline 6 \\ \times 4 \\ \hline 24 \\ + 36 \\ \hline 60 \end{array} \\
 & \begin{array}{r} 12 \\ \times 8 \\ \hline 96 \\ \times 3 \\ \hline 288 \\ \times 3 \\ \hline 864 \\ \times 3 \\ \hline 2592 \end{array} & \begin{array}{r} 864 \\ \times 2 \\ \hline 1728 \\ \times 3 \\ \hline 5184 \\ \times 3 \\ \hline 15552 \end{array} & \begin{array}{r} 56 \\ - 180 \\ \hline 24 \\ - 21 \\ \hline 3 \\ \times 7 \\ \hline 252 \end{array} \\
 & \text{Answer} & 34 & 
 \end{aligned}$$

### Score Point 1 (out of 3 points)

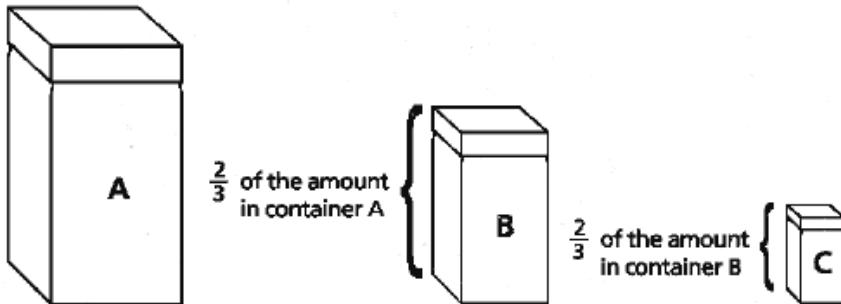
This response demonstrates only a limited understanding of the mathematical concepts in the task. The amounts in containers B and C are correctly calculated; however, the amounts are not added to determine a total and the solution is incorrect. This response addresses some elements of the task correctly but reaches an inadequate solution and provides reasoning that is incomplete.

## GUIDE PAPER 8

Additional

52

The diagram below shows a set of three different-sized containers Tanner used for storing dry goods. The largest container held  $12\frac{3}{4}$  cups of dry goods.



What was the total amount, in cups, of dry goods that Tanner could store in all three containers?

Show your work.

$$\begin{array}{r} 104 \\ \times 2 \\ \hline 208 \end{array}$$

$$\begin{array}{r} -96 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 12 \\ \times 4 \\ \hline 48 \end{array}$$

$$\frac{52}{4} \times \frac{2}{3} = \frac{104}{12}$$

$$\begin{array}{r} 8\frac{8}{12} = 8\frac{24}{36} \\ -8\frac{6}{12} \\ \hline = 36 \div 2 = 18 \end{array}$$

$$\begin{array}{r} 104 \times 2 = 208 \\ \hline 12 \quad 3 \quad 36 \end{array}$$

$$\begin{array}{r} 2 + 2\frac{1}{3} + \frac{7}{9} = \\ 2 + 2\frac{3}{9} + \frac{7}{9} = \end{array}$$

$$\begin{array}{r} 14 \div 2 = 7 \\ 18 \div 2 = 9 \end{array}$$

$$\begin{array}{r} 12\frac{3}{4} + 8\frac{2}{3} + 5\frac{7}{9} \\ 12\frac{9}{12} + 8\frac{8}{12} + 5\frac{14}{18} \\ \hline \end{array}$$

$$\begin{array}{r} 36 \\ \times 5 \\ \hline 180 \\ 28 \\ \hline 208 \end{array}$$

$$12 + 8 + 5 = 25$$

**Answer**

**28**

cups

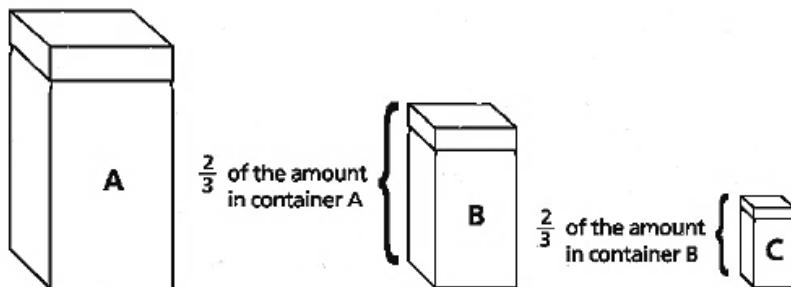
### Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The amount in container B is correctly multiplied by  $\frac{2}{3}$ ; however, container A's amount is not converted to an improper fraction correctly ( $5\frac{1}{4} \rightarrow 5\frac{2}{4}$ ). Container C is correctly calculated from container B's amount; however, there is a calculation error when the three amounts are added together. This response addresses some elements of the task correctly but reaches an inadequate solution.

## GUIDE PAPER 9

52

The diagram below shows a set of three different-sized containers Tanner used for storing dry goods. The largest container held  $12\frac{3}{4}$  cups of dry goods.



What was the total amount, in cups, of dry goods that Tanner could store in all three containers?

Show your work.

$$\begin{array}{r}
 12\frac{12}{16} \\
 + 19\frac{2}{16} \\
 + 28\frac{4}{16} \\
 \hline
 59\frac{25}{16}
 \end{array}$$

$$\begin{array}{r}
 51 \div \frac{2}{3} \\
 = \frac{51}{4} \times \frac{3}{2} \\
 = \frac{153}{8} = 19\frac{1}{8}
 \end{array}$$

$$\begin{array}{r}
 51 \\
 \times 3 \\
 \hline
 153
 \end{array}$$

$$\begin{array}{r}
 153 \times \frac{3}{2} = \frac{459}{16} = 28\frac{11}{16}
 \end{array}$$

$$\begin{array}{r}
 4\frac{16}{18} \\
 - 321 \\
 \hline
 128
 \end{array}$$

$$\begin{array}{r}
 16\frac{25}{49} \\
 - 139 \\
 \hline
 - 128 \\
 - 128 \\
 \hline
 11 \\
 \times 19 \\
 \hline
 107 \\
 - 107 \\
 \hline
 0
 \end{array}$$

**Answer**  $60\frac{9}{16}$  cups

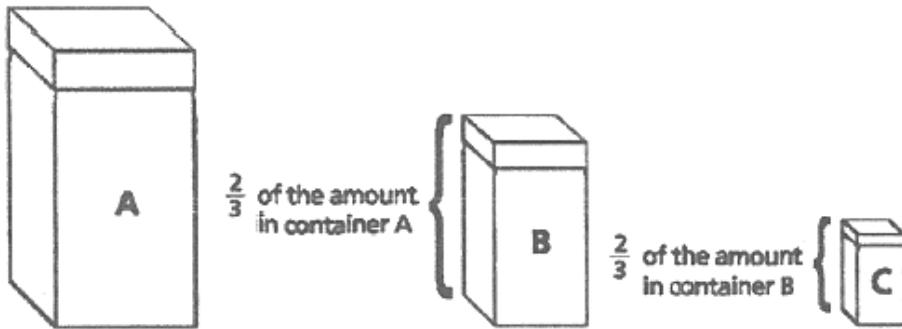
### Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The amounts in containers A and B are divided by  $\frac{2}{3}$  instead of multiplied by  $\frac{2}{3}$  to determine the amounts in containers B and C. The three amounts are then correctly added to determine the solution. This response reflects a lack of essential understanding of the underlying mathematical concepts.

## GUIDE PAPER 10

52

The diagram below shows a set of three different-sized containers Tanner used for storing dry goods. The largest container held  $12\frac{3}{4}$  cups of dry goods.



What was the total amount, in cups, of dry goods that Tanner could store in all three containers?

Show your work.

$$\frac{3}{4} = \frac{9}{12}$$

$$\frac{2}{3} = \frac{8}{12}$$

$$12\frac{9}{12} = \text{Container A}$$

$$-\frac{8}{12}$$

$$12\frac{1}{12} = \text{Container B}$$

$$\begin{array}{r} 12\frac{1}{12} + 12\frac{1}{12} = 11\frac{13}{12} \\ - \frac{8}{12} = \frac{8}{12} \\ \hline \text{Container C} = 11\frac{5}{12} \end{array}$$

$$\begin{array}{r} 12\frac{9}{12} \\ 12\frac{1}{12} \\ 11\frac{5}{12} \\ + \frac{15}{12} \\ \hline 35\frac{15}{12} = 36\frac{3}{12} \\ 36\frac{1}{4} \end{array}$$

Answer

$36\frac{1}{4}$

cups

Score Point 0 (out of 3 points)

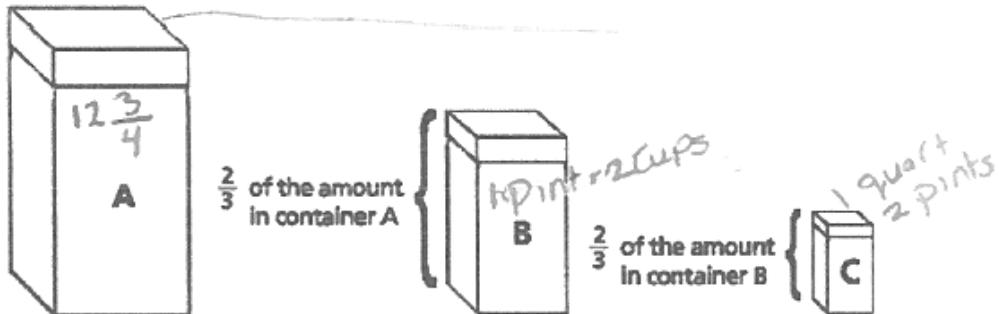
This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although the final addition is performed correctly, an incorrect procedure is used to determine the amounts in containers B and C.

## GUIDE PAPER 11

Additional

52

The diagram below shows a set of three different-sized containers Tanner used for storing dry goods. The largest container held  $12\frac{3}{4}$  cups of dry goods.



What was the total amount, in cups, of dry goods that Tanner could store in all three containers?

Show your work.

$$12\frac{3}{4} \div 12\frac{8}{1} = 1$$

$$\frac{2}{3} \times \frac{6}{1} = \frac{12}{3} \div 3 = 4 \quad 1\frac{4}{4}$$

$$12\frac{3}{4} \times \frac{8}{1} = 12$$

$$\frac{2}{3} \div \frac{6}{1} = \frac{2}{18} \div 2 = 1$$

$$\frac{1}{9} + \frac{1}{9} + \frac{1}{9} = \frac{3}{9} \div 3 = \frac{1}{3}$$

$$\begin{array}{r} 12\frac{3}{4} \\ - 2\frac{2}{3} \\ \hline 10\frac{1}{4} \\ - 6 \\ \hline 12\frac{3}{4} \end{array}$$

$$1\frac{3}{3}$$

$$12\frac{3}{4} \div \frac{2}{3} = 12$$

Answer  $\frac{1}{3}$  OR 8 ounces cups

**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 solution is incorrect and irrelevant.

## EXEMPLARY RESPONSE

53

A juice company produced 8,064 cartons of juice in 21 days. Each day, they produced the same number of cartons and delivered those cartons to 16 area coffee shops. The cartons were delivered in cases of six cartons per case, and each coffee shop received an equal number of cases in each delivery. How many cases were delivered to each coffee shop each day?

*Show your work.*

8,064 cartons in 21 days delivered equally to 16 stores daily

$$8,064 \div 21 = 384 \text{ cartons per day}$$

$$384 \div 6 = 64 \text{ cases per day}$$

$$64 \div 16 = 4 \text{ cases per day per coffee shop}$$

Or

$16 \times 21 = 336$  total number of deliveries for 21 days to all 16 coffee shops

$$8,067 \div 336 = 24 \text{ cartons per day per coffee shop}$$

$$24 \div 6 = 4 \text{ cases per day per coffee shop}$$

Or other valid response

*Answer* \_\_\_\_\_ 4 cases

# GUIDE PAPER 1

Additional

53

A juice company produced 8,064 cartons of juice in 21 days. Each day, they produced the same number of cartons and delivered those cartons to 16 area coffee shops. The cartons were delivered in cases of six cartons per case, and each coffee shop received an equal number of cases in each delivery. How many cases were delivered to each coffee shop each day?

34

Show your work.

$$\begin{array}{r} \textcircled{1} \quad \boxed{384} \\ \hline 21 \overline{) 8,064 } \\ -6 \quad \quad \quad 1 \\ \hline 2 \quad \quad \quad 0 \\ -1 \quad \quad \quad 6 \\ \hline 4 \quad \quad \quad 6 \\ -4 \quad \quad \quad 6 \\ \hline 0 \end{array}$$
$$\begin{array}{r} \textcircled{2} \quad \boxed{21} \\ \times 7 \\ \hline 147 \\ + 21 \\ \hline 168 \end{array}$$

② 384 cartons produced  
each day

$$\begin{array}{r} \textcircled{3} \quad \boxed{24} \\ \hline 16 \overline{) 384 } \\ -32 \\ \hline 64 \\ -64 \\ \hline 0 \end{array}$$

③ 24 cartons to each  
store ✓  
4 cases to each  
6 24

Answer

4

cases

## Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total number of cartons produced each day, the number of cartons delivered to each coffee shop, and the number of cases delivered to each coffee shop per day are all appropriately and correctly calculated to determine the correct solution using mathematically sound procedures.

## GUIDE PAPER 2

53

A juice company produced 8,064 cartons of juice in 21 days. Each day, they produced the same number of cartons and delivered those cartons to 16 area coffee shops. The cartons were delivered in cases of six cartons per case, and each coffee shop received an equal number of cases in each delivery. How many cases were delivered to each coffee shop each day?

Show your work.

$$\begin{array}{r} 384 \\ \hline 21 ) 8064 \\ -63 \\ \hline 176 \\ -168 \\ \hline 84 \\ -84 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 24 \div 6 = 4 \\ \hline 16 ) 384 \\ -32 \\ \hline 64 \\ -64 \\ \hline 0 \end{array}$$

Answer 4 cases

### Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total number of cartons produced each day, the number of cartons delivered to each coffee shop and the number of cases delivered to each coffee shop per day are all appropriately and correctly calculated to determine the correct solution using mathematically sound procedures.

## GUIDE PAPER 3

53

A juice company produced 8,064 cartons of juice in 21 days. Each day, they produced the same number of cartons and delivered those cartons to 16 area coffee shops. The cartons were delivered in cases of six cartons per case, and each coffee shop received an equal number of cases in each delivery. How many cases were delivered to each coffee shop each day?

Show your work.

$$21 \times 16$$

$$\begin{array}{r} 21 \\ \times 16 \\ \hline 126 \\ + 210 \\ \hline 336 \end{array}$$

$$\begin{array}{r} 336 \longdiv{781064} & 100 \\ \underline{-336} & 10 \\ \hline 4704 & 1 \\ -336 & 2 \\ \hline 1344 & +1 \\ -336 & \hline 008 & 6 \longdiv{24} \\ \hline 0672 & \quad \quad 24 \\ \hline 0356 & \quad \quad 0 \\ \hline 0000 & \end{array}$$

Answer

4

cases

### Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total number of deliveries for 21 days for all coffee shops is correctly calculated and used to determine the number of cartons per delivery and the number of cases for each coffee shop per day. The correct solution is obtained using mathematically sound procedures.

## GUIDE PAPER 4

53

A juice company produced 8,064 cartons of juice in 21 days. Each day, they produced the same number of cartons and delivered those cartons to 16 area coffee shops. The cartons were delivered in cases of six cartons per case, and each coffee shop received an equal number of cases in each delivery. How many cases were delivered to each coffee shop each day?

Show your work.

$$\begin{array}{r} 21 \\ \times 16 \\ \hline 126 \\ 210 \\ \hline 336 \end{array}$$

$$\begin{array}{r} 2) \overline{)8064} \\ 336 \quad \quad \quad 24 \\ -672 \\ \hline 1344 \end{array}$$

Division process

$$\begin{array}{r} 2) \overline{)336} \\ 336 \quad \quad \quad 4 \\ -336 \\ \hline 0 \end{array}$$

check:

$$\begin{array}{r} 24 \\ \times 336 \\ \hline 144 \\ 6720 \\ \hline 8064 \end{array}$$

Answer 24 cases

### Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The total number of deliveries over 21 days and the total number of cartons per delivery is correctly calculated; however, the number of cases per delivery to each coffee shop is not calculated. This response appropriately addresses most, but not all aspects of the task using mathematically sound procedures.

## GUIDE PAPER 5

53

A juice company produced 8,064 cartons of juice in 21 days. Each day, they produced the same number of cartons and delivered those cartons to 16 area coffee shops. The cartons were delivered in cases of six cartons per case, and each coffee shop received an equal number of cases in each delivery. How many cases were delivered to each coffee shop each day?

Show your work.

The handwritten work shows the following steps:

$$\begin{array}{r} 8064 \\ \times 21 \\ \hline 16 \\ 16 \\ \hline 4 \\ 4 \\ \hline 0 \\ \end{array}$$
$$\begin{array}{r} 384 \\ \times 16 \\ \hline 24 \\ 32 \\ \hline 0 \\ \end{array}$$
$$\begin{array}{r} 24 \\ \times 6 \\ \hline 14 \\ 12 \\ \hline 4 \\ 4 \\ \hline 0 \\ \end{array}$$

Answer

4

cases

### Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The total number of cartons and cases delivered to each coffee shop per day is correctly calculated; however, it is unclear how the number of cartons produced each day is obtained as no work is shown. This response appropriately addresses most, but not all aspects of the task using mathematically sound procedures.

## GUIDE PAPER 6

53

A juice company produced 8,064 cartons of juice in 21 days. Each day, they produced the same number of cartons and delivered those cartons to 16 area coffee shops. The cartons were delivered in cases of six cartons per case, and each coffee shop received an equal number of cases in each delivery. How many cases were delivered to each coffee shop each day?

Show your work.

$$16 \overline{)8064} \quad \begin{array}{r} 3 \\ 48 \\ \hline 15 \end{array}$$

$$\begin{array}{r} 63 \text{ cartons} \\ 6 \overline{)384} \\ 36 \\ \hline 24 \\ -24 \\ \hline 0 \end{array} \quad \begin{array}{r} 384 \text{ cartons per} \\ 21 \overline{)8064} \text{ Day} \\ 63 \\ \hline 1816 \\ -168 \\ \hline 84 \\ -84 \\ \hline 0 \end{array}$$

4

Answer \_\_\_\_\_ cases

### Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The total number of cartons produced each day is correctly calculated; however, the work to determine the number of cases produced each day contains a calculation error ( $384 \div 6 = 63$ ). The calculation to determine the number of cases delivered to each coffee shop per day is rounded to the nearest whole cases. The response reflects some minor misunderstanding of the underlying procedures.

## GUIDE PAPER 7

53

A juice company produced 8,064 cartons of juice in 21 days. Each day, they produced the same number of cartons and delivered those cartons to 16 area coffee shops. The cartons were delivered in cases of six cartons per case, and each coffee shop received an equal number of cases in each delivery. How many cases were delivered to each coffee shop each day?

Show your work.

The handwritten work shows the following calculations:

- A vertical division problem:  $21 \overline{)8064}$ . The quotient is written above the line as  $384$ .
- An intermediate step:  $168 \overline{)8064}$ , with a horizontal line through it.
- A multiplication problem:  $21 \times 168 = 3568$ .
- A subtraction problem:  $8064 - 3568 = 4496$ .
- A multiplication problem:  $21 \times 4496 = 94316$ .
- A subtraction problem:  $8064 - 94316$  (with a minus sign over the first digit).
- A multiplication problem:  $21 \times 189 = 4069$ .
- A final result:  $384$  underlined, labeled "Answer" and "cases".

### Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The total number of cartons produced by the juice company per day is correctly calculated; however, it is misinterpreted as the number of cases delivered to each coffee shop each day. This response reflects a lack of essential understanding of the underlying mathematical concepts.

# GUIDE PAPER 8

Additional

**53**

A juice company produced 8,064 cartons of juice in 21 days. Each day, they produced the same number of cartons and delivered those cartons to 16 area coffee shops. The cartons were delivered in cases of six cartons per case, and each coffee shop received an equal number of cases in each delivery. How many cases were delivered to each coffee shop each day?

*Carton = 6*

**Show your work.**

$$\begin{array}{r}
 & 6084 \\
 21 & \overline{) 8065} \\
 - & 634 \\
 \hline
 & 170 \\
 - & 168 \\
 \hline
 & 85 \\
 - & 84 \\
 \hline
 & 1
 \end{array}$$

$$\begin{array}{r}
 & 16 \\
 \times & 2 \\
 \hline
 & 32 \\
 & 16 \\
 \times & 3 \\
 \hline
 & 48 \\
 & 16 \\
 \times & 4 \\
 \hline
 & 64
 \end{array}
 \quad
 \begin{array}{r}
 160 \\
 \times 16 \\
 \hline
 42 \\
 160 \\
 \hline
 64
 \end{array}
 \quad
 \begin{array}{r}
 42 \\
 160 \\
 \hline
 812
 \end{array}$$

$$\begin{array}{r}
 21 - 1 \\
 + 21 \\
 \hline
 42 - 2 \\
 + 21 \\
 \hline
 63 - 3 \\
 + 21 \\
 \hline
 84 - 4 \\
 + 21 \\
 \hline
 105 - 5 \\
 + 21 \\
 \hline
 126 - 6 \\
 + 21 \\
 \hline
 147 - 7 \\
 + 21 \\
 \hline
 168 - 8 \\
 + 21 \\
 \hline
 189 - 9 \\
 + 21 \\
 \hline
 2142
 \end{array}$$

**Answer** \_\_\_\_\_ cases

7

## Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The correct operation to calculate the total number of cartons produced per day is provided; however, a transcription error ( $8064 \rightarrow 8065$ ) and a calculation error ( $8065 \div 21 = 684$ ) results in an incorrect number of cartons per day. The calculated number of cartons per day is correctly divided by the 16 coffee shops which are then divided by the number of cartons per cases to arrive at the solution; however, remainders are ignored in the work. This response exhibits multiple flaws related to misunderstanding of important aspects of the task.

## GUIDE PAPER 9

53

A juice company produced 8,064 cartons of juice in 21 days. Each day, they produced the same number of cartons and delivered those cartons to 16 area coffee shops. The cartons were delivered in cases of six cartons per case, and each coffee shop received an equal number of cases in each delivery. How many cases were delivered to each coffee shop each day?

*Show your work.*

The student has shown several calculations:

- Multiplication:  $14 \times 16 = 128$ ,  $316 \times 16 = 504$ ,  $216 \times 4 = 64$ .
- Division:  $16 \overline{)8064}$  (with a remainder of 0),  $21 \overline{)8064}$  (with a remainder of 0),  $21 \overline{)168}$  (with a remainder of 0).
- Subtraction:  $11344 - 670 = 10674$ ,  $10674 - 504 = 10170$ ,  $10170 - 34 = 10136$ ,  $10136 - 26 = 10010$ ,  $10010 - 168 = 9842$ .
- Final calculation:  $11344 \times 21 = 28124$ .

**Answer** 504 cases

### Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The total number of cartons per coffee shop for the 21 days, the total number of cartons per day, and the total number of cases produced in 21 days are all calculated; however, the total number of cartons delivered per coffee shop over the 21 days is incorrectly chosen as the solution. This response reflects a lack of essential understanding of the underlying mathematical concepts of the task.

## GUIDE PAPER 10

53

A juice company produced 8,064 cartons of juice in 21 days. Each day, they produced the same number of cartons and delivered those cartons to 16 area coffee shops. The cartons were delivered in cases of six cartons per case, and each coffee shop received an equal number of cases in each delivery. How many cases were delivered to each coffee shop each day?

Show your work.

3226

$$\begin{array}{r} 3226 \\ 21 \overline{)8064} \\ 63 \\ \hline 476 \\ 462 \\ \hline 14 \\ 126 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 21 \\ 5 \\ \hline 105 \end{array}$$

420

126

441

26

462

Answer

3226

cases

### Score Point 0 (out of 3 points)

Although an appropriate division operation to determine the total number of cartons produced each day is provided, the solution contains a calculation error and no other work is provided. Holistically, this response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task.

## GUIDE PAPER 11

Additional

53

A juice company produced 8,064 cartons of juice in 21 days. Each day, they produced the same number of cartons and delivered those cartons to 16 area coffee shops. The cartons were delivered in cases of six cartons per case, and each coffee shop received an equal number of cases in each delivery. How many cases were delivered to each coffee shop each day?

*Show your work.*

*Step 1  
8064  
÷ 18064*

*Answer* 4 cases

### Score Point 0 (out of 3 points)

Although an appropriate division operation to determine the total number of cartons produced each day is provided, the calculation is not completed. The correct solution is not supported by the work. This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task.

## EXEMPLARY RESPONSE

54

For 4 weeks in June, Cameron biked  $3\frac{1}{4}$  miles each week and swam  $2\frac{1}{2}$  miles each week. For 3 weeks in July, he biked  $4\frac{3}{4}$  miles each week and swam  $3\frac{1}{2}$  miles each week.

How much greater was the total distance Cameron biked and swam in July compared to the total distance he biked and swam in June?

*Show your work.*

June:

$$3\frac{1}{4} \times 4 = 13 \text{ miles biked}$$

$$2\frac{1}{2} \times 4 = 10 \text{ miles swam}$$

$$13 + 10 = 23 \text{ total miles}$$

July:

$$4\frac{3}{4} \times 3 = 14\frac{1}{4} \text{ miles biked}$$

$$3\frac{1}{2} \times 3 = 10\frac{1}{2} \text{ miles swam}$$

$$14\frac{1}{4} + 10\frac{1}{2} = 24\frac{3}{4} \text{ total miles}$$

Difference:

$$24\frac{3}{4} - 23 = 1\frac{3}{4} \text{ miles}$$

Or other valid response

Answer 1 $\frac{3}{4}$  mile(s)

## GUIDE PAPER 1

Additional

54

For 4 weeks in June, Cameron biked  $3\frac{1}{4}$  miles each week and swam  $2\frac{1}{2}$  miles each week. For 3 weeks in July, he biked  $4\frac{3}{4}$  miles each week and swam  $3\frac{1}{2}$  miles each week.

How much greater was the total distance Cameron biked and swam in July compared to the total distance he biked and swam in June?

Show your work.

$$\text{June} = B, 13 \text{ miles}$$
$$S, 10 \text{ miles}$$
$$13 \times \frac{4}{1} = \frac{52}{4} = 13 \frac{13}{52}$$

$$\text{July} = B, 14\frac{1}{4}$$
$$S, 10\frac{1}{2}$$
$$\frac{5}{2} \times \frac{4}{1} = \frac{20}{2}$$
$$4\frac{3}{4} = \frac{19}{4} \times \frac{3}{1} = \frac{57}{4} = 14\frac{1}{4}$$

$$13 + 10\frac{3}{4} = 24\frac{3}{4}$$
$$24\frac{3}{4} - 23 = 1\frac{3}{4}$$
$$\frac{7}{2} \times \frac{3}{1} = \frac{21}{2} = 10\frac{1}{2}$$

Answer  $1\frac{3}{4}$  mile(s)

### Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total distance biked and swam in June and July is correctly calculated and the difference between June and July is correctly determined using mathematically sound procedures.

## GUIDE PAPER 2

54

For 4 weeks in June, Cameron biked  $3\frac{1}{4}$  miles each week and swam  $2\frac{1}{2}$  miles each week. For 3 weeks in July, he biked  $4\frac{3}{4}$  miles each week and swam  $3\frac{1}{2}$  miles each week.

How much greater was the total distance Cameron biked and swam in July compared to the total distance he biked and swam in June?

Show your work. June:  $3\frac{1}{4} \times 4$

$$\begin{array}{r} 13 \\ \times 4 \\ \hline 52 \\ 13 \end{array} = 13 \text{ miles}$$
$$2\frac{1}{2} \times 4$$
$$\begin{array}{r} 5 \\ \times 4 \\ \hline 20 \end{array} = 10 \text{ miles}$$

July:  $4\frac{3}{4} \times 3$

$$\begin{array}{r} 19 \\ \times 3 \\ \hline 57 \end{array} = 14\frac{1}{4} \text{ miles}$$
$$3\frac{1}{2} \times 3$$
$$\begin{array}{r} 7 \\ \times 3 \\ \hline 21 \end{array} = 10\frac{1}{2} \text{ miles}$$
$$24\frac{3}{4} - 23 = \frac{3}{4}$$

Answer 1 $\frac{3}{4}$  mile(s)

### Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total distance biked and swam in June and July is correctly calculated and the difference between June and July is correctly determined using mathematically sound procedures.

## GUIDE PAPER 3

54

For 4 weeks in June, Cameron biked  $3\frac{1}{4}$  miles each week and swam  $2\frac{1}{2}$  miles each week. For 3 weeks in July, he biked  $4\frac{3}{4}$  miles each week and swam  $3\frac{1}{2}$  miles each week.

How much greater was the total distance Cameron biked and swam in July compared to the total distance he biked and swam in June?

Show your work.

<u>June</u>	<u>July</u>	<u>Difference</u>
$3\frac{1}{4} + 2\frac{1}{2} =$	$4\frac{3}{4} + 3\frac{1}{2} =$	$24\frac{3}{4} - 23 = 1\frac{3}{4} \text{ m}$
$2\frac{1}{2} = 2\frac{2}{4}$	$3\frac{1}{2} = 3\frac{2}{4}$	
$3\frac{1}{4} + 2\frac{2}{4} = 5\frac{3}{4}$	$4\frac{3}{4} + 3\frac{2}{4} = 7\frac{5}{4}$	
$5\frac{3}{4} \times 4 = 20\frac{12}{4}$	$7\frac{5}{4} \times 3 = 21\frac{15}{4}$	
= 23 miles total	= $24\frac{3}{4}$ miles total	

Answer 1  $\frac{3}{4}$  mile(s)

### Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total distance biked and swam in June and July is correctly calculated and the difference between June and July is correctly determined using mathematically sound procedures.

## GUIDE PAPER 4

54

For 4 weeks in June, Cameron biked  $3\frac{1}{4}$  miles each week and swam  $2\frac{1}{2}$  miles each week. For 3 weeks in July, he biked  $4\frac{3}{4}$  miles each week and swam  $3\frac{1}{2}$  miles each week.

How much greater was the total distance Cameron biked and swam in July compared to the total distance he biked and swam in June?

Show your work.

$$4\frac{3}{4} + 3\frac{1}{2} = 4\frac{3}{4} + 3\frac{2}{4} = 7\frac{5}{4}$$

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

$$7\frac{5}{4} - 5\frac{3}{4} = 2\frac{2}{4}$$

Answer  $2\frac{1}{2}$  mile(s)

### Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The total miles swam and biked for one week in June and July is correctly calculated and the difference for the one week is correctly determined; however, the difference between the total distances for the whole month is not determined. The response appropriately addresses most, but not all aspects of the task using mathematically sound procedures.

## GUIDE PAPER 5

54

For 4 weeks in June, Cameron biked  $3\frac{1}{4}$  miles each week and swam  $2\frac{1}{2}$  miles each week. For 3 weeks in July, he biked  $4\frac{3}{4}$  miles each week and swam  $3\frac{1}{2}$  miles each week.

How much greater was the total distance Cameron biked and swam in July compared to the total distance he biked and swam in June?

Show your work.

$$3\frac{1}{4} \times 4 = \frac{13}{4} \times 4 = \frac{52}{4} = 13$$

$$2\frac{1}{2} \times 4 = \frac{5}{2} \times 4 = \frac{20}{2} = 10$$

$$4 \overline{)52} \\ \underline{-4} \\ 12 \\ 12 \\ 0$$

$$4\frac{3}{4} \times 3 = \frac{19}{4} \times 3 = \frac{57}{4} = 14\frac{1}{4}$$

$$3\frac{1}{2} \times 3 = \frac{7}{2} \times 3 = \frac{21}{2} = 10\frac{1}{2}$$

$$\begin{array}{r} 19 \\ \times 3 \\ \hline 57 \end{array}$$

$$23 = 22\frac{4}{4} \\ 22\frac{4}{4} - 24\frac{3}{4} = 2\frac{1}{4} \\ 14\frac{1}{4} + 10\frac{1}{2} = 14\frac{1}{4} + 10\frac{2}{4} \\ 14\frac{1}{4} + 10\frac{2}{4} = 24\frac{3}{4}$$

$$14 \overline{)52} \\ \underline{-4} \\ 12 \\ 12 \\ 0$$

Answer  $2\frac{1}{4}$  mile(s)

### Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The total distance biked and swam in June and July is correctly calculated; however, the July total is improperly and incorrectly subtracted from the June total for an incorrect solution. This response reflects some minor misunderstanding of the underlying mathematical concepts.

## GUIDE PAPER 6

54

For 4 weeks in June, Cameron biked  $3\frac{1}{4}$  miles each week and swam  $2\frac{1}{2}$  miles each week. For 3 weeks in July, he biked  $4\frac{3}{4}$  miles each week and swam  $3\frac{1}{2}$  miles each week.

How much greater was the total distance Cameron biked and swam in July compared to the total distance he biked and swam in June?

Show your work.

July

$$\begin{array}{r} 4\frac{3}{4} \\ + 4\frac{3}{4} \\ \hline 14\frac{1}{4}\text{ m} \end{array}$$
$$+ \begin{array}{r} 3\frac{1}{2} \\ + 3\frac{1}{2} \\ \hline 10\frac{1}{2} \end{array}$$

$$24\frac{3}{4}\text{ m}$$

Answer 1 mile(s)

June  
4 weeks

$$\begin{array}{r} 3\frac{1}{4} \\ + 3\frac{1}{4} \\ \hline 6\frac{1}{2} \end{array}$$
$$\begin{array}{r} 2\frac{1}{2} \\ + 2\frac{1}{2} \\ \hline 5\frac{1}{2} \end{array}$$
$$\begin{array}{r} 2\frac{1}{2} \\ + 2\frac{1}{2} \\ \hline 5\frac{1}{2} \end{array}$$
$$\begin{array}{r} 2\frac{1}{2} \\ + 2\frac{1}{2} \\ \hline 5\frac{1}{2} \end{array}$$
$$\begin{array}{r} 5\frac{1}{2} \\ + 5\frac{1}{2} \\ \hline 11\frac{1}{2} \end{array}$$
$$+ \begin{array}{r} 3\frac{1}{4} \\ + 3\frac{1}{4} \\ \hline 6\frac{1}{2} \end{array}$$
$$13\text{ m}$$
$$10\text{ m}$$

$13 + 10 = 23\text{ m}$

### Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The total distance biked and swam in June and July is correctly calculated and the total for each month is correctly determined; however, it is unclear how the solution on the answer blank was determined as no operation is explicitly provided. This response contains an incorrect solution but provides sound procedures.

## GUIDE PAPER 7

54

For 4 weeks in June, Cameron biked  $3\frac{1}{4}$  miles each week and swam  $2\frac{1}{2}$  miles each week. For 3 weeks in July, he biked  $4\frac{3}{4}$  miles each week and swam  $3\frac{1}{2}$  miles each week.

How much greater was the total distance Cameron biked and swam in July compared to the total distance he biked and swam in June?

Show your work.

$$\begin{array}{r} \cancel{4} \cancel{2} \\ 4 \quad 2 \\ \hline 4 \end{array} \quad \begin{array}{r} 3 \frac{1}{2} \times \frac{2}{2} = 2 \frac{2}{4} \\ \text{July} \\ 3 \frac{1}{4} + 2 \frac{2}{4} = 5 \frac{3}{4} \end{array} \quad \begin{array}{r} 3 \frac{1}{2} \times \frac{2}{2} = 3 \frac{2}{4} \\ \text{June} \\ 4 \frac{3}{4} + 3 \frac{2}{4} = 8 \frac{1}{4} \end{array} \quad \begin{array}{r} \cancel{4} \cancel{2} \\ 4 \quad 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 8 \frac{1}{4} \\ - 5 \frac{3}{4} \\ \hline 3 \frac{2}{4} \end{array}$$

Answer 3 $\frac{1}{2}$  mile(s)

### Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The total miles swam and biked for one week in June and July is correctly calculated; however, the total distances swam and biked for each month is not addressed. The operation to determine the difference in distance for one week is correctly provided; however, there is a calculation error in the subtraction. The response addresses some elements of the task correctly but reaches an inadequate solution due to faulty and incomplete reasoning.

## GUIDE PAPER 8

Additional

54

For 4 weeks in June, Cameron biked  $3\frac{1}{4}$  miles each week and swam  $2\frac{1}{2}$  miles each week. For 3 weeks in July, he biked  $4\frac{3}{4}$  miles each week and swam  $3\frac{1}{2}$  miles each week.

How much greater was the total distance Cameron biked and swam in July compared to the total distance he biked and swam in June?

Show your work.

AMC

$$\begin{array}{r} 3\frac{1}{4} \\ + 2\frac{1}{2} \\ \hline 5\frac{3}{4} \end{array}$$

$$\begin{array}{r} 4\frac{3}{4} \\ + 3\frac{1}{2} \\ \hline 7\frac{5}{4} = 8\frac{1}{4} \end{array}$$

$$4 \overline{)5} \quad 4 \times 1 = 4 \\ \underline{-4} \\ 1 \quad 1 \times 4 = 4 \\ \underline{-4} \\ 1$$

$$\begin{array}{r} 5\frac{3}{4} \\ + 8\frac{1}{4} \\ \hline 13\frac{4}{4} = 13 \text{ whole } + 1 = 14 \end{array}$$

Answer 14 mile(s)

### Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The total miles swam and biked in one week for June and July is correctly calculated; however, the total miles for each month are not calculated. The total miles for one week in June and July are inappropriately added instead of determining the difference. The response exhibits multiple flaws related to misunderstanding of important aspects of the task.

## GUIDE PAPER 9

54

For 4 weeks in June, Cameron biked  $3\frac{1}{4}$  miles each week and swam  $2\frac{1}{2}$  miles each week. For 3 weeks in July, he biked  $4\frac{3}{4}$  miles each week and swam  $3\frac{1}{2}$  miles each week.

How much greater was the total distance Cameron biked and swam in July compared to the total distance he biked and swam in June?

Show your work.

$$\begin{array}{r} 3 \frac{1}{4} \\ + 2 \frac{2}{4} \\ \hline 5 \frac{3}{4} \end{array}$$

June ←

$$\text{July} = 4\frac{3}{4} + 3\frac{2}{4} = 7\frac{5}{4}$$

Answer 7 $\frac{5}{4}$  mile(s)

### Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The total miles swam and biked in one week for both June and July is correctly calculated; however, the total miles for each month and the difference in total miles between the months are not determined. The response addresses some elements of the task correctly but reaches an inadequate solution and provides reasoning that is incomplete.

## GUIDE PAPER 10

54

For  $4$  weeks in June, Cameron biked  $3\frac{1}{4}$  miles each week and swam  $2\frac{1}{2}$  miles each week. For  $3$  weeks in July, he biked  $4\frac{3}{4}$  miles each week and swam  $3\frac{1}{2}$  miles each week.

How much greater was the total distance Cameron biked and swam in July compared to the total distance he biked and swam in June?

Show your work.

$$\begin{array}{r} 3 \frac{1}{4} \times 2 \\ \hline 2 \frac{1}{2} \times 4 \\ \hline 4 + 14 \\ \hline 13 \frac{16}{6} \end{array}$$

Answer 13  $\frac{16}{6}$  mile(s)

Score Point 0 (out of 3 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. All distances in the prompt are added and the sum is incorrect. The solution is incorrect and irrelevant.

## GUIDE PAPER 11

Additional

54

For 4 weeks in June, Cameron biked  $3\frac{1}{4}$  miles each week and swam  $2\frac{1}{2}$  miles each week. For 3 weeks in July, he biked  $4\frac{3}{4}$  miles each week and swam  $3\frac{1}{2}$  miles each week.

How much greater was the total distance Cameron biked and swam in July compared to the total distance he biked and swam in June?

Show your work.

$$\begin{array}{r} 2\frac{2}{4} \\ 3\frac{2}{4} \\ \hline 4\frac{3}{4} \\ + 3\frac{1}{4} \\ \hline 12\frac{8}{4} \end{array} \quad 4 \sqrt{8}$$

$$\begin{array}{r} 2 \\ \hline 14 \end{array}$$

Answer 14 mile(s)

Score Point 0 (out of 3 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. All distances in the prompt are added and the sum is incorrect. The solution is incorrect and irrelevant.

## EXEMPLARY RESPONSE

55

The table below shows part of the operating budget of a small dairy farm for last year. The only expense not listed in the table is maintenance.

LAST YEAR'S  
OPERATING BUDGET

Expense	Fraction of Budget
Food	$\frac{1}{3}$
Housing	$\frac{1}{3}$
Medical Care	$\frac{1}{4}$

This year, the managers of the farm will change the fraction of the budget for housing to  $\frac{1}{8}$  but will leave the fraction of the budget for food and medical care the same.

Again, the remaining portion of the budget will be for maintenance expenses. What is the difference between the fraction of the budget for maintenance this year and last year?

*Show your work.*

$$\begin{aligned}\text{Last year: } & \frac{1}{3} + \frac{1}{3} + \frac{1}{4} + x = 1 \\ & \frac{4}{12} + \frac{4}{12} + \frac{3}{12} + x = \frac{12}{12} \\ & \frac{11}{12} + x = \frac{12}{12} \\ & x = \frac{1}{12}\end{aligned}$$

$$\begin{aligned}\text{This year: } & \frac{1}{3} + \frac{1}{8} + \frac{1}{4} + y = 1 \\ & \frac{8}{24} + \frac{3}{24} + \frac{6}{24} + y = \frac{24}{24} \\ & \frac{17}{24} + y = \frac{24}{24} \\ & y = \frac{7}{24}\end{aligned}$$

Difference in maintenance cost between the two years:  
 $\frac{7}{24} - \frac{1}{12} = \frac{7}{24} - \frac{2}{24} = \frac{5}{24}$

Or other valid response

$\frac{5}{24}$

*Answer* \_\_\_\_\_

# GUIDE PAPER 1

Additional

55

The table below shows part of the operating budget of a small dairy farm for last year. The only expense not listed in the table is maintenance.

### LAST YEAR'S OPERATING BUDGET

Expense	Fraction of Budget
Food	$\frac{1}{3}$
Housing	$\frac{1}{3}$ <del><math>\times \frac{1}{8}</math></del>
Medical Care	$\frac{1}{4}$

Maintenance  
last year

This year, the managers of the farm will change the fraction of the budget for housing to  $\frac{1}{8}$  but will leave the fraction of the budget for food and medical care the same.

Again, the remaining portion of the budget will be for maintenance expenses. What is the difference between the fraction of the budget for maintenance this year and last year?

Show your work.

$$\begin{aligned} & \frac{1}{3} + \frac{1}{4} + \frac{1}{3} = \\ & \frac{1}{3} + \frac{1}{8} + \frac{1}{4} \\ & \frac{3}{8} \times \frac{3}{3} = \frac{9}{24} \quad \text{maintenance this year} \\ & \frac{1}{4} \times \frac{3}{3} = \frac{3}{12} \\ & \frac{1}{3} \times \frac{8}{8} = \frac{8}{24} \quad \frac{17}{24} \\ & \frac{2}{3} \times \frac{4}{4} = \frac{8}{12} \quad \frac{11}{12} \\ & \frac{1}{4} \times \frac{3}{3} = \frac{3}{12} \\ & \frac{7}{24} - \frac{2}{24} = \frac{5}{24} \end{aligned}$$

Answer 5/24

### Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. Appropriate and correct addition and subtraction of fractions is used to correctly determine the difference between the fraction of the budget for maintenance this year and last year using mathematically sound procedures.

## GUIDE PAPER 2

55

The table below shows part of the operating budget of a small dairy farm for last year. The only expense not listed in the table is maintenance.

### LAST YEAR'S OPERATING BUDGET

Expense	Fraction of Budget
Food	$\frac{1}{3}$
Housing	$\frac{1}{3}$
Medical Care	$\frac{1}{4}$

$\frac{1}{8}$  This year

This year, the managers of the farm will change the fraction of the budget for housing to  $\frac{1}{8}$  but will leave the fraction of the budget for food and medical care the same.

Again, the remaining portion of the budget will be for maintenance expenses. What is the difference between the fraction of the budget for maintenance this year and last year?

Show your work.

Last year	This year	difference
$\frac{1}{3} \times 8 = \frac{8}{12}$	$\frac{1}{3} \times 8 = \frac{8}{24}$	$\frac{22}{24}$
$\frac{1}{3} \times 8 = \frac{8}{12}$	$\frac{1}{8} \times 3 = \frac{3}{24}$	$\frac{17}{24}$
$\frac{1}{4} \times 0 = \frac{0}{12}$	$\frac{1}{4} \times 0 = \frac{0}{24}$	$\frac{5}{24}$
$+ \frac{11}{12} = \frac{22}{24}$	$+ \frac{17}{24}$	
		$\frac{5}{24}$

Answer

$$\frac{5}{24}$$

### Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. Appropriate and correct addition and subtraction of fractions is used to correctly determine the difference between the fraction of the budget for maintenance this year and last year using mathematically sound procedures.

## GUIDE PAPER 3

55

The table below shows part of the operating budget of a small dairy farm for last year. The only expense not listed in the table is maintenance.

### LAST YEAR'S OPERATING BUDGET

Expense	Fraction of Budget
Food	$\frac{1}{3}$
Housing	$\frac{1}{3}$
Medical Care	$\frac{1}{4}$

This year, the managers of the farm will change the fraction of the budget for housing to  $\frac{1}{8}$  but will leave the fraction of the budget for food and medical care the same.

Again, the remaining portion of the budget will be for maintenance expenses. What is the difference between the fraction of the budget for maintenance this year and last year?

Show your work.

Answer

$$\begin{array}{r} \frac{1}{3} = \frac{8}{24} \\ - \frac{1}{8} = - \frac{3}{24} \\ \hline \frac{5}{24} \end{array}$$

### Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The difference between the fraction of the budget for housing this year and last year is calculated correctly using mathematically sound procedures. Since the budget for food and medical care both remained the same from last year to this year, the difference in the budget for maintenance is equal to the difference in the budget for housing.

## GUIDE PAPER 4

55

The table below shows part of the operating budget of a small dairy farm for last year. The only expense not listed in the table is maintenance.

**LAST YEAR'S  
OPERATING BUDGET**

Expense	Fraction of Budget
Food	$\frac{1}{3}$
Housing	$\frac{1}{3}$
Medical Care	$\frac{1}{4}$

This year, the managers of the farm will change the fraction of the budget for housing to  $\frac{1}{8}$  but will leave the fraction of the budget for food and medical care the same. Again, the remaining portion of the budget will be for maintenance expenses. What is the difference between the fraction of the budget for maintenance this year and last year?

**Show your work.**

$\begin{aligned} \text{Last Year: } & \quad \frac{1}{3} + \frac{1}{3} + \frac{1}{4} = \frac{11}{12} \\ \text{Food: } & \frac{1}{3} \\ \text{Housing: } & \frac{1}{3} \\ \text{Medical Care: } & \frac{1}{4} \\ \text{Maintenance: } & \frac{1}{12} \end{aligned}$	$\begin{aligned} \text{This Year: } & \quad \frac{1}{3} + \frac{1}{8} + \frac{1}{4} = \frac{17}{24} \\ \text{Food: } & \frac{1}{3} \\ \text{Housing: } & \frac{1}{8} \\ \text{Medical Care: } & \frac{1}{4} \\ \text{Maintenance: } & \frac{7}{24} \end{aligned}$
---	---

Last Year       $\frac{11}{12}$   
 This Year       $\frac{17}{24}$   
 Difference       $\frac{17}{24} - \frac{11}{12} = \frac{1}{24}$

**Answer**  $\frac{1}{24}$  of the budget this year

### Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. Appropriate and correct addition and subtraction of fractions is completed to correctly determine the fraction of the budget for maintenance this year and last year; however, the final operation to determine the difference between the two years is not explicitly shown and the solution is incorrect. This response contains an incorrect solution but provides sound procedures.

## GUIDE PAPER 5

**55**

The table below shows part of the operating budget of a small dairy farm for last year. The only expense not listed in the table is maintenance.

**LAST YEAR'S  
OPERATING BUDGET**

Expense	Fraction of Budget
Food	$\frac{1}{3}$
Housing	$\frac{1}{3}$
Medical Care	$\frac{1}{4}$

This year, the managers of the farm will change the fraction of the budget for housing to  $\frac{1}{8}$  but will leave the fraction of the budget for food and medical care the same. Again, the remaining portion of the budget will be for maintenance expenses. What is the difference between the fraction of the budget for maintenance this year and last year?

**Show your work.**

$$\frac{1}{3} \times \frac{8}{8} = \frac{8}{24} + \frac{3}{24} + \frac{6}{24} = \frac{17}{24}$$

$$\frac{1}{8} \times \frac{3}{3} = \frac{3}{24}$$

$$\frac{1}{4} \times \frac{6}{6} = \frac{6}{24}$$

**Answer** \_\_\_\_\_

$$\frac{1}{3} \times \frac{4}{4} = \frac{4}{12} + \frac{4}{12} + \frac{3}{12} = \frac{11}{12}$$

$$\frac{1}{4} \times \frac{3}{3} = \frac{3}{12} \quad \text{Maintenance} = \frac{12}{24}$$

$$\begin{array}{r} 17/24 \\ - 2/24 \\ \hline 15/24 \end{array}$$

For Last  
Year

Maintenance  
For This  
Year

$\frac{15}{24}$

### Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. Appropriate and correct addition and subtraction of fractions is completed to correctly determine the fraction of the budget for maintenance for last year; however, the total fraction of the budget for food, housing and medical care for this year is misinterpreted as the maintenance budget, resulting in an incorrect solution. This response reflects some minor misunderstanding of the underlying mathematical concepts.

## GUIDE PAPER 6

55

The table below shows part of the operating budget of a small dairy farm for last year. The only expense not listed in the table is maintenance.

### LAST YEAR'S OPERATING BUDGET

Expense	Fraction of Budget
Food	$\frac{1}{3}$
Housing	$\frac{1}{3}$
Medical Care	$\frac{1}{4}$

This year, the managers of the farm will change the fraction of the budget for housing to  $\frac{1}{8}$  but will leave the fraction of the budget for food and medical care the same.

Again, the remaining portion of the budget will be for maintenance expenses. What is the difference between the fraction of the budget for maintenance this year and last year?

Show your work.

$$\frac{8}{24} - \frac{3}{24} = \frac{5}{24}$$

The fraction of budget for the housing is  $\frac{5}{24}$  less than the last year.

Answer 5 $\frac{1}{8}$  Housing

### Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. Appropriate and correct subtraction of fractions is used to correctly determine the difference between the fraction of the budget for housing this year and last year; however, the budget for maintenance is not addressed. Although the difference for maintenance is equal to the difference for housing, the solution is explicitly labeled as "housing". A transcription error is made when providing the solution on the answer blank; however, the correct value appears twice in the work and the error is considered inconsequential. The response appropriately addresses most, but not all aspects of the task using mathematically sound procedures.

## GUIDE PAPER 7

55

The table below shows part of the operating budget of a small dairy farm for last year. The only expense not listed in the table is maintenance.

### LAST YEAR'S OPERATING BUDGET

Expense	Fraction of Budget
Food	$\frac{1}{3}$
Housing	$\frac{1}{3}$
Medical Care	$\frac{1}{4}$

This year, the managers of the farm will change the fraction of the budget for housing to  $\frac{1}{8}$  but will leave the fraction of the budget for food and medical care the same. Again, the remaining portion of the budget will be for maintenance expenses. What is the difference between the fraction of the budget for maintenance this year and last year?

Show your work.

2nd year

$$\frac{1}{8} + \frac{1}{3} + \frac{1}{4} = ?$$



$$\frac{3}{24} +$$

*1st year*

$$\frac{4}{12} + \frac{4}{12} + \frac{3}{12} = \frac{11}{12} \quad \frac{12}{12} - \frac{11}{12} = \frac{1}{12}$$

*1/12 maintenance*

Answer \_\_\_\_\_

### Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. Appropriate and correct addition and subtraction of the fractions is completed for last year's budget to correctly determine the fraction of the budget for maintenance; however, the fraction of the budget for maintenance this year is not determined and the difference is not calculated. The response reflects a lack of essential understanding of the underlying mathematical concepts.

## GUIDE PAPER 8

Additional

55

The table below shows part of the operating budget of a small dairy farm for last year. The only expense not listed in the table is maintenance.

### LAST YEAR'S OPERATING BUDGET

Expense	Fraction of Budget
Food	$\frac{1}{3}$
Housing	$\frac{1}{3}$
Medical Care	$\frac{1}{4}$

This year, the managers of the farm will change the fraction of the budget for housing to  $\frac{1}{8}$  but will leave the fraction of the budget for food and medical care the same.

Again, the remaining portion of the budget will be for maintenance expenses. What is the difference between the fraction of the budget for maintenance this year and last year?

**Show your work.**

$$\frac{8}{24} + \frac{3}{24} + \frac{6}{24} = \frac{17}{24}$$

**Answer**

$$\frac{17}{24}$$

### Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The total fraction for this year's food, housing, and medical care expenses is correctly determined; however, the fraction of the budget for maintenance is not addressed and no calculations are shown for last year's budget. This response addresses some elements of the task correctly but reaches an inadequate solution and provides reasoning that is incomplete.

## GUIDE PAPER 9

55

The table below shows part of the operating budget of a small dairy farm for last year.  
The only expense not listed in the table is maintenance.

### LAST YEAR'S OPERATING BUDGET

Expense	Fraction of Budget
Food	$\frac{1}{3}$
Housing	$\frac{1}{3}$
Medical Care	$\frac{1}{4}$

This year, the managers of the farm will change the fraction of the budget for housing to  $\frac{1}{8}$  but will leave the fraction of the budget for food and medical care the same.

Again, the remaining portion of the budget will be for maintenance expenses. What is the difference between the fraction of the budget for maintenance this year and last year?

Show your work.

Answer \_\_\_\_\_

$$\begin{aligned} & \frac{11}{12} - \frac{1}{8} = \frac{23}{24} \\ & \frac{23}{24} - \frac{1}{3} = \frac{19}{24} \\ & \frac{19}{24} - \frac{4}{12} = \frac{11}{24} \end{aligned}$$

### Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The total fraction for last year's food, housing, and medical care expenses is correctly determined; however, the fraction of the budget for maintenance is not addressed. Additionally, only this year's fraction of the budget for housing is subtracted from last year's non-maintenance expenses without also subtracting this year's fractions for food and medical care. This response exhibits multiple flaws related to misunderstanding of the underlying mathematical concepts.

## GUIDE PAPER 10

55

The table below shows part of the operating budget of a small dairy farm for last year. The only expense not listed in the table is maintenance.

### LAST YEAR'S OPERATING BUDGET

Expense	Fraction of Budget
Food	$\frac{1}{3}$
Housing	$\frac{1}{3}$
Medical Care	$\frac{1}{4}$

This year, the managers of the farm will change the fraction of the budget for housing to  $\frac{1}{8}$  but will leave the fraction of the budget for food and medical care the same.

Again, the remaining portion of the budget will be for maintenance expenses. What is the difference between the fraction of the budget for maintenance this year and last year?

Show your work.

$$\frac{1}{8} - \frac{1}{3} = \frac{7}{24} - \frac{3}{24} = \frac{4}{24} - \frac{6}{24} = \frac{2}{24}$$

$$\frac{1}{4} - \frac{1}{3} = \frac{3}{12} - \frac{4}{12} = \frac{4}{12} - \frac{1}{12} - \frac{4}{12} = \frac{3}{12} = \frac{6}{24}$$

That last  
years Maintenance  
was more  
than this years  
Maintenance.

Answer

2/24

### Score Point 0 (out of 3 points)

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

## GUIDE PAPER 11

Additional

55

The table below shows part of the operating budget of a small dairy farm for last year. The only expense not listed in the table is maintenance.

### LAST YEAR'S OPERATING BUDGET

Expense	Fraction of Budget
Food	$\frac{1}{3}$
Housing	$\frac{1}{3}$
Medical Care	$\frac{1}{4}$

This year, the managers of the farm will change the fraction of the budget for housing to  $\frac{1}{8}$  but will leave the fraction of the budget for food and medical care the same.

Again, the remaining portion of the budget will be for maintenance expenses. What is the difference between the fraction of the budget for maintenance this year and last year?

Show your work.

$$\begin{array}{r} 0 \cancel{1} \cancel{3} \\ -7 \\ \hline 6 \\ \times 24 \\ \hline 13 \\ 8 \cancel{1} \cancel{3} \times 24 = 6/24 \end{array}$$

Answer \_\_\_\_\_

### Score Point 0 (out of 3 points)

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