

New York NYSTP 2017 Grade 7 Math

Reference Materials
Page 2

Exam Materials
Pages 3 - 34

Answer Key Materials
Pages 35 - 37

Rubric Materials
Pages 38 - 142

Grade 7 Mathematics Reference Sheet

CONVERSIONS

1 inch = 2.54 centimeters

1 meter = 39.37 inches

1 mile = 5,280 feet

1 mile = 1,760 yards

1 mile = 1.609 kilometers

1 kilometer = 0.62 mile

1 pound = 16 ounces

1 pound = 0.454 kilogram

1 kilogram = 2.2 pounds

1 ton = 2,000 pounds

1 cup = 8 fluid ounces

1 pint = 2 cups

1 quart = 2 pints

1 gallon = 4 quarts

1 gallon = 3.785 liters

1 liter = 0.264 gallon

1 liter = 1,000 cubic centimeters

FORMULAS

Triangle

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

Parallelogram

$$A = bh$$

Circle

$$A = \pi r^2$$

Circle

$$C = \pi d \text{ or } C = 2\pi r$$

General Prisms

$$V = Bh$$

Name: _____



New York State *Testing Program*

2017 Common Core Mathematics Test Book 1

Grade **7**

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.

- 1 Point P is shown on the number line below.



The distance between point Q and point P is $6\frac{1}{2}$ units. Which number could represent point Q?

A $-9\frac{1}{2}$

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

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

D $10\frac{1}{2}$

- 2 Ms. Gartland bought x number of shirts for the new members of her chorus. The cost for x number of shirts, including \$3.99 shipping, was \$77.49. Each shirt cost \$12.25. There was no sales tax on this purchase. Which equation could be used to find x ?

A $3.99(x + 12.25) = 77.49$

B $3.99x + 12.25 = 77.49$

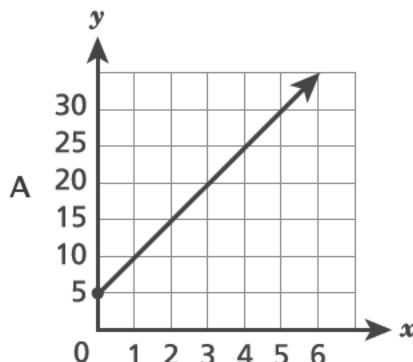
C $12.25(x + 3.99) = 77.49$

D $12.25x + 3.99 = 77.49$

GO ON

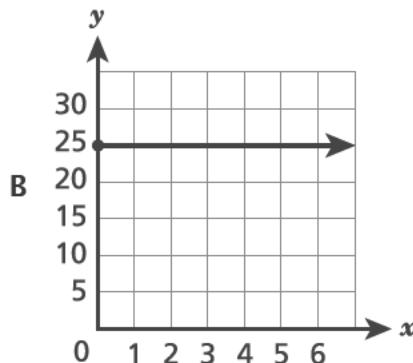
3

Which representation shows a proportional relationship between x and y ?



C

x	y
2	8
4	16
8	24
12	32



D

x	y
2	3
4	6
8	12
12	18

4

Every five years in March, the population of a certain town is recorded. In 1995, the town had a population of 4,500 people. From 1995 to 2000, the population increased by 15%. From 2000 to 2005, the population decreased by 4%. What was the town's population in 2005?

- A 4,527
- B 4,968
- C 4,995
- D 5,382

GO ON

9

The measure of one side of a square is $(s + 3)$ inches long. Which pair of expressions both represent the perimeter of this square?

$2s + 3$

A and

$(s + 3)(s + 3)$

$2(s + 3)$

B and

$(s + 3)(s + 3)$

$4s + 3$

C and

$(s + 3) + (s + 3) + (s + 3) + (s + 3)$

$4(s + 3)$

D and

$(s + 3) + (s + 3) + (s + 3) + (s + 3)$

10

Which expression has the same value as $59.2 - 84.7$?

A $84.7 - 59.2$

B $-84.7 + (-59.2)$

C $59.2 - (-84.7)$

D $59.2 + (-84.7)$

GO ON

11

Winston needs at least 80 signatures from students in his school before he can run for class president. He has 23 signatures already. He and two of his friends plan to get the remaining signatures during lunch. If each person gets the same number of signatures, which inequality can Winston use to determine the minimum number of signatures each person should get so he can run for class president?

- A $3x + 80 \geq 23$
- B $3x + 80 \leq 23$
- C $3x + 23 \geq 80$
- D $3x + 23 \leq 80$

12

In the morning, a farm worker packed 3 pints of strawberries every 4 minutes. In the afternoon, she packed 2 pints of strawberries every 3 minutes. What was the difference between her morning and afternoon packing rates, in pints per hour?

- A 5
- B 10
- C 40
- D 45

13

Which expression makes the equation true for all values of x ?

$$16x - 16 = 4(\underline{\quad}?)$$

- A $4x - 4$
- B $4x - 16$
- C $2x - 2$
- D $12x - 12$

GO ON

14

Which number is equivalent to $\frac{43}{12}$?

- A 3.583
- B $3.5\bar{8}\bar{3}$
- C $3.\overline{583}$
- D $3.\overline{5}8\overline{3}$

15

Mr. Santino needs a total of 406 forks for his restaurant. He currently has 278 forks. If each set has 12 forks, what is the minimum number of sets of forks he should buy?

- A 11
- B 12
- C 128
- D 140

16

If the expression below has a positive value, which inequality represents all possible values of x in the expression?

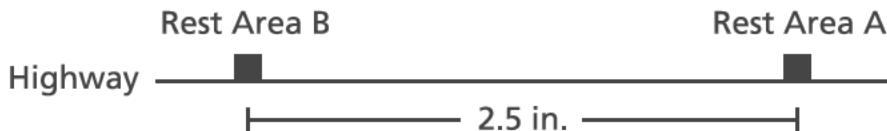
$$-3x$$

- A $x < 0$
- B $x > 0$
- C $x \leq 0$
- D $x \geq 0$

GO ON

19

Jensen stopped at rest area A along the side of the highway. His map, shown below, has a scale of 1 inch to 35 miles.



Jensen planned to stop at rest area B next. What is the actual distance, in miles, between the two rest areas?

- A 14.0
- B 37.5
- C 70.5
- D 87.5

20

Which statement describes the decimal equivalent of $\frac{7}{8}$?

- A It is a decimal with a repeating digit of 5.
- B It is a decimal with repeating digits of 75.
- C It is a decimal that terminates after 2 decimal places.
- D It is a decimal that terminates after 3 decimal places.

GO ON

21

Which expression is equivalent to the expression shown below?

$$-\frac{1}{2}\left(-\frac{3}{2}x + 6x + 1\right) - 3x$$

- A $\frac{3}{2}x - \frac{1}{2}$
- B $6\frac{3}{4}x - \frac{1}{2}$
- C $-\frac{3}{4}x + \frac{1}{2}$
- D $-5\frac{1}{4}x - \frac{1}{2}$

22

Leanne collects data throughout the basketball season and uses these data to determine the probabilities of different teams playing in the league championship game. The probabilities for her four favorite teams playing in the championship game are shown below.

- Tigers: $P = \frac{2}{3}$
- Redbirds: $P = \frac{4}{5}$
- Bulldogs: $P = \frac{3}{8}$
- Titans: $P = \frac{1}{2}$

Which of these teams is **least likely** to play in the championship game?

- A Tigers
- B Redbirds
- C Bulldogs
- D Titans

GO ON

25

The initial balance of a savings account was \$275. After which transactions will the balance of the savings account be the same as the initial balance?

- A a withdrawal of \$232 followed by a deposit of \$132
- B a deposit of \$278 followed by a withdrawal of \$278
- C a withdrawal of \$115 followed by a deposit of \$312
- D a deposit of \$205 followed by a withdrawal of \$317

26

A researcher surveyed five randomly selected employees from each of four different companies about their daily commutes to work. The table shows the commute times for the surveyed employees.

COMMUTE TIMES FOR SELECTED EMPLOYEES

Amount of Time for Company 1 (minutes)	Amount of Time for Company 2 (minutes)	Amount of Time for Company 3 (minutes)	Amount of Time for Company 4 (minutes)
24	6	15	13
26	32	15	10
28	9	15	45
23	31	15	12
21	21	15	15

Based on the data, which company **most likely** has the longest average commute time per employee?

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

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, a protractor, and a calculator) and a reference sheet to use during the test. It is up to you to decide when each tool and the reference sheet will be helpful. You should use mathematics tools and the reference sheet whenever you think they will help you to answer the question.

- 27** In a scale drawing of an apartment, 1 centimeter represents $2\frac{3}{4}$ feet. If the length of the kitchen is $4\frac{1}{2}$ cm on the scale drawing, what is the actual length, in feet, of the kitchen?

A $6\frac{2}{3}$

B $7\frac{1}{4}$

C $8\frac{3}{8}$

D $12\frac{3}{8}$

- 28** A passenger train has tickets available for 12 window seats and 8 aisle seats. The next person to buy a ticket will be randomly assigned to one of those seats. What is the probability that the next person will be assigned to an aisle seat?

A $\frac{1}{8}$

B $\frac{2}{5}$

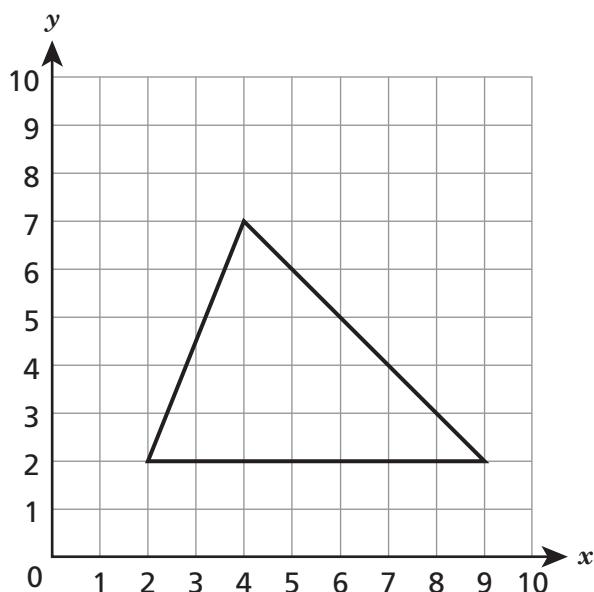
C $\frac{1}{2}$

D $\frac{2}{3}$

GO ON

32

The scale drawing of a field in the shape of a triangle is shown below.



KEY
= 2 meters

What is the actual area, in square meters, of this field?

- A 8.75
- B 17.5
- C 35
- D 70

33

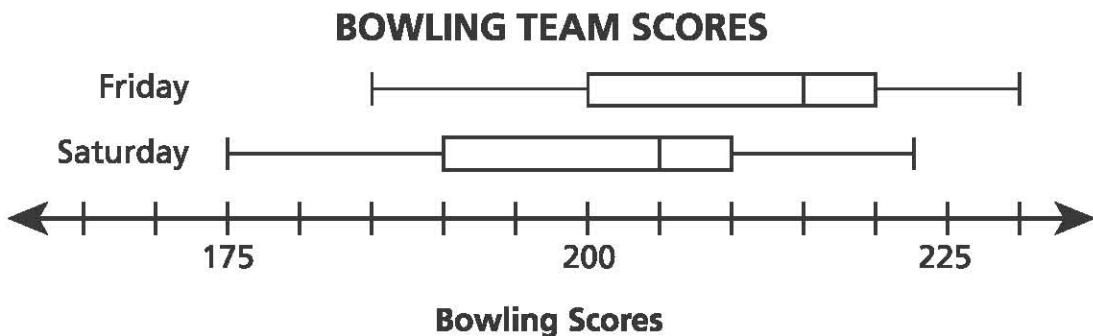
A vehicle uses $1\frac{1}{8}$ gallons of gasoline to travel $13\frac{1}{2}$ miles. At this rate, how many miles can the vehicle travel per gallon of gasoline?

- A $\frac{16}{243}$
- B $\frac{4}{3}$
- C 12
- D 13

GO ON

34

A bowling team participates in a two-day tournament and records the scores for each team member on both days. The scores for both days are represented by the box plots below.



Which conclusion can be drawn from the box plots?

- A The scores on Friday and the scores on Saturday have the same median and interquartile range.
- B The scores on Friday have a greater median and a greater interquartile range than the scores on Saturday.
- C The scores on Friday have a greater interquartile range than the scores on Saturday, but both data sets have the same median.
- D The scores on Friday have a greater median than the scores on Saturday, but both data sets have the same interquartile range.

35

Which expression is equivalent to $\frac{7}{2}h - 3\left(5h - \frac{1}{2}\right)$?

- A $-\frac{23}{2}h + \frac{3}{2}$
- B $-\frac{23}{2}h - \frac{3}{2}$
- C $\frac{37}{2}h + \frac{3}{2}$
- D $\frac{37}{2}h - \frac{3}{2}$

GO ON

36

Jeanette purchased a concert ticket on a web site. The original price of the ticket was \$75. She used a coupon code to receive a 20% discount. The web site applied a 10% service fee to the discounted price. Jeanette's ticket was less than the original price by what percent?

- A 7%
- B 10%
- C 12%
- D 28%

37

A seventh grade English Language Arts teacher wants to order books for all the seventh grade classes. He wants to determine the favorite type of book among the seventh grade students. Which sample would be the most appropriate for this survey?

- A 7 girls in each of his classes
- B every fifth student in the seventh grade
- C 1 out of 7 students in his middle school
- D all of the boys in one of his seventh grade classes

38

The amount of money in a bank account increased by 21.5% over the last year. If the amount of money at the beginning of the year is represented by n , which expression represents the amount of money in the bank account after the increase?

- A $n + 0.215n$
- B $n + 21.5n$
- C $0.215n$
- D $21.5n$

GO ON

39

Kiyo used wire fencing to form a border around a circular region in his back yard. If the radius of the circular region was 5 yards, what was the total length of the border, rounded to the nearest tenth of a yard?

- A 15.7
- B 31.4
- C 78.5
- D 157.1

40

A triangle has side lengths of $(5.5x + 6.2y)$ centimeters, $(4.3x + 8.3z)$ centimeters, and $(1.6z - 5.1y)$ centimeters. Which expression represents the perimeter, in centimeters, of the triangle?

- A $11.4xz + 9.4yz$
- B $11.7xy + 12.6xz - 3.5yz$
- C $9.8x + 1.1y + 9.9z$
- D $9.8x + 7.8y + 3.5z$

41

Carl wants to buy a television that costs \$500, including taxes. To pay for the television, he will use a payment plan that requires him to make a down payment of \$125, and then pay \$72.50 each month for 6 months. What is the percent increase from the original cost of the television to the cost of the television using the payment plan?

- A 6%
- B 12%
- C 58%
- D 89%

GO ON

42

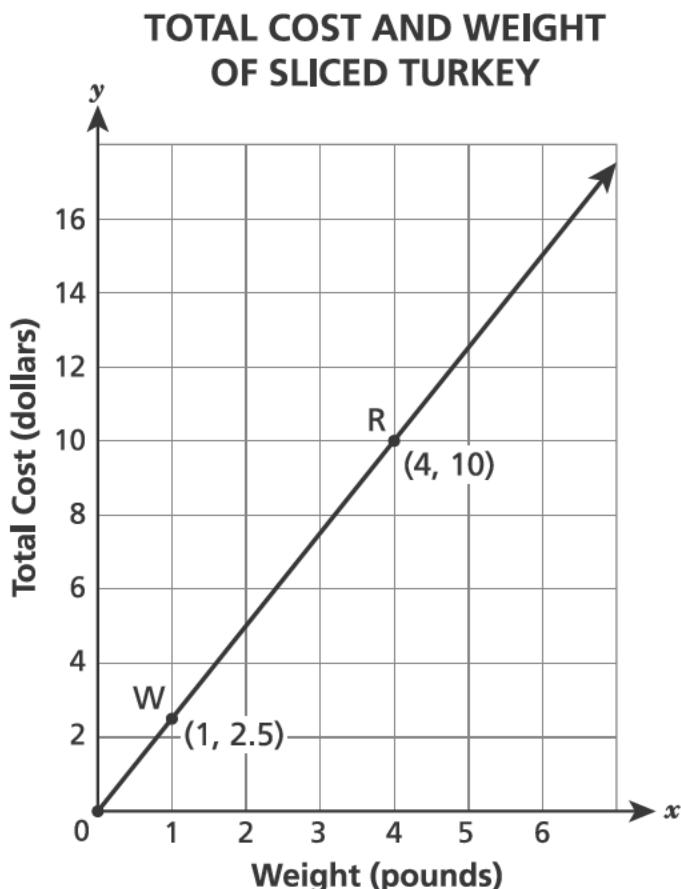
Yolanda participated in a walkathon in which each kilometer walked raised \$10 for charity. Her goal was to raise more than \$300 on Saturday and Sunday. She raised \$50 on Saturday. Which graph shows all the distances, in kilometers, that Yolanda could have walked on Sunday to reach her goal?



GO ON

43

A grocery store sells sliced turkey. The graph shows the relationship between the weight of the sliced turkey and the total cost of the sliced turkey. Two points, R and W, are labeled on the graph shown below.



Which statement about the graph is true?

- A Point R means that the unit rate is \$10.00 per pound.
- B Point R means that the unit rate is 4 pounds per dollar.
- C Point W means that the unit rate is \$2.50 per pound.
- D Point W means that the unit rate is 2.5 pounds per dollar.

GO ON

44

An item with an original price of p dollars is on sale at a 25% discount. Which expression is **not** equivalent to the price of the item with the discount?

- A $(1.0p - 0.25p)$
- B $(1.0 - 0.25)p$
- C $0.75p$
- D $0.25p$

45

A circle has a diameter of 26 units. What is the area of the circle to the nearest hundredth of a square unit?

- A 81.68
- B 530.93
- C 2,123.72
- D 8,494.87

46

The width of a rectangle is $6\frac{2}{3}$ inches. The length of the rectangle is twice its width. What is the perimeter of the rectangle?

- A 20 inches
- B 40 inches
- C $30\frac{2}{3}$ inches
- D $88\frac{8}{9}$ inches

GO ON

47

A student uses a solution that contains 16 grams of water to conduct an evaporation experiment.

- At the end of one hour, the amount of water in the solution has decreased by 3.5%.
- At the end of two hours, the amount of water in the solution has decreased by another 4.25%.

Which calculations can be used to determine the amount of water, in grams, remaining in the solution at the end of the second hour?

A Step 1: $0.035 \times 16 = 0.56$

Step 2: $16 - 0.56 = 15.44$

Step 3: $0.0425 \times 15.44 = 0.6562$

Step 4: $16 - 0.6562 = 15.3438$

B Step 1: $0.035 \times 16 = 0.56$

Step 2: $16 - 0.56 = 15.44$

Step 3: $0.0425 \times 15.44 = 0.6562$

Step 4: $15.44 - 0.6562 = 14.7838$

C Step 1: $0.35 \times 16 = 5.6$

Step 2: $16 - 5.6 = 10.4$

Step 3: $0.425 \times 10.4 = 4.42$

Step 4: $16 - 4.42 = 11.58$

D Step 1: $0.35 \times 16 = 5.6$

Step 2: $16 - 5.6 = 10.4$

Step 3: $0.425 \times 10.4 = 4.42$

Step 4: $10.4 - 4.42 = 5.98$

GO ON

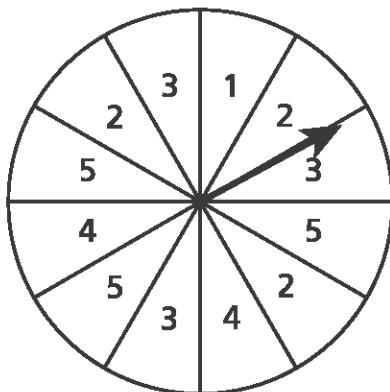
50

What is the value of the expression $\left(-\frac{8}{9}\right) \div \left(-\frac{2}{3}\right) \times \left(-4\frac{1}{2}\right)$?

- A -6
- B $-\frac{8}{27}$
- C $\frac{8}{27}$
- D 6

51

A board game has a spinner divided into sections of equal size. Each section is labeled with a number between 1 and 5.



Which number is a reasonable estimate of the number of times the spinner will land on a section labeled 5 over the course of 150 spins?

- A 15
- B 25
- C 40
- D 60

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, a protractor, and a calculator) and a reference sheet to use during the test. It is up to you to decide when each tool and the reference sheet will be helpful. You should use mathematics tools and the reference sheet whenever you think they will help you to answer the question.
- Be sure to show your work when asked.

52

Find the value of the expression.

$$\frac{5}{(-1.5 + 9.5)} + \frac{0.4(7 + 11)}{-0.2}$$

Show your work.

Answer _____

GO ON

53

A museum opened at 8:00 a.m. In the first hour, 350 people purchased admission tickets. In the second hour, 20% more people purchased admission tickets than in the first hour. Each admission ticket cost \$17.50.

What was the total amount of money paid for all the tickets purchased in the first two hours?

Show your work.

Answer \$_____

GO ON

54

Mick paid \$2.94 in sales tax on an item that cost \$42.00 before tax. At that rate, how much would he pay in sales tax for an item that costs \$58.00 before tax?

Show your work.

Answer \$_____

GO ON

55

At a store, customers are randomly selected to participate in a survey. On Friday, there were 500 customers at the store. Of those, 90 were selected to participate in the survey. On Saturday, the store manager expects 700 customers in the store. If the probability of being selected to participate in the survey on Saturday is the same as it was on Friday, how many customers will be selected to participate in the survey on Saturday?

Show your work.

Answer _____ customers on Saturday

GO ON

56

A school club needs 300 feet of rope for a project. They have the amounts of rope listed below.

- 2 pieces of rope that are each 16 yards in length
- 1 piece of rope that is 12.5 yards in length
- 1 piece of rope that is 123.25 feet in length

How much additional rope, in feet, does the school club need in order to have enough rope for their project?

Show your work.

Answer _____ additional feet of rope

GO ON

57

The table below lists the masses and volumes of several pieces of the same type of metal. There is a proportional relationship between the mass and the volume of the pieces of metal.

PIECES OF METAL

Mass (grams)	Volume (cubic centimeters)
34.932	4.1
47.712	5.6
61.344	7.2
99.684	11.7

Determine the mass, in grams, of a piece of this metal that has a volume of 15.3 cubic centimeters. Round your answer to the nearest tenth of a gram.

Show your work.

Answer _____ grams

GO ON

58

The table below shows the weekly change in the price of one gram of gold for four weeks.

ONE GRAM OF GOLD

Week	Weekly Change in the Price (dollars)
1	+1.25
2	-3.125
3	+0.625
4	+1.5

By how much did the price of one gram of gold change from the beginning of week 1 to the end of week 4? Did the price increase or decrease?

Explain how you found your answer.

At the end of week 4, the price per gram of gold was \$39.28. What was the price per gram of gold at the beginning of week 1?

Show your work.

Answer _____ price per gram of gold

GO ON

59

Hallum Hardware created flyers to advertise a sale on a certain type of carpet. A portion of the flyer is shown below.

HALLUM HARDWARE CARPET SALE	
Area (square feet)	Cost (dollars)
500	750
1,000	1,500
1,500	2,250
2,000	3,000

Guillen Floors advertises the same type of carpet at a cost of 10% less per square foot than Hallum Hardware. Determine the cost of 700 square feet of the carpet if it is bought from Guillen Floors.

Show your work.

Answer \$_____

GO ON

60

A single gram of a certain metallic substance has 0.52 gram of copper and 0.26 gram of zinc. The remaining portion of the substance is nickel. Ben estimated that 0.2 gram of nickel is in 1 gram of the substance. He used this to estimate the amount of nickel in 35 grams of the substance. Find the result of Ben's estimation strategy. Then, find the exact amount of nickel in 35 grams of the substance.

Show your work.

Ben's estimate _____ grams

Exact amount _____ grams

GO ON

61

Last year, a property manager bought five identical snow shovels and six identical bags of salt. The total cost of the snow shovels was \$172.50, before tax, and each bag of salt cost \$6.20, before tax.

This year, the property manager bought two identical snow shovels and four identical bags of salt. The total cost of the snow shovels was \$70.38, before tax, and the total cost of the bags of salt was \$26.04, before tax.

Determine the item with the greatest percent increase in the price from last year to this year. Be sure to include the percent increase of this item to the nearest percent.

Show your work.

Answer _____ and _____ %

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 7	Question	Type	Key	Points	Standard	Cluster	Secondary Standard(s)	Multiple Choice Questions:		Constructed Response Questions:	
								Percentage of Students Who Answered Correctly	(P-Value)	Average Points Earned	P-Value (Average Points Earned ÷ Total Possible Points)
Book 1											
1	Multiple Choice	C	1	CCSS.Math.Content.7.NS.A.1b	The Number System			0.76			
2	Multiple Choice	D	1	CCSS.Math.Content.7.EE.B.4a	Expressions and Equations			0.65			
3	Multiple Choice	D	1	CCSS.Math.Content.7.RP.A.2a	Ratios and Proportional Relationships			0.37			
4	Multiple Choice	B	1	CCSS.Math.Content.7.RP.A.3	Ratios and Proportional Relationships			0.52			
9	Multiple Choice	D	1	CCSS.Math.Content.7.EE.A.2	Expressions and Equations			0.54			
10	Multiple Choice	D	1	CCSS.Math.Content.7.NS.A.1c	The Number System			0.63			
11	Multiple Choice	C	1	CCSS.Math.Content.7.EE.B.4b	Expressions and Equations			0.54			
12	Multiple Choice	A	1	CCSS.Math.Content.7.RP.A.1	Ratios and Proportional Relationships			0.62			
13	Multiple Choice	A	1	CCSS.Math.Content.7.EE.A.1	Expressions and Equations			0.61			
14	Multiple Choice	B	1	CCSS.Math.Content.7.NS.A.2d	The Number System			0.68			
15	Multiple Choice	A	1	CCSS.Math.Content.7.EE.B.4a	Expressions and Equations			0.57			
16	Multiple Choice	A	1	CCSS.Math.Content.7.NS.A.2a	The Number System	CCSS.Math.Content.7.EE.B.4		0.33			
19	Multiple Choice	D	1	CCSS.Math.Content.7.G.A.1	Geometry			0.61			
20	Multiple Choice	D	1	CCSS.Math.Content.7.NS.A.2d	The Number System			0.49			
21	Multiple Choice	D	1	CCSS.Math.Content.7.EE.A.1	Expressions and Equations			0.30			
22	Multiple Choice	C	1	CCSS.Math.Content.7.SP.C.5	Statistics and Probability			0.64			

Released Questions on EngageNY								
Grade 7	Question	Type	Key	Points	Standard	Cluster	Secondary Standard(s)	Multiple Choice Questions:
								Percentage of Students Who Answered Correctly (P-Value)
	25	Multiple Choice	B	1	CCSS.Math.Content.7.NS.A.1a	The Number System		0.66
	26	Multiple Choice	A	1	CCSS.Math.Content.7.SP.B.4	Statistics and Probability		0.74
Book 2								
	27	Multiple Choice	D	1	CCSS.Math.Content.7.G.A.1	Geometry		0.65
	28	Multiple Choice	B	1	CCSS.Math.Content.7.SP.C.7a	Statistics and Probability		0.50
	32	Multiple Choice	D	1	CCSS.Math.Content.7.G.A.1	Geometry		0.29
	33	Multiple Choice	C	1	CCSS.Math.Content.7.RP.A.1	Ratios and Proportional Relationships		0.67
	34	Multiple Choice	D	1	CCSS.Math.Content.7.SP.B.3	Statistics and Probability		0.34
	35	Multiple Choice	A	1	CCSS.Math.Content.7.EE.A.1	Expressions and Equations		0.40
	36	Multiple Choice	C	1	CCSS.Math.Content.7.RP.A.3	Ratios and Proportional Relationships		0.35
	37	Multiple Choice	B	1	CCSS.Math.Content.7.SP.A.1	Statistics and Probability		0.77
	38	Multiple Choice	A	1	CCSS.Math.Content.7.EE.A.2	Expressions and Equations		0.38
	39	Multiple Choice	B	1	CCSS.Math.Content.7.G.B.4	Geometry		0.48
	40	Multiple Choice	C	1	CCSS.Math.Content.7.EE.A.1	Expressions and Equations		0.58
	41	Multiple Choice	B	1	CCSS.Math.Content.7.RP.A.3	Ratios and Proportional Relationships		0.52
	42	Multiple Choice	B	1	CCSS.Math.Content.7.EE.B.4b	Expressions and Equations		0.46
	43	Multiple Choice	C	1	CCSS.Math.Content.7.RP.A.2d	Ratios and Proportional Relationships		0.64
	44	Multiple Choice	D	1	CCSS.Math.Content.7.EE.A.2	Expressions and Equations		0.40

Released Questions on EngageNY															
Grade 7	Question	Type	Key	Points	Standard	Cluster	Secondary Standard(s)	Multiple Choice Questions:							
								Percentage of Students Who Answered Correctly (P-Value)							
45	Multiple Choice	B	1	CCSS.Math.Content.7.G.B.4	Geometry		0.56								
46	Multiple Choice	B	1	CCSS.Math.Content.7.NS.A.3	The Number System		0.53								
47	Multiple Choice	B	1	CCSS.Math.Content.7.RP.A.3	Ratios and Proportional Relationships		0.47								
50	Multiple Choice	A	1	CCSS.Math.Content.7.NS.A.2c	The Number System		0.62								
51	Multiple Choice	C	1	CCSS.Math.Content.7.SP.C.6	Statistics and Probability		0.44								
Book 3															
52	Constructed Response		2	CCSS.Math.Content.7.EE.B.3	Expressions and Equations		0.94	0.47							
53	Constructed Response		2	CCSS.Math.Content.7.EE.B.3	Expressions and Equations		0.95	0.48							
54	Constructed Response		2	CCSS.Math.Content.7.RP.A.3	Ratios and Proportional Relationships		0.88	0.44							
55	Constructed Response		2	CCSS.Math.Content.7.SP.C.6	Statistics and Probability		1.05	0.52							
56	Constructed Response		2	CCSS.Math.Content.7.NS.A.3	The Number System		0.79	0.39							
57	Constructed Response		2	CCSS.Math.Content.7.RP.A.2b	Ratios and Proportional Relationships		0.84	0.42							
58	Constructed Response		3	CCSS.Math.Content.7.NS.A.3	The Number System		1.00	0.33							
59	Constructed Response		3	CCSS.Math.Content.7.RP.A.2	Ratios and Proportional Relationships		1.08	0.36							
60	Constructed Response		3	CCSS.Math.Content.7.EE.B.3	Expressions and Equations		1.22	0.41							
61	Constructed Response		3	CCSS.Math.Content.7.RP.A.3	Ratios and Proportional Relationships		0.66	0.22							

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

2-Point Holistic Rubric

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

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

3-Point Holistic Rubric

Score Points:

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

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

2017 2- and 3-Point Mathematics Scoring Policies

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

1. If a student shows the work in other than a designated “Show your work” or “Explain” area, that work should still be scored.
2. If the question requires students to show their work, and the student shows appropriate work and clearly identifies a correct answer but fails to write that answer in the answer blank, the student should still receive full credit.
3. If students are directed to show work, a correct answer with **no** work shown receives **no** credit.
4. If students are **not** directed to show work, any work shown will **not** be scored. This applies to items that do **not** ask for any work and items that ask for work for one part and do **not** ask for work in another part.
5. If the student provides one legible response (and one response only), the rater should score the response, even if it has been crossed out.
6. If the student has written more than one response but has crossed some out, the rater should score only the response that has **not** been crossed out.
7. Trial-and-error responses are **not** subject to Scoring Policy #6 above, since crossing out is part of the trial-and-error process.
8. If a response shows repeated occurrences of the same conceptual error within a question, the conceptual error should **not** be considered more than once in gauging the demonstrated level of understanding.
9. In questions requiring number sentences, the number sentences must be written horizontally.
10. Condition Code A is applied whenever a student who is present for a test session leaves an entire constructed-response question in that session completely blank (no response attempted). This is not to be confused with a score of zero wherein the student does respond to part or all of the question but that work results in a score of zero.

EXEMPLARY RESPONSE

52

Find the value of the expression.

$$\frac{5}{(-1.5+9.5)} + \frac{0.4(7+11)}{-0.2}$$

Show your work.

$$\frac{5}{8} + \frac{0.4(18)}{-0.2}$$

$$\frac{5}{8} + \frac{7.2}{-0.2} \quad \text{or} \quad \frac{5}{8} + (-2)(18)$$

$$\frac{5}{8} + (-36)$$

$$-35\frac{3}{8} = -35.375$$

Or other valid process

$$-35\frac{3}{8}$$

Answer _____

GUIDE PAPER 1

Additional

52

Find the value of the expression.

$$\frac{5}{(-1.5+9.5)} + \frac{0.4(7+11)}{-0.2}$$

Show your work.

$$\frac{5}{(-1.5+9.5)} + \frac{0.4(7+11)}{-0.2}$$

$$\frac{5}{(-1.5+9.5)} + \frac{2.8+4.4}{-0.2}$$

$$\frac{5}{8} + \frac{7.2}{-0.2}$$

$$62\frac{5}{8} + -36$$

$$-35\frac{3}{8}$$

Answer

$$-35\frac{3}{8}$$

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The expression is evaluated correctly using mathematically sound procedures.

GUIDE PAPER 2

52

Find the value of the expression.

$$\frac{5}{(-1.5+9.5)} + \frac{0.4(7+11)}{-0.2}$$

Show your work.

$$\frac{5}{\cancel{(-1.5+9.5)}} + \frac{\cancel{0.4(7+11)}}{-0.2}$$

8

$$\frac{5}{8} + \frac{2.8 + 4.4}{-0.2}$$

$$\frac{5}{8} + \frac{7.2}{-0.2}$$

$$\frac{5}{8} + -36 \\ .625 + -36 = -35.375$$

Answer -35.375

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The expression is evaluated correctly using mathematically sound procedures.

GUIDE PAPER 3

52

Find the value of the expression.

$$\frac{5}{(-1.5+9.5)} + \frac{0.4(7+11)}{-0.2}$$

Show your work.

$$\begin{array}{r} 5 \\ \hline (-1.5+9.5) \\ \hline 5 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 0.4(7+11) \\ \hline -0.2 \\ \hline 7.2 \\ \hline -0.2 \end{array}$$

$$\begin{array}{r} 0.625 + -36 \\ -35.375 \end{array}$$

Answer -35.375

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The expression is evaluated correctly using mathematically sound procedures.

GUIDE PAPER 4

52

Find the value of the expression.

$$\frac{5}{(-1.5+9.5)} + \frac{0.4(7+11)}{-0.2}$$

5 72
-0.2

Show your work.

Answer -35.375

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The expression is evaluated correctly; however, the work only simplifies individual terms and does not demonstrate how to add the terms to arrive at the solution.

GUIDE PAPER 5

52

Find the value of the expression.

$$\frac{5}{(-1.5+9.5)} + \frac{0.4(\overline{7}+11)}{-0.2} - \frac{5}{-0.2}$$

Show your work.

$$\frac{5+7.2}{8-0.2}$$

$$6.3 + -36$$

$$\textcircled{35.37}$$

$$-35.37$$

Answer _____

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. All processes applied are correct; however, the value $\frac{5}{8}$ is inappropriately rounded to the nearest hundredths place (0.63), resulting in an incorrect solution. The response correctly addresses only some elements of the task.

GUIDE PAPER 6

52

Find the value of the expression.

$$\frac{5}{(-1.5+9.5)} + \frac{0.4(7+11)}{-0.2}$$

Show your work.

$$\frac{5}{(-1.5+9.5)} + \frac{0.4(7+11)}{-0.2}$$

$$\frac{5}{8} + \frac{0.4(18)}{-0.2}$$

$$\frac{5}{8} + \frac{7.2}{-0.2} = \frac{12.2}{7.8}$$

$$12.2 \\ \overline{)7.8}$$

Answer 12.2
7.8

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. Individual numerators and denominators are evaluated correctly; however, the fractions are added incorrectly without determining a common denominator or converting to decimal form. The response correctly addresses only some elements of the task.

GUIDE PAPER 7

52

Find the value of the expression.

$$\frac{5}{(-1.5+9.5)} + \frac{0.4(7+11)}{-0.2}$$

Show your work.

$$\begin{array}{r} 5 \\ (-1.5+9.5) \\ \hline 16 \\ 5 \overline{) 8.0} \\ \hline 30 \\ \begin{array}{r} 92 \\ + 1.6 \\ \hline 93.6 \end{array} \end{array}$$
$$\begin{array}{r} 0.4(7+11) \\ -0.2 \\ \hline 92 \end{array}$$

Answer 93.6

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 and solution provided are incorrect.

GUIDE PAPER 8

Additional

52

Find the value of the expression.

$$\frac{5}{(-1.5+9.5)} + \frac{0.4(7+11)}{-0.2}$$

Show your work.

$$\frac{5}{(-1.5+9.5)} + \frac{0.4(7+11)}{-0.2} = \frac{12.2}{7.8}$$

Answer 7,8

Score Point 0 (out of 2 points)

Although some elements may contain correct mathematical procedures, holistically they are not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task. Compared to Guide Paper 6, less work is shown and the denominator rather than the whole fraction is inappropriately taken as the solution.

EXEMPLARY RESPONSE

53

A museum opened at 8:00 a.m. In the first hour, 350 people purchased admission tickets. In the second hour, 20% more people purchased admission tickets than in the first hour. Each admission ticket costs \$17.50.

What was the total amount of money paid for all the tickets purchased in the first two hours?

Show your work.

$$350 + 350 \times 0.2 = 350 + 70 = 420$$

$$350 + 420 = 770$$

$$770 \times \$17.50 = \$13,475$$

Or other valid process

Answer \$ 13,475

GUIDE PAPER 1

Additional

53

A museum opened at 8:00 a.m. In the first hour, 350 people purchased admission tickets. In the second hour, 20% more people purchased admission tickets than in the first hour. Each admission ticket costs \$17.50.

What was the total amount of money paid for all the tickets purchased in the first two hours?

Show your work.

$$\begin{array}{r}
 \text{First Hour} \downarrow \\
 \begin{array}{r}
 17.50 \\
 \times 350 \\
 \hline
 \$6125
 \end{array}
 \end{array}
 \quad \left\{
 \begin{array}{l}
 \text{Second Hour} \downarrow \\
 \begin{array}{r}
 350 \\
 \times 1.20 \\
 \hline
 420 \text{ people}
 \end{array}
 \end{array}
 \right.$$

$$\begin{array}{r}
 \text{Total} \downarrow \\
 \begin{array}{r}
 7350 \\
 + 6125 \\
 \hline
 \$13,475
 \end{array}
 \end{array}$$

Answer: \$13,475 paid for all tickets.

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total ticket revenue is calculated correctly using mathematically sound procedures.

GUIDE PAPER 2

53

A museum opened at 8:00 a.m. In the first hour, 350 people purchased admission tickets. In the second hour, 20% more people purchased admission tickets than in the first hour. Each admission ticket costs \$17.50.

What was the total amount of money paid for all the tickets purchased in the first two hours?

Show your work.

$$350 + (350 \cdot 1.2)$$

✓

$$350 + 420 = 770$$

$$770 \cdot 17.5 = \$13,475$$

Answer: $\$13,475$

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total ticket revenue is calculated correctly using mathematically sound procedures.

GUIDE PAPER 3

53

A museum opened at 8:00 a.m. In the first hour, 350 people purchased admission tickets. In the second hour, 20% more people purchased admission tickets than in the first hour. Each admission ticket costs \$17.50.

What was the total amount of money paid for all the tickets purchased in the first two hours?

Show your work.

$$\begin{array}{r} 350 \\ \times 17.50 \\ \hline 6,125 \end{array}$$

$$\begin{array}{r} 350 \\ \div 10 \\ \hline 35 \end{array}$$

$$\begin{array}{r} 35 \\ + 35 \\ \hline 70 \end{array}$$

$$\begin{array}{r} 350 \\ + 70 \\ \hline 420 \end{array}$$

$$\begin{array}{r} 420 \\ \times 17.50 \\ \hline 7,350 \end{array}$$

$$\begin{array}{r} 7,350 \\ + 6,125 \\ \hline 13,475 \end{array}$$

Answer \$

13,475

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The total ticket revenue is calculated correctly using mathematically sound procedures.

GUIDE PAPER 4

53

A museum opened at 9:00 a.m. In the first hour, 350 people purchased admission tickets. In the second hour, 20% more people purchased admission tickets than in the first hour. Each admission ticket costs \$17.50.

What was the total amount of money paid for all the tickets purchased in the first two hours?

Show your work.

Step 1
First hour =
350 pp.
\$17.50
\$6125

Step 2
$$\begin{array}{r} 350 \\ \times .20 \\ \hline 70 \end{array}$$

↓
350
+ 70
420 pp.

Step 3
Second hour =
420 pp.
\$17.50
\$7350

Step 4
First hour Second hour
+ \$6125 + \$7350

\$13470 two hours

Answer: \$ 13470

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The response applies a mathematically appropriate process; however, a calculation error occurs when adding the ticket revenue from each hour to determine the total revenue ($\$6125 + \$7350 = \$13470$), resulting in an incorrect solution.

GUIDE PAPER 5

53

A museum opened at 8:00 a.m. In the first hour, 350 people purchased admission tickets. In the second hour, 20% more people purchased admission tickets than in the first hour. Each admission ticket costs \$17.50.

What was the total amount of money paid for all the tickets purchased in the first two hours?

Show your work.

$$\begin{array}{r} \times 350 \\ \quad .20 \\ \hline 70 \end{array} \qquad \begin{array}{r} 1 \\ + 350 \\ \hline 70 \\ \hline 420 \end{array}$$

$$\begin{array}{r} 420 \\ + 350 \\ \hline 770 \end{array}$$

$$\begin{array}{r} 770 \\ \times 17.50 \\ \hline \end{array}$$

Answer: \$ 134.75

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 tickets sold is calculated correctly; however, the decimal point is placed incorrectly in the solution for the total revenue. The response correctly addresses only some elements of the task.

GUIDE PAPER 6

53

A museum opened at 8:00 a.m. In the first hour, 350 people purchased admission tickets. In the second hour, 20% more people purchased admission tickets than in the first hour. Each admission ticket costs \$17.50.

What was the total amount of money paid for all the tickets purchased in the first two hours?

Show your work.

$$\text{open} = 8:00 \text{am} \quad (350 \text{ people})$$

$$20\% \text{ of } 350 = 350 \cdot 0.20 = 70$$

$$\text{Total people} = 350 + 70 = 420$$

$$\text{Total price} = 17.50 \cdot 420 = \$7,350$$

Answer: \$7,350.00

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The number of tickets sold and the ticket revenue for the second hour are calculated correctly; however, this is misinterpreted as the total without including the ticket sales from the first hour. The response correctly addresses only some elements of the task.

GUIDE PAPER 7

53

A museum opened at 8:00 a.m. In the first hour, 350 people purchased admission tickets. In the second hour, 20% more people purchased admission tickets than in the first hour. Each admission ticket costs \$17.50.

What was the total amount of money paid for all the tickets purchased in the first two hours?

Show your work.

$$\begin{array}{r} 21 \\ \times 350 \\ \hline 6000 \\ 187500 \\ \hline 72500 \\ \hline 612500 \end{array}$$

\$6125

Answer \$

6125

Score Point 0 (out of 2 points)

Although some elements may contain correct mathematical procedures, holistically they are not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task. Only the ticket revenue from the first hour is calculated: the ticket sales during the second hour are not addressed.

GUIDE PAPER 8

Additional

53

A museum opened at 8:00 a.m. In the first hour, 350 people purchased admission tickets. In the second hour, 20% more people purchased admission tickets than in the first hour. Each admission ticket costs \$17.50.

What was the total amount of money paid for all the tickets purchased in the first two hours?

Show your work.

$$\begin{array}{r} 20 \\ \times 350 \\ \hline \end{array}$$

$$\begin{array}{r} 17.50 \\ \times 350 \\ \hline \end{array}$$

$$\begin{array}{r} 350 \\ + 175 \\ \hline 525 \end{array}$$

$$\begin{array}{r} 17.50 \\ \times 525 \\ \hline \end{array}$$

$$\begin{array}{r} 187.50 \\ + 61.25 \\ \hline 248.75 \end{array}$$

Answer: \$ 9,248.75

Score Point 0 (out of 2 points)

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

EXEMPLARY RESPONSE

54

Mick paid \$2.94 in sales tax on an item that cost \$42.00 before tax. At that rate, how much would he pay in sales tax for an item that costs \$58 before tax?

Show your work.

$$\frac{\$2.94}{\$42.00} = 0.07 = 7\%$$
$$0.07 \times \$58 = \$4.06$$

Or other valid process

Answer \$ 4.06

GUIDE PAPER 1

Additional

54

Mick paid \$2.94 in sales tax on an item that cost \$42.00 before tax. At that rate, how much would he pay in sales tax for an item that costs \$58 before tax?

Show your work.

$$\frac{2.94}{42} = \frac{X}{58}$$

$$58 \times 2.94 = 170.52$$

$$170.52 \div 42 = 4.06$$

Answer \$ 4.06

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The tax paid on the \$58 item is calculated correctly using a proportion.

GUIDE PAPER 2

54

Mick paid \$2.94 in sales tax on an item that cost \$42.00 before tax. At that rate, how much would he pay in sales tax for an item that costs \$58 before tax?

Show your work.

$$\begin{array}{r} 14.29 \\ 2.94 \sqrt{42} \\ \hline 1429 \end{array}$$

$$\begin{array}{r} 4.058 \\ 14.29 \sqrt{58} \\ \hline 58 \end{array}$$

$$4.058 - 4.06$$

Answer \$ 4.06

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The response correctly calculates the reciprocal of the tax rate and uses that result to determine the tax to be paid on the \$58 item.

GUIDE PAPER 3

54

Mick paid \$2.94 in sales tax on an item that cost \$42.00 before tax. At that rate, how much would he pay in sales tax for an item that costs \$58 before tax?

Show your work.

$$\begin{aligned}42 \cdot 5\% &= 2.1 \\42 \cdot 6\% &= 2.52 \\42 \cdot \underline{7\%} &= 2.94\end{aligned}$$

$$58 \cdot 7\% = 4.06$$

Answer \$ 4.06

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. A trial-and-error method is used to determine the 7% tax rate which is then applied correctly to calculate the amount of sales tax on the \$58 item.

GUIDE PAPER 4

54

Mick paid \$2.94 in sales tax on an item that cost \$42.00 before tax. At that rate, how much would he pay in sales tax for an item that costs \$58 before tax?

Show your work.

$$\frac{2.94}{42} = \frac{x}{58}$$

$$\frac{42x}{42} = \frac{170.52}{42}$$
$$x = 4.06$$

$$\begin{array}{r} 58 \\ \times 4.06 \\ \hline 62.06 \end{array}$$

Answer \$ 62.06

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. A proportion is used to correctly determine the amount of sales tax on the \$58 item; however, the total cost of the item including tax is chosen as the solution rather than the tax alone. The response contains an incorrect solution but applies a mathematically appropriate process.

GUIDE PAPER 5

54

Mick paid \$2.94 in sales tax on an item that cost \$42.00 before tax. At that rate, how much would he pay in sales tax for an item that costs \$58 before tax?

Show your work.

$$2.94 \div 42.00 = 0.0735$$

$$\begin{array}{r} 0.0735 \\ \times 58 \\ \hline 0.3675 \\ + 0.5880 \\ \hline 4.263 \end{array}$$

Answer \$4.26

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The sales tax is appropriately divided by the cost of the item to determine the tax rate; however, a calculation error results in an incorrect tax rate. The incorrect rate is then used to correctly calculate the tax paid on the \$58 item. The response contains an incorrect solution but applies an appropriate process.

GUIDE PAPER 6

54

Mick paid \$2.94 in sales tax on an item that cost \$42.00 before tax. At that rate, how much would he pay in sales tax for an item that costs \$58 before tax?

Show your work.

$$\frac{2.94}{42.00} = \frac{7}{100}$$

7%. tax

$$\begin{array}{r} 58 \\ \times .7 \\ \hline 4.06 \end{array}$$

Answer \$4.06

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. A proportion is used to correctly determine the tax rate; however, although the solution for the amount of sales tax for the \$58 item is correct, the tax rate is represented as a decimal incorrectly in the calculation. This response correctly addresses only some elements of the task.

GUIDE PAPER 7

54

Mick paid \$2.94 in sales tax on an item that cost \$42.00 before tax. At that rate, how much would he pay in sales tax for an item that costs \$58 before tax?

Show your work.

$$\begin{array}{r} 42.00 \\ - 2.94 \\ \hline 39.06 \end{array}$$

Answer \$ 39.06

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 tax paid is inappropriately subtracted from the pre-tax price of the item and no attempt is made to address the tax rate or the \$58 item.

GUIDE PAPER 8

Additional

54

Mick paid \$2.94 in sales tax on an item that cost \$42.00 before tax. At that rate, how much would he pay in sales tax for an item that costs \$58 before tax?

Show your work.

$$\begin{array}{r} 2.94 \\ + 42.00 \\ \hline 44.94 \end{array}$$

$$\begin{array}{r} 2.94 \\ 42.00 \\ \hline 54.94 \end{array}$$

Answer \$54.94

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 total cost of the item including tax is calculated correctly; however this operation, as well as the other calculation shown, is irrelevant to the task.

EXEMPLARY RESPONSE

55

At a store, customers are randomly selected to participate in a survey. On Friday, there were 500 customers at the store. Of those, 90 were selected to participate in the survey. On Saturday, the store manager expects 700 customers in the store. If the probability of being selected to participate in the survey on Saturday is the same as it was on Friday, how many customers will be selected to participate in the survey on Saturday?

Show your work.

$$\frac{90}{500} = 0.18 = 18\%$$

$$0.18 \times 700 = 126$$

Or other valid process

Answer 126 customers on Saturday

GUIDE PAPER 1

Additional

55

At a store, customers are randomly selected to participate in a survey. On Friday, there were 500 customers at the store. Of those, 90 were selected to participate in the survey. On Saturday, the store manager expects 700 customers in the store. If the probability of being selected to participate in the survey on Saturday is the same as it was on Friday, how many customers will be selected to participate in the survey on Saturday?

Show your work.

$$\frac{90}{500} = \frac{x}{700}$$

$$\frac{500x}{500} = \frac{63000}{500}$$

$$x = 126$$

Answer 126 customers on Saturday

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. An appropriate proportion is written and solved correctly to determine the number of customers selected on Saturday.

GUIDE PAPER 2

55

At a store, customers are randomly selected to participate in a survey. On Friday, there were 500 customers at the store. Of those, 90 were selected to participate in the survey. On Saturday, the store manager expects 700 customers in the store. If the probability of being selected to participate in the survey on Saturday is the same as it was on Friday, how many customers will be selected to participate in the survey on Saturday?

Show your work.

500 customers
90 selected

$$\frac{90}{500} = .18$$

$.18 \cdot 5 = 90$

700 customers
 x selected

$$\frac{x}{700} = .18$$

$.18 \cdot 7 = 12.6$

126 selected

Answer 126 customers on Saturday

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The probability of being selected for the survey and the number of customers selected on Saturday are calculated correctly using mathematically sound procedures.

GUIDE PAPER 3

55

At a store, customers are randomly selected to participate in a survey. On Friday, there were 500 customers at the store. Of those, 90 were selected to participate in the survey. On Saturday, the store manager expects 700 customers in the store. If the probability of being selected to participate in the survey on Saturday is the same as it was on Friday, how many customers will be selected to participate in the survey on Saturday?

Show your work.

$$500 \cdot (0.18) = 90$$
$$700 \cdot (0.18) = 126$$

Answer 126 customers on Saturday

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The probability of being selected for the survey and the number of customers selected on Saturday are calculated correctly using mathematically sound procedures.

GUIDE PAPER 4

55

At a store, customers are randomly selected to participate in a survey. On Friday, there were 500 customers at the store. Of those, 90 were selected to participate in the survey. On Saturday, the store manager expects 700 customers in the store. If the probability of being selected to participate in the survey on Saturday is the same as it was on Friday, how many customers will be selected to participate in the survey on Saturday?

Show your work.

Days	customers	survived
FRIDAY	500	90
Saturday	700	

$$\frac{90}{500} = 0.18$$

$$700 \cdot 0.18 = 126$$

Answer 126 customers on Saturday

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The probability of being selected for the survey is calculated correctly; however, the solution for the number of customers selected on Saturday is incorrect. The response correctly addresses only some elements of the task.

GUIDE PAPER 5

55

At a store, customers are randomly selected to participate in a survey. On Friday, there were 500 customers at the store. Of those, 90 were selected to participate in the survey. On Saturday, the store manager expects 700 customers in the store. If the probability of being selected to participate in the survey on Saturday is the same as it was on Friday, how many customers will be selected to participate in the survey on Saturday?

Show your work.

$$\begin{array}{r} 6 \\ 90 \sqrt{500} \\ \hline 6 \end{array} \quad \begin{array}{r} 116 \\ 6 \sqrt{700} \\ \hline 6 \end{array}$$

Answer 116 customers on Saturday

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The proportion of customers selected for the survey is calculated using an appropriate operation, but with an incorrect result due to a calculation error ($500 \div 90 = 6$). This incorrect proportion is correctly applied to the 700 customers in the store on Saturday (the actual value $116\frac{2}{3}$ is truncated, reflecting that there cannot be a fractional number of customers). The response contains an incorrect solution but applies an appropriate process.

GUIDE PAPER 6

55

At a store, customers are randomly selected to participate in a survey. On Friday, there were 500 customers at the store. Of those, 90 were selected to participate in the survey. On Saturday, the store manager expects 700 customers in the store. If the probability of being selected to participate in the survey on Saturday is the same as it was on Friday, how many customers will be selected to participate in the survey on Saturday?

Show your work.

$$\cancel{500} \rightarrow 500 \div 5.5 = 90$$

$$700 \div 5.5 = 127$$

Answer 127 customers on Saturday

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The proportion of customers selected for the survey is calculated using an appropriate operation but is incorrect due to a truncation error ($5\frac{5}{9}$ is truncated to 5.5); however, this incorrect proportion is correctly applied to the 700 customers in the store on Saturday (the actual value $127\frac{27}{100}$ is truncated, reflecting that there cannot be a fractional number of customers). The response contains an incorrect solution but applies an appropriate process.

GUIDE PAPER 7

55

At a store, customers are randomly selected to participate in a survey. On Friday, there were 500 customers at the store. Of those, 90 were selected to participate in the survey. On Saturday, the store manager expects 700 customers in the store. If the probability of being selected to participate in the survey on Saturday is the same as it was on Friday, how many customers will be selected to participate in the survey on Saturday?

Show your work.

$$700 + 500 + 90 = 1290$$

$$\begin{array}{r} 700 \\ 500 \\ \hline 1200 \\ - 90 \\ \hline 1290 \end{array}$$

1290 customers on Saturday

Answer 1290 customers on Saturday

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. Adding all values from the prompt is irrelevant and incorrect.

GUIDE PAPER 8

Additional

55

At a store, customers are randomly selected to participate in a survey. On Friday, there were 500 customers at the store. Of those, 90 were selected to participate in the survey. On Saturday, the store manager expects 700 customers in the store. If the probability of being selected to participate in the survey on Saturday is the same as it was on Friday, how many customers will be selected to participate in the survey on Saturday?

Show your work.

$$\begin{array}{rcl} 700 & \xrightarrow{\text{2 hundreds}} & \\ \uparrow & & \uparrow \\ 500 = & 90 & 700 = 110 \end{array}$$

Answer 110 customers on Saturday

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 and solution are incoherent and incorrect.

EXEMPLARY RESPONSE

56

A school club needs 300 feet of rope for a project. They have the amounts of rope listed below.

- 2 pieces of rope that are each 16 yards in length
- 1 piece of rope that is 12.5 yards in length
- 1 piece of rope that is 123.25 feet in length

How much additional rope, in feet, does the school club need in order to have enough rope for their project?

Show your work.

$$16 \text{ yd} \times 3 \frac{\text{ft}}{\text{yd}} = 48 \text{ ft} \quad 12.5 \text{ yd} \times 3 \frac{\text{ft}}{\text{yd}} = 37.5 \text{ ft}$$
$$48 \frac{\text{ft}}{\text{rope}} \times 2 \text{ ropes} = 96 \text{ ft}$$

$$96 + 37.5 + 123.25 = 256.75$$

$$300 - 256.75 = 43.25$$

Or other valid process

Answer 43.25 additional feet of rope

GUIDE PAPER 1

Additional

56

A school club needs 300 feet of rope for a project. They have the amounts of rope listed below.

- 2 pieces of rope that are each 16 yards in length
 - 1 piece of rope that is 12.5 yards in length
 - 1 piece of rope that is 123.25 feet in length

How much additional rope, in feet, does the school club need in order to have enough rope for their project?

Show your work.

$$\begin{array}{r} 16 \times 3 = 48 \quad 48 \times 2 = 96 \quad 12.5 \times 3 = 37.5 \\ \hline 123.25 \\ 96 + 37.5 + 123.25 = 256.75 \\ \hline 300 - 256.75 = 43.25 \end{array}$$

Answer 43.25 additional feet of rope

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The length of additional rope required is calculated correctly using mathematically sound procedures.

GUIDE PAPER 2

56

A school club needs 300 feet of rope for a project. They have the amounts of rope listed below.

- 2 pieces of rope that are each 16 yards in length
- 1 piece of rope that is 12.5 yards in length
- 1 piece of rope that is 123.25 feet in length

How much additional rope, in feet, does the school club need in order to have enough rope for their project?

Show your work.

$$1 \text{ yard} = 3 \text{ feet}$$

$$96 + 37.5 + 123.25 = 256.75$$

$$3 \times 16 = 48$$

$$48 \times 2 = 96$$

$$12.5 \times 3 = 37.5$$

$$300 - 256.75 = 43.25$$

$$123.25$$

Answer

43.25

additional feet of rope

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The length of additional rope required is calculated correctly using mathematically sound procedures.

GUIDE PAPER 3

56

A school club needs 300 feet of rope for a project. They have the amounts of rope listed below.

- 2 pieces of rope that are each 16 yards in length
- 1 piece of rope that is 12.5 yards in length
- 1 piece of rope that is 123.25 feet in length

How much additional rope, in feet, does the school club need in order to have enough rope for their project?

Show your work.

$$300 - (48 + 48 + 37.5 + 123.25) = 43.25$$

$$16 \times 3 = 48$$

$$12.5 \times 3 = 37.5$$

Answer 43.25 additional feet of rope

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The length of additional rope required is calculated correctly using mathematically sound procedures.

GUIDE PAPER 4

56

A school club needs 300 feet of rope for a project. They have the amounts of rope listed below.

- 2 pieces of rope that are each 16 yards in length
- 1 piece of rope that is 12.5 yards in length
- 1 piece of rope that is 123.25 feet in length

How much additional rope, in feet, does the school club need in order to have enough rope for their project?

Show your work.

$$32 + 12.5 + 123.25 = 167.75$$

$$300 - 167.75 = 132.25$$

Answer

132.3

additional feet of rope

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The total length of existing rope is appropriately subtracted from 300 feet to determine the additional rope required; however, values given in yards are not converted into feet. The response correctly addresses only some elements of the task.

GUIDE PAPER 5

56

A school club needs 300 feet of rope for a project. They have the amounts of rope listed below.

- 2 pieces of rope that are each 16 yards in length
- 1 piece of rope that is 12.5 yards in length
- 1 piece of rope that is 123.25 feet in length

How much additional rope, in feet, does the school club need in order to have enough rope for their project?

Show your work.

$$16 \times 3 = 48$$

$$300 - 208.75 = 91.25$$

$$12.5 \times 3 = 37.5$$

$$16 + 12.5 + 123.25 = 151.75$$

$$300 - 151.75 = 148.25$$

$$123.25 + 37.5 + 48 = 208.75$$

Answer

91.25

additional feet of rope

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The total length of existing rope is appropriately subtracted from 300 feet to determine the additional rope required; however, the existing length is calculated incorrectly. Only one 16 yard piece is included in the calculation. The response correctly addresses only some elements of the task.

GUIDE PAPER 6

56

A school club needs 300 feet of rope for a project. They have the amounts of rope listed below.

- 2 pieces of rope that are each 16 yards in length
- 1 piece of rope that is 12.5 yards in length
- 1 piece of rope that is 123.25 feet in length

How much additional rope, in feet, does the school club need in order to have enough rope for their project?

Show your work.

$$16+12.5+123.25=151.75$$

$$300-151.75=148.25$$

Answer 148.3 additional feet of rope

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The total length of existing rope is appropriately subtracted from 300 feet to determine the additional rope required; however, values given in yards are not converted into feet and only one 16 yard piece is included in the calculation. The response correctly addresses only some elements of the task.

GUIDE PAPER 7

56

A school club needs 300 feet of rope for a project. They have the amounts of rope listed below.

- 2 pieces of rope that are each 16 yards in length
- 1 piece of rope that is 12.5 yards in length
- 1 piece of rope that is 123.25 feet in length

How much additional rope, in feet, does the school club need in order to have enough rope for their project?

Show your work.

$$2 \times 16 = 32$$

$$32 + 12.5 = 44.5$$

$$123.25 = 124$$

$$124 + 44.5 + 32 = 200.5$$

$$300.0 - 200.5 = 99.5$$

Answer

99.5

additional feet of rope

Score Point 0 (out of 2 points)

Although some elements may contain correct procedures, holistically they are not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task. The total length of existing rope is subtracted from 300 feet to determine the additional rope required; however, the length of existing rope is calculated incorrectly. Values given in yards are not converted into feet and four 16 yard pieces of rope are included in the calculation rather than two.

GUIDE PAPER 8

Additional

56

A school club needs 300 feet of rope for a project. They have the amounts of rope listed below.

- 2 pieces of rope that are each 16 yards in length
- 1 piece of rope that is 12.5 yards in length
- 1 piece of rope that is 123.25 feet in length

How much additional rope, in feet, does the school club need in order to have enough rope for their project?

Show your work.

$$[16(2)] / 3 + 12.5 / 3 + 123.25 =$$

Answer

130.9

additional feet of rope

Score Point 0 (out of 2 points)

This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Values given in yards are incorrectly converted into feet by dividing rather than multiplying by 3 and the total length of rope is never subtracted from 300 feet to determine the amount of additional rope required.

EXEMPLARY RESPONSE

57

The table below lists the masses and volumes of several pieces of the same type of metal. There is a proportional relationship between the mass and the volume of the pieces of metal.

PIECES OF METAL

Mass (grams)	Volume (cubic centimeters)
34.932	4.1
47.712	5.6
61.344	7.2
99.684	11.7

Determine the mass, in grams, of a piece of this metal that has a volume of 15.3 cubic centimeters. Round your answer to the nearest tenth of a gram.

Show your work.

$$\frac{34.932}{4.1} = 8.52$$

$$8.52 \times 15.3 = 130.356$$

$$\approx 130.4$$

Or other valid process

Answer _____ 130.4 grams

GUIDE PAPER 1

Additional

57

The table below lists the masses and volumes of several pieces of the same type of metal. There is a proportional relationship between the mass and the volume of the pieces of metal.

PIECES OF METAL

Mass (grams)	Volume (cubic centimeters)
34.932	4.1
47.712	5.6
61.344	7.2
99.684	11.7
<i>m</i>	15.3

Determine the mass, in grams, of a piece of this metal that has a volume of 15.3 cubic centimeters. Round your answer to the nearest tenth of a gram.

Show your work.

$$34.932 \div 4.1 = 8.52$$

$$47.712 \div 5.6 = 8.52$$

$$61.344 \div 7.2 = 8.52$$

$$99.684 \div 11.7 = 8.52$$

$$15.3 \times 8.52 = m$$

$$m = 130.356 \text{ round to nearest tenth} = 130.4$$

Answer

130.4

grams

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The unit rate is correctly calculated and applied to the 15.3 cubic centimeter piece of metal and the solution is rounded to the nearest tenth of a gram.

GUIDE PAPER 2

57

The table below lists the masses and volumes of several pieces of the same type of metal. There is a proportional relationship between the mass and the volume of the pieces of metal.

PIECES OF METAL

Mass (grams)	Volume (cubic centimeters)
34.932	4.1
47.712	5.6
61.344	7.2
99.684	11.7

.117370892

Determine the mass, in grams, of a piece of this metal that has a volume of 15.3 cubic centimeters. Round your answer to the nearest tenth of a gram.

Show your work.

$$15.3 \div 4.1 = 117370892$$

$$15.3 \div 117370892 = 130.356 = 130.4$$

Answer 130.4 grams

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The unit rate is correctly calculated and applied to the 15.3 cubic centimeter piece of metal and the solution is rounded to the nearest tenth of a gram.

GUIDE PAPER 3

57

The table below lists the masses and volumes of several pieces of the same type of metal. There is a proportional relationship between the mass and the volume of the pieces of metal.

PIECES OF METAL

Mass (grams)	Volume (cubic centimeters)
34.932	4.1
47.712	5.6
61.344	7.2
99.684	11.7

Determine the mass, in grams, of a piece of this metal that has a volume of 15.3 cubic centimeters. Round your answer to the nearest tenth of a gram.

Show your work.

$$\frac{v}{m} = \frac{4.1}{34.932} = \frac{15.3}{x}$$
$$\frac{534.4596}{4.1} = \frac{4.1x}{4.1}$$
$$130.356 = x \approx 130.4$$
$$\frac{7.2}{61.344} = \frac{15.3}{x}$$
$$\frac{938.5632}{7.2} = \frac{7.2x}{7.2}$$
$$130.356 = x$$

about

Answer 130.4 grams

Score Point 2 (out of 2 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. Appropriate proportional equations are solved correctly and the solution is rounded to the nearest tenth of a gram.

GUIDE PAPER 4

57

The table below lists the masses and volumes of several pieces of the same type of metal. There is a proportional relationship between the mass and the volume of the pieces of metal.

PIECES OF METAL

Mass (grams)	Volume (cubic centimeters)
34.932	4.1
47.712	5.6
61.344	7.2
99.684	11.7

Determine the mass, in grams, of a piece of this metal that has a volume of 15.3 cubic centimeters. Round your answer to the nearest tenth of a gram.

Show your work.

unit rate - 8.52 gram/cubic centimeters

Mass (gram ³)	Volume (cubic centimeter ³)	
34.932	4.1	= 8.52
47.712	5.6	= 8.52
61.344	7.2	= 8.52
99.684	11.7	= 8.52
130.356	15.3	= 8.52

Answer 130.356 grams

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The unit rate is correctly calculated and applied to the 15.3 cubic centimeter piece of metal; however, the solution is not rounded to the nearest tenth of a gram as required.

GUIDE PAPER 5

57

The table below lists the masses and volumes of several pieces of the same type of metal. There is a proportional relationship between the mass and the volume of the pieces of metal.

PIECES OF METAL

Mass (grams)	Volume (cubic centimeters)
34.932	4.1
47.712	5.6
61.344	7.2
99.684	11.7

8.52

7

Determine the mass, in grams, of a piece of this metal that has a volume of 15.3 cubic centimeters. Round your answer to the nearest tenth of a gram.

Show your work.

$$34.932 \div 4.1 = 8.52$$

$$\begin{array}{r} 15.3 \\ \times 8.52 \\ \hline 130.56 \end{array}$$

Answer 130.6 grams

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The unit rate is calculated correctly and applied to the 15.3 cubic centimeter piece of metal; however, a calculation error results in an incorrect solution. The solution is appropriately rounded to the nearest tenth of a gram. The response contains an incorrect solution but provides sound procedures.

GUIDE PAPER 6

57

The table below lists the masses and volumes of several pieces of the same type of metal. There is a proportional relationship between the mass and the volume of the pieces of metal.

PIECES OF METAL

Mass (grams)	Volume (cubic centimeters)
34.932	4.1
47.712	5.6
61.344	7.2
99.684	11.7

Determine the mass, in grams, of a piece of this metal that has a volume of 15.3 cubic centimeters. Round your answer to the nearest tenth of a gram.

Show your work.

$$34.932 \div 4.1 = 8.52$$

$$47.712 \div 5.6 = 8.52$$

$$61.344 \div 7.2 = 8.52$$

$$99.684 \div 11.7 = 8.52$$

$$8.52 = 8.50$$

Answer 8.50 grams

Score Point 1 (out of 2 points)

This response demonstrates only a partial understanding of the mathematical concepts in the task. The unit rate is calculated correctly; however, it is taken as the solution rather than applying it to the 15.3 cubic centimeter piece of metal. The response correctly addresses only some elements of the task.

GUIDE PAPER 7

57

The table below lists the masses and volumes of several pieces of the same type of metal. There is a proportional relationship between the mass and the volume of the pieces of metal.

PIECES OF METAL

Mass (grams)	Volume (cubic centimeters)
34.932	4.1
47.712	5.6
61.344	7.2
99.684	11.7

8.52
8.52

Determine the mass, in grams, of a piece of this metal that has a volume of 15.3 cubic centimeters. Round your answer to the nearest tenth of a gram.

Show your work.

Answer 130.4 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. Although the solution is correct and the unit rate is identified next to the table in the prompt, there is no work to support how these values were obtained. Per Scoring Policy #3, a correct answer with no work shown receives no credit.

GUIDE PAPER 8

Additional

57

The table below lists the masses and volumes of several pieces of the same type of metal. There is a proportional relationship between the mass and the volume of the pieces of metal.

PIECES OF METAL

Mass (grams)	Volume (cubic centimeters)
(3) 1.932	(4) 1.1
1 (4) 7.12	(5) 6
2 (6) 3.44	(7) 2
3 (9) 6.84	(10) 4.5
4 (13) 0.	(11) 3.0

Determine the mass, in grams, of a piece of this metal that has a volume of 15.3 cubic centimeters. Round your answer to the nearest tenth of a gram.

Show your work.

$$\begin{aligned} 11.7 - 7.2 &= 4.5 \\ 7.2 - 5.6 &= 1.6 \\ 5.6 - 4.1 &= 1.5 \end{aligned}$$

Answer 130 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 work shown is irrelevant and only calculates the differences between adjacent rows in the table with no indication of how the value 130 is obtained from this process.

EXEMPLARY RESPONSE

58

The table below shows the weekly change in the price of one gram of gold for four weeks.

ONE GRAM OF GOLD

Week	Weekly Change in the Price (dollars)
1	+1.25
2	-3.125
3	+0.625
4	+1.5

By how much did the price of one gram of gold change from the beginning of week 1 to the end of week 4? Did the price increase or decrease?

Explain how you found your answer.

The total change is all the weekly changes added together,

$$1.25 - 3.125 + 0.625 + 1.5 = +0.25$$

It is a positive number so that means it was an increase of \$0.25

or other valid response

At the end of week 4, the price per gram of gold was \$39.28. What was the price per gram of gold at the beginning of week 1?

Show your work.

$$39.28 - 0.25 = 39.03$$

or other valid process

Answer 39.03 price per gram of gold

GUIDE PAPER 1

Additional

58

The table below shows the weekly change in the price of one gram of gold for four weeks.

ONE GRAM OF GOLD

Week	Weekly Change in the Price (dollars)
1	+1.25
2	-3.125
3	+0.625
4	+1.5

By how much did the price of one gram of gold change from the beginning of week 1 to the end of week 4? Did the price increase or decrease?

Explain how you found your answer.

x dollars

$x + 1.25 - 3.125 + 0.625 + 1.5 = \0.25 more than the original price from week 1 to the end of week 4

As a result, the price increases by \$0.25 from the beginning of week 1 to the end of week 4

At the end of week 4, the price per gram of gold was \$39.28. What was the price per gram of gold at the beginning of week 1?

Show your work.

end of week four = \$39.28

\$39.28 - \$0.25 = \$39.03

Answer

39.03

price per gram of gold

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The explanation correctly describes how to determine the net change in price and identifies the change as an increase. The initial price is calculated correctly.

GUIDE PAPER 2

58

The table below shows the weekly change in the price of one gram of gold for four weeks.

ONE GRAM OF GOLD

Week	Weekly Change in the Price (dollars)
1	+1.25
2	-3.125
3	+0.625
4	+1.5

By how much did the price of one gram of gold change from the beginning of week 1 to the end of week 4? Did the price increase or decrease?

Explain how you found your answer.

*It increased by 0.25, I added all of them up
and got 0.25.*

At the end of week 4, the price per gram of gold was \$39.28. What was the price per gram of gold at the beginning of week 1?

Show your work.

$$\begin{array}{r} 39.28 \\ - .25 \\ \hline 39.03 \end{array}$$

Answer 39.03 price per gram of gold

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The explanation correctly describes how to determine the net change in price and the initial price is calculated correctly.

GUIDE PAPER 3

58

The table below shows the weekly change in the price of one gram of gold for four weeks.

ONE GRAM OF GOLD

Week	Weekly Change in the Price (dollars)
1	+1.25
2	-3.125
3	+0.625
4	+1.5

By how much did the price of one gram of gold change from the beginning of week 1 to the end of week 4? Did the price increase or decrease?

Explain how you found your answer.

The price of one gram of gold changed from the beginning of week 1 to the end of week 4 by +0.25. The price increased because if the beginning price was 0, the end price would be, if calculated, +0.25, which is an increase.
At the end of week 4, the price per gram of gold was \$39.28. What was the increase price per gram of gold at the beginning of week 1?

Show your work.

+0.25 + change between price from beginning of week 1 to the end of week 4

$$39.28 - 0.25 = \boxed{39.03}$$

Answer \$39.03 price per gram of gold

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The explanation correctly describes how to determine the net change in price and the initial price is calculated correctly.

GUIDE PAPER 4

58

The table below shows the weekly change in the price of one gram of gold for four weeks.

ONE GRAM OF GOLD

$$\begin{array}{r} 1.250 \\ 1.625 \\ +1.50 \\ \hline 3.275 \\ -3.125 \\ \hline \$0.050 \end{array}$$

Week	Weekly Change in the Price (dollars)
1	+1.25
2	-3.125
3	+0.625
4	+1.5

By how much did the price of one gram of gold change from the beginning of week 1 to the end of week 4? Did the price increase or decrease?

Explain how you found your answer.

The price increased by \$0.05. I found my answer by adding weeks 1, 3, and 4 together, then subtracting week 2 from that.

At the end of week 4, the price per gram of gold was \$39.28. What was the price per gram of gold at the beginning of week 1?

Show your work.

$$\begin{array}{r} 39.28 \\ -0.05 \\ \hline 39.23 \end{array}$$

Answer: \$39.23 price per gram of gold

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. A correct process is described to determine the net change in price; however, calculation errors result in an incorrect value. While the statement “subtracting week 2 from that” is technically incorrect, it is interpreted as understanding that the addition of a negative number is equivalent to subtraction of the absolute value of the number. The initial price is determined correctly based on the previous calculation errors. The response contains an incorrect solution but applies sound procedures and reasoning.

GUIDE PAPER 5

58

The table below shows the weekly change in the price of one gram of gold for four weeks.

ONE GRAM OF GOLD

Week	Weekly Change in the Price (dollars)
1	+1.25
2	-3.125
3	+0.625
4	+1.5

By how much did the price of one gram of gold change from the beginning of week 1 to the end of week 4? Did the price increase or decrease?

Explain how you found your answer.

I added all of the weekly change together and got \$0.25

At the end of week 4, the price per gram of gold was \$39.28. What was the price per gram of gold at the beginning of week 1?

Show your work.

$$39.28 - 0.25 = 39.03$$

Answer 39.03 price per gram of gold

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The explanation correctly describes how to determine the net change in price and the initial price is calculated correctly; however, the explanation does not state whether the change is an increase or a decrease as required. The response appropriately addresses most, but not all aspects of the task.

GUIDE PAPER 6

58

The table below shows the weekly change in the price of one gram of gold for four weeks.

ONE GRAM OF GOLD

Week	Weekly Change in the Price (dollars)
1	+1.25
2	-3.125
3	+0.625
4	+1.5

By how much did the price of one gram of gold change from the beginning of week 1 to the end of week 4? Did the price increase or decrease?

Explain how you found your answer.

*The price increased by 25¢. I took away
3.125 From 1.25 then added 0.625 and 1.5
and got 0.25.*

At the end of week 4, the price per gram of gold was \$39.28. What was the price per gram of gold at the beginning of week 1?

Show your work.

Answer 39.03 price per gram of gold

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The explanation correctly describes how to determine the net change in price and the initial price is calculated correctly; however, no work is shown to calculate the initial price. The response appropriately addresses most, but not all aspects of the task.

GUIDE PAPER 7

58

The table below shows the weekly change in the price of one gram of gold for four weeks.

ONE GRAM OF GOLD

Week	Weekly Change in the Price (dollars)
1	+1.25
2	-3.125
3	+0.625
4	+1.5

By how much did the price of one gram of gold change from the beginning of week 1 to the end of week 4? Did the price increase or decrease?

Explain how you found your answer.

the pice decreased. i added up all of the positive numbers and subtracted it by the negitve number.

At the end of week 4, the price per gram of gold was \$39.28. What was the price per gram of gold at the beginning of week 1?

Show your work.

$$1.25 + 0.625 + 1.5 - 3.125 = -0.25$$

Answer .25 price per gram of gold

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The explanation and work correctly describe how to determine the net change in price; however, the change is misinterpreted as a decrease and no attempt is made to solve for the initial price. The response addresses some elements of the task correctly but reaches an inadequate solution based on faulty and incomplete reasoning.

GUIDE PAPER 8

Additional

58

The table below shows the weekly change in the price of one gram of gold for four weeks.

ONE GRAM OF GOLD

Week	Weekly Change in the Price (dollars)
1	+1.25
2	−3.125
3	+0.625
4	+1.5

By how much did the price of one gram of gold change from the beginning of week 1 to the end of week 4? Did the price increase or decrease?

Explain how you found your answer.

The price decreased because by doing
 $1.25 - 3.125 + 0.625 + 1.5 = 0.25$, and
 $0.25 < 1.25$.

DO NOT WRITE BEYOND THIS AREA

At the end of week 4, the price per gram of gold was \$39.28. What was the price per gram of gold at the beginning of week 1?

Show your work.

$$39.28 - 1.5 - 0.625 + 3.125 - 1.25 =$$

Answer 41.53 price per gram of gold

41.53 ✓

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The explanation correctly describes how to determine the net change in price; however, the change is misinterpreted as a decrease by comparing it to the change from week 1 and the initial price is calculated incorrectly. The response addresses some elements of the task correctly but reaches an inadequate solution based on reasoning that is faulty.

GUIDE PAPER 9

58

The table below shows the weekly change in the price of one gram of gold for four weeks.

ONE GRAM OF GOLD

Week	Weekly Change in the Price (dollars)
1	+1.25
2	-3.125
3	+0.625
4	+1.5

By how much did the price of one gram of gold change from the beginning of week 1 to the end of week 4? Did the price increase or decrease?

Explain how you found your answer.

I added $1.25 + -3.125 + 0.625 + 1.5$ and i got 0.25 grams of gold.

At the end of week 4, the price per gram of gold was \$39.28. What was the price per gram of gold at the beginning of week 1?

Show your work.

$$\begin{array}{r} 39.28 \\ + 4 \\ \hline 39.33 \end{array}$$

Answer 44.28 price per gram of gold

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. A correct process is described to determine the net change in price; however, the explanation does not state whether the change is an increase or a decrease and the change is incorrectly reported as grams rather than dollars. The calculation of the initial price is incorrect.

GUIDE PAPER 10

58

The table below shows the weekly change in the price of one gram of gold for four weeks.

ONE GRAM OF GOLD

Week	Weekly Change in the Price (dollars)
1	+1.25
2	-3.125
3	+0.625
4	+1.5

By how much did the price of one gram of gold change from the beginning of week 1 to the end of week 4? Did the price increase or decrease?

Explain how you found your answer.

The price increased. 1.25 is less than 1.5. This is because you can add a zero at the end of any decimal. So, 1.5 is really 1.50.

Now that both numbers have two digits after the decimal, we can decide whether 25 or 50 is the greater number. (since the number BEFORE the decimal is the same for both numbers) 50 is the greater number (in fact, two times greater...) so, 1.5 is greater than 1.25.

This means that the price of one gram of gold has increased :)
(.25)

At the end of week 4, the price per gram of gold was \$39.28. What was the price per gram of gold at the beginning of week 1?

Show your work.

(NO STUDENT RESPONSE GIVEN)

Answer 29.46 price per gram of gold

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 explanation contains the correct net change in price, it is obtained using an incorrect procedure: the difference between the weekly changes for week 1 and week 4 is calculated rather than the sum of all four weekly changes. In addition, the initial price is calculated incorrectly with no work shown.

GUIDE PAPER 11

Additional

58

The table below shows the weekly change in the price of one gram of gold for four weeks.

ONE GRAM OF GOLD

Week	Weekly Change in the Price (dollars)
1	+1.25
2	-3.125
3	+0.625
4	+1.5

By how much did the price of one gram of gold change from the beginning of week 1 to the end of week 4? Did the price increase or decrease?

Explain how you found your answer.

first it started at +1.25 for the week 1 then dropped to -3.125 by week 2 and increased by 0.625 and 1.5 on week 3 and 4

At the end of week 4, the price per gram of gold was \$39.28. What was the price per gram of gold at the beginning of week 1?

Show your work.

$$39.28 + 1.25 = 52.28$$

Answer 52.28 price per gram of gold

DO NOT WRITE BEYOND THIS AREA

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 explanation only repeats the information in the table in verbal form, misinterprets the information for week 2, and the initial price is calculated incorrectly.

EXEMPLARY RESPONSE

59

Hallum Hardware created flyers to advertise a sale on a certain type of carpet. A portion of the flyer is shown below.

HALLUM HARDWARE CARPET SALE	
Area (square feet)	Cost (dollars)
500	750
1,000	1,500
1,500	2,250
2,000	3,000

Guillen Floors advertises the same type of carpet at a cost of 10% less per square foot than Hallum Hardware. Determine the cost of 700 square feet of the carpet if it is bought from Guillen Floors.

Show your work.

$$\frac{750}{500} = 1.5 \quad 1.5 \times 0.9 = 1.35 \quad 1.35 \times 700 = 945$$

Or other valid process

Answer \$ 945

GUIDE PAPER 1

Additional

59

Hallum Hardware created flyers to advertise a sale on a certain type of carpet. A portion of the flyer is shown below.

HALLUM HARDWARE CARPET SALE	
Area (square feet)	Cost (dollars)
500	750
1,000	1,500
1,500	2,250
2,000	3,000

Guillen Floors advertises the same type of carpet at a cost of 10% less per square foot than Hallum Hardware. Determine the cost of 700 square feet of the carpet if it is bought from Guillen Floors.

Show your work.

$$\begin{aligned} \textcircled{1} \text{ Hallum Hardware} \\ \text{sq. feet} \rightarrow \frac{500}{\cancel{500}} - \frac{700}{x} & \quad \frac{500x = 525000}{\cancel{500}} \\ \text{cost} \rightarrow \frac{750}{\cancel{750}} - x & \quad \frac{500}{\cancel{500}} \\ & \quad x = \$1,050 \text{ for } 700 \\ & \quad \text{square feet} \\ \textcircled{2} \text{ Guillen Floors} - 100\% - 10\% = 90\% = 0.9 \\ 1050 \times 0.9 = \$945 & \end{aligned}$$

Answer \$ 945

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The cost of 700 square feet of carpet at Guillen Floors is calculated correctly.

GUIDE PAPER 2

59

Hallum Hardware created flyers to advertise a sale on a certain type of carpet. A portion of the flyer is shown below.

Guillen Floors advertises the same type of carpet at a cost of 10% less per square foot than Hallum Hardware. Determine the cost of 700 square feet of the carpet if it is bought from Guillen Floors.

Show your work.

$$\begin{aligned}750 \div 500 &= \$1.50 \\\$1.50 \times .10 &= 0.15 \\\$1.50 - 0.15 &= 1.35 \\\$1.35 \times 700 &= \$945\end{aligned}$$

Answer \$ 945

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The cost of 700 square feet of carpet at Guillen Floors is calculated correctly.

GUIDE PAPER 3

59

Hallum Hardware created flyers to advertise a sale on a certain type of carpet. A portion of the flyer is shown below.

HALLUM HARDWARE CARPET SALE	
Area (square feet)	Cost (dollars)
500	750
1,000	1,500
1,500	2,250
2,000	3,000

$$\frac{c}{a} = 1.5$$

$$\begin{array}{r} 1.5 \\ \times 0.9 \\ \hline 1.35 \end{array}$$

Guillen Floors advertises the same type of carpet at a cost of 10% less per square foot than Hallum Hardware. Determine the cost of 700 square feet of the carpet if it is bought from Guillen Floors.

Show your work.

$$\begin{array}{r} 1.35 \\ \times 700 \\ \hline 945 \end{array}$$

Answer \$ 945

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The cost of 700 square feet of carpet at Guillen Floors is calculated correctly. Although specific values are not used to calculate the price per square foot for Hallum Hardware, the procedure is shown as an appropriate formula, $c/a = 1.5$.

GUIDE PAPER 4

59

Hallum Hardware created flyers to advertise a sale on a certain type of carpet. A portion of the flyer is shown below.

HALLUM HARDWARE CARPET SALE	
Area (square feet)	Cost (dollars)
500	750
1,000	1,500
1,500	2,250
2,000	3,000

Guillen Floors advertises the same type of carpet at a cost of 10% less per square foot than Hallum Hardware. Determine the cost of 700 square feet of the carpet if it is bought from Guillen Floors.

Show your work.

Answer \$ 945

The handwritten work shows the calculation of the cost per square foot at Hallum Hardware and then its reduction by 10% to find the cost at Guillen Floors. It also shows the final calculation for 700 square feet.

Handwritten calculations:

- Cost per square foot at Hallum Hardware:
$$\begin{array}{r} \$1.50 \\ + 0.10 \\ \hline \$1.65 \end{array}$$
- Cost per square foot at Guillen Floors (10% less):
$$\begin{array}{r} \$1.65 \\ - 0.10 \\ \hline \$1.55 \end{array}$$
- Total cost for 700 square feet:
$$\begin{array}{r} \$1.55 \\ \times 700 \\ \hline \$1,085 \end{array}$$
- Final answer: $\underline{\hspace{2cm}}\ 945 \underline{\hspace{2cm}}$

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The cost of 700 square feet of carpet at Guillen Floors is calculated correctly; however, the calculations do not show how the cost per square foot at Hallum Hardware was obtained. The response appropriately addresses most, but not all aspects of the task.

GUIDE PAPER 5

59

Hallum Hardware created flyers to advertise a sale on a certain type of carpet. A portion of the flyer is shown below.

HALLUM HARDWARE CARPET SALE	
Area (square feet)	Cost (dollars)
500	750
1,000	1,500
1,500	2,250
2,000	3,000

Guillen Floors advertises the same type of carpet at a cost of 10% less per square foot than Hallum Hardware. Determine the cost of 700 square feet of the carpet if it is bought from Guillen Floors.

Show your work.

$$\begin{aligned} & 1050(0.10) \\ & \leq 105 \end{aligned}$$

$$150 \div 500 = 1.5$$

$$700 \times 1.5 = 1050$$

$$\begin{aligned} & 1050 + 105 \\ & = 1155 \end{aligned}$$

Answer \$ 6155

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The cost of 700 square feet of carpet at Hallum Hardware is calculated correctly; however, the 10% discount is added to the price rather than subtracted to determine the cost of the carpet at Guillen Floors. The response appropriately addresses most, but not all aspects of the task.

GUIDE PAPER 6

59

Hallum Hardware created flyers to advertise a sale on a certain type of carpet. A portion of the flyer is shown below.

HALLUM HARDWARE CARPET SALE	
Area (square feet)	Cost (dollars)
500	750
1,000	1,500
1,500	2,250
2,000	3,000

= 1.5

Guillen Floors advertises the same type of carpet at a cost of 10% less per square foot than Hallum Hardware. Determine the cost of 700 square feet of the carpet if it is bought from Guillen Floors.

Show your work.

$$\begin{aligned} p &= 0.10 \cdot w \\ x &= .9 \cdot 1.5 \\ x &= 1.35 \end{aligned}$$

$$700 \cdot 1.35 = 945$$

Answer \$ 945

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The cost of 700 square feet of carpet at Guillen Floors is calculated correctly; however, the calculations do not show how the cost per square foot at Hallum Hardware was obtained. The response appropriately addresses most, but not all aspects of the task.

GUIDE PAPER 7

59

Hallum Hardware created flyers to advertise a sale on a certain type of carpet. A portion of the flyer is shown below.

HALLUM HARDWARE CARPET SALE	
Area (square feet)	Cost (dollars)
500	750
1,000	1,500
1,500	2,250
2,000	3,000

Guillen Floors advertises the same type of carpet at a cost of 10% less per square foot than Hallum Hardware. Determine the cost of 700 square feet of the carpet if it is bought from Guillen Floors.

Show your work.

$$\frac{1}{15} = \frac{10}{100}$$

1.35

0.15

Answer \$ 945

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The 10% discount is correctly applied to the cost per square foot of Hallum Hardware's prices to obtain the cost per square foot at Guillen Floors; however, the work does not show how the unit rate at Hallum Hardware was calculated or how the unit rate was applied to the amount of carpet purchased. The response contains the correct solution but the required work is limited.

GUIDE PAPER 8

Additional

59

Hallum Hardware created flyers to advertise a sale on a certain type of carpet. A portion of the flyer is shown below.

HALLUM HARDWARE CARPET SALE	
Area (square feet)	Cost (dollars)
500	750
1,000	1,500
1,500	2,250
2,000	3,000

Guillen Floors advertises the same type of carpet at a cost of 10% less per square foot than Hallum Hardware. Determine the cost of 700 square feet of the carpet if it is bought from Guillen Floors.

Show your work.

$$750 \div 500 = 1.5$$

$$1,500 \div 1000 = 1.5$$

$$1000 - 300 = 700$$

$$\begin{array}{r} 300 \times 1.5 \\ \hline 450 \end{array}$$

Answer \$ 450

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The cost per square foot at Hallum Hardware is calculated correctly. An attempt is then made to calculate the cost of 700 square feet of carpet using the 300 square foot difference from the 1,000 square foot entry in the table; however, it only calculates the cost of 300 square feet without subtracting that result from the \$1,500 cost of 1,000 square feet. Also, the 10% discount is never applied to determine the prices at Guillen Floors. The response addresses some elements of the task correctly but reaches an inadequate solution based on incomplete reasoning.

GUIDE PAPER 9

59

Hallum Hardware created flyers to advertise a sale on a certain type of carpet. A portion of the flyer is shown below.

HALLUM HARDWARE CARPET SALE	
Area (square feet)	Cost (dollars)
500	750
1,000	1,500
1,500	2,250
2,000	3,000

Guillen Floors advertises the same type of carpet at a cost of 10% less per square foot than Hallum Hardware. Determine the cost of 700 square feet of the carpet if it is bought from Guillen Floors.

Show your work.

$$\frac{750}{500} = 1.5 \quad 10\% - 1.5$$

Answer \$ _____

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The cost per square foot at Hallum Hardware is calculated correctly; however, it is not used to calculate any costs at Guillen Floors. The response addresses some elements of the task correctly but reaches an inadequate solution based on incomplete reasoning.

GUIDE PAPER 10

59

Hallum Hardware created flyers to advertise a sale on a certain type of carpet. A portion of the flyer is shown below.

HALLUM HARDWARE CARPET SALE	
Area (square feet)	Cost (dollars)
500	750
1,000	1,500
1,500	2,250
2,000	3,000

Guillen Floors advertises the same type of carpet at a cost of 10% less per square foot than Hallum Hardware. Determine the cost of 700 square feet of the carpet if it is bought from Guillen Floors.

Show your work.

1050

Answer \$ 945

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 correct cost is provided for 700 square feet of carpet at both stores, no work is shown to support how these values were obtained. Per Scoring Policy #3, if students are directed to show work, a correct answer with no work shown receives no credit.

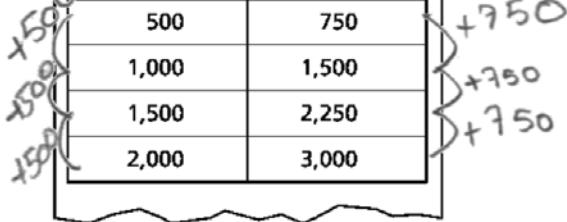
GUIDE PAPER 11

Additional

59

Hallum Hardware created flyers to advertise a sale on a certain type of carpet. A portion of the flyer is shown below.

HALLUM HARDWARE CARPET SALE	
Area (square feet)	Cost (dollars)
500	750
1,000	1,500
1,500	2,250
2,000	3,000



Guillen Floors advertises the same type of carpet at a cost of 10% less per square foot than Hallum Hardware. Determine the cost of 700 square feet of the carpet if it is bought from Guillen Floors.

Show your work.

Answer \$ 105.00

Area	cost
2,500	3,750
3,000	4,500
3,500	5,250
4,000	6,000
4,500	6,750
5,000	7,500
5,500	8,250
6,000	9,000
6,500	9,750
7,000	10,500

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 cost of 7,000 square feet of carpet at Hallum Hardware is calculated correctly; however, this operation is irrelevant to the task and no attempt is made to calculate the reduced price at Guillen Floors.

EXEMPLARY RESPONSE

60

A single gram of a certain metallic substance has 0.52 gram of copper and 0.26 gram of zinc. The remaining portion of the substance is nickel. Ben estimated that 0.2 gram of nickel is in 1 gram of the substance. He used this to estimate the amount of nickel in 35 grams of the substance. Find the result of Ben's estimation strategy. Then, find the exact amount of nickel in 35 grams of the substance.

Show your work.

Ben's Estimate:

$$0.2 \times 35 = 7$$

Exact Amount:

$$1 - 0.52 - 0.26 = 0.22$$

$$0.22 \times 35 = 7.7$$

Or other valid process

Ben's estimate 7 grams

Exact amount 7.7 grams

GUIDE PAPER 1

Additional

60

A single gram of a certain metallic substance has 0.52 gram of copper and 0.26 gram of zinc. The remaining portion of the substance is nickel. Ben estimated that 0.2 gram of nickel is in 1 gram of the substance. He used this to estimate the amount of nickel in 35 grams of the substance. Find the result of Ben's estimation strategy. Then, find the exact amount of nickel in 35 grams of the substance.

Show your work.

$$0.52 + 0.26 = 0.78$$

$$1.00 - 0.78 = 0.22$$

$$0.22 * 35 = 7.7$$

$$0.2 * 35 = 7$$

Ben's estimate grams

Exact amount grams

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. Ben's estimate and the exact amount of nickel are both calculated correctly using mathematically sound procedures.

GUIDE PAPER 2

60

A single gram of a certain metallic substance has 0.52 gram of copper and 0.26 gram of zinc. The remaining portion of the substance is nickel. Ben estimated that 0.2 gram of nickel is in 1 gram of the substance. He used this to estimate the amount of nickel in 35 grams of the substance. Find the result of Ben's estimation strategy. Then, find the exact amount of nickel in 35 grams of the substance.

Show your work.

The image shows handwritten calculations for estimating and finding the exact amount of nickel in 35 grams of a substance. On the left, two addition problems are shown: $0.52 + 0.26 = 0.78$ and $0.78 + 0.20 = 1.00$. In the center, a subtraction problem is shown: $1.00 - 0.78 = 0.22$. To the right, a multiplication problem is shown: $1 \times 35 = 35$, followed by $35 \times 0.20 = 7.00$. Below these, a cloud-shaped bubble contains the text "Ben's Estimate" above the equation $0.20 \times 35 = 7$, and "Exact Amount" above the equation $0.22 \times 35 = 7.7$. An arrow points from the "Exact Amount" calculation towards the multiplication 35×0.20 . At the bottom, the text "Ben's estimate" is followed by a blank line and the number 7, and the text "Exact amount" is followed by a blank line and the number 7.7.

Ben's estimate 7 grams

Exact amount 7.7 grams

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. Ben's estimate and the exact amount of nickel are both calculated correctly using mathematically sound procedures.

GUIDE PAPER 3

60

A single gram of a certain metallic substance has 0.52 gram of copper and 0.26 gram of zinc. The remaining portion of the substance is nickel. Ben estimated that 0.2 gram of nickel is in 1 gram of the substance. He used this to estimate the amount of nickel in 35 grams of the substance. Find the result of Ben's estimation strategy. Then, find the exact amount of nickel in 35 grams of the substance.

Show your work.

$$1/0.2=35/x \quad 1x=7 \quad 0.52+0.26=0.78 \quad 1.00-0.78=0.22 \quad 1/0.22=35/x \quad 1x=7.7$$

Ben's estimate grams

Exact amount grams

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. Ben's estimate and the exact amount of nickel are both calculated correctly using proportionality equations.

GUIDE PAPER 4

60

A single gram of a certain metallic substance has 0.52 gram of copper and 0.26 gram of zinc. The remaining portion of the substance is nickel. Ben estimated that 0.2 gram of nickel is in 1 gram of the substance. He used this to estimate the amount of nickel in 35 grams of the substance. Find the result of Ben's estimation strategy. Then, find the exact amount of nickel in 35 grams of the substance.

Show your work.

bens strategy: $1 - 0.52 - 0.26 = 0.18$ =about 0.20
 $35(0.18) = 6.3$ grams

$$35(0.2) = 7$$

Ben's estimate 7 grams
Exact amount 6.3 grams

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. Ben's estimate is calculated correctly; however, a calculation error results in using an incorrect proportion of nickel (18% rather than 22%) to determine the exact amount. The response contains an incorrect solution but provides sound procedures.

GUIDE PAPER 5

60

A single gram of a certain metallic substance has 0.52 gram of copper and 0.26 gram of zinc. The remaining portion of the substance is nickel. Ben estimated that 0.2 gram of nickel is in 1 gram of the substance. He used this to estimate the amount of nickel in 35 grams of the substance. Find the result of Ben's estimation strategy. Then, find the exact amount of nickel in 35 grams of the substance.

Show your work.

Ben subtracted .52 grams and .26 grams from 1 gram. The answer is .22 grams. Then you would have to multiply .2 by 35. The answer is 7.

Ben's estimate grams
Exact amount grams

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. Ben's estimate and the exact amount of nickel are both calculated correctly; however, the work does not show the multiplication step to determine the solution for the exact amount. The response appropriately addresses most, but not all aspects of the task.

GUIDE PAPER 6

60

A single gram of a certain metallic substance has 0.52 gram of copper and 0.26 gram of zinc. The remaining portion of the substance is nickel. Ben estimated that 0.2 gram of nickel is in 1 gram of the substance. He used this to estimate the amount of nickel in 35 grams of the substance. Find the result of Ben's estimation strategy. Then, find the exact amount of nickel in 35 grams of the substance.

Show your work.

$$\begin{array}{r} 0.52 \\ + 0.26 \\ \hline 0.78 \end{array}$$

$$\begin{array}{r} 5 = 1 \\ 7 \cdot 5 = 35 \end{array}$$

$$\begin{array}{r} 0.78 \\ - 0.78 \\ \hline 0.22 \end{array}$$

$$\begin{array}{r} 10 \\ \times 2.2 \\ \hline 22 \end{array}$$

$$\begin{array}{r} 2.2 \\ \times 2.2 \\ \hline 44 \\ + 22 \\ \hline 4.84 \end{array}$$

Ben's estimate 7 grams

Exact amount 7.7 grams

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The exact amount of nickel is determined correctly by calculating 2.2×3.5 via addition, an equivalent operation to 0.22×35 ; however, the work is unclear about how the correct solution for Ben's estimate was obtained. An incorrectly placed decimal point of 0.22 in the multiplication $10 \times 2.2 = 2.2$ is an inconsequential error that does not detract from the response. The response appropriately addresses most, but not all aspects of the task.

GUIDE PAPER 7

60

A single gram of a certain metallic substance has 0.52 gram of copper and 0.26 gram of zinc. The remaining portion of the substance is nickel. Ben estimated that 0.2 gram of nickel is in 1 gram of the substance. He used this to estimate the amount of nickel in 35 grams of the substance. Find the result of Ben's estimation strategy. Then, find the exact amount of nickel in 35 grams of the substance.

Show your work.

Ben's Strategy
35 g of substance

$$35 \div 2 = 17.5$$

Exact

$$\begin{array}{r} 0.52 \text{ copper} \\ + 0.26 \text{ zinc} \\ \hline 0.78 \end{array}$$
$$\begin{array}{r} 1.78 \\ - 0.78 \\ \hline 1.00 \end{array} \qquad \begin{array}{r} 35 \\ \times 0.22 \\ \hline 7.00 \\ + 3.50 \\ \hline 7.70 \end{array}$$

Ben's estimate 17.5 grams

Exact amount 17.7 grams

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The exact amount of nickel is calculated correctly; however, Ben's estimate is determined incorrectly by dividing the total mass in two. The response reflects a lack of essential understanding of the underlying concepts.

GUIDE PAPER 8

Additional

60

A single gram of a certain metallic substance has 0.52 gram of copper and 0.26 gram of zinc. The remaining portion of the substance is nickel. Ben estimated that 0.2 gram of nickel is in 1 gram of the substance. He used this to estimate the amount of nickel in 35 grams of the substance. Find the result of Ben's estimation strategy. Then, find the exact amount of nickel in 35 grams of the substance.

Show your work.

Ben's strategy was wrong because he got .2g of nickel but the actual amount is .22g of nickel because .22g and .52g and .26g adds up to 1g

Ben's estimate grams
Exact amount grams

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The exact amount of nickel in 1 gram of the substance is calculated correctly; however, the amount of nickel in 35 grams of the substance is not addressed. The response addresses some elements of the task correctly but reaches an inadequate solution based on reasoning that is incomplete.

GUIDE PAPER 9

60

A single gram of a certain metallic substance has 0.52 gram of copper and 0.26 gram of zinc. The remaining portion of the substance is nickel. Ben estimated that 0.2 gram of nickel is in 1 gram of the substance. He used this to estimate the amount of nickel in 35 grams of the substance. Find the result of Ben's estimation strategy. Then, find the exact amount of nickel in 35 grams of the substance.

Show your work.

$$0.2 \times 35 = 7$$

Ben's estimate grams
Exact amount grams

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. Ben's estimate is calculated correctly; however, the exact amount of nickel is not addressed. The response addresses some elements of the task correctly but reaches an inadequate solution based on reasoning that is incomplete.

GUIDE PAPER 10

60

A single gram of a certain metallic substance has 0.52 gram of copper and 0.26 gram of zinc. The remaining portion of the substance is nickel. Ben estimated that 0.2 gram of nickel is in 1 gram of the substance. He used this to estimate the amount of nickel in 35 grams of the substance. Find the result of Ben's estimation strategy. Then, find the exact amount of nickel in 35 grams of the substance.

Show your work.

$$\begin{array}{r} 7.7 \\ + 7.7 \\ \hline 35.4 \end{array}$$

$$\begin{array}{r} .78 \\ .55 \\ \hline .48033 \end{array}$$

$$\begin{array}{r} 52 \\ + .26 \\ \hline 78 \\ + 22 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 27.7 \\ + 7 \\ \hline 4.7 \end{array}$$

Ben's estimate 7 grams

Exact amount 7.7 grams

Score Point 0 (out of 3 points)

Holistically, this response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Although correct solutions are provided for both Ben's estimate and the exact amount of nickel, the work shown does not support this solution.

GUIDE PAPER 11

Additional

60

A single gram of a certain metallic substance has 0.52 gram of copper and 0.26 gram of zinc. The remaining portion of the substance is nickel. Ben estimated that 0.2 gram of nickel is in 1 gram of the substance. He used this to estimate the amount of nickel in 35 grams of the substance. Find the result of Ben's estimation strategy. Then, find the exact amount of nickel in 35 grams of the substance.

Show your work.

$$\begin{array}{l} .2/.52=.38 \\ 35/.26=134 \end{array}$$

Ben's estimate .38 grams
Exact amount 134 grams

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 solutions are incorrect.

EXEMPLARY RESPONSE

61

Last year, a property manager bought five identical snow shovels and six identical bags of salt. The total cost of the snow shovels was \$172.50, before tax, and each bag of salt cost \$6.20, before tax.

This year, the property manager bought two identical snow shovels and four identical bags of salt. The total cost of the snow shovels was \$70.38, before tax, and the total cost of the bags of salt was \$26.04, before tax.

Determine the item with the greatest percent increase in the price from last year to this year. Be sure to include the percent increase of this item to the nearest percent.

Show your work.

Last year:

$$\frac{172.50}{5} = \$34.50 \text{ shovels} \quad \$6.20 \text{ salt}$$

This year:

$$\frac{70.38}{2} = \$35.19 \text{ shovels} \quad \frac{26.04}{4} = \$6.51 \text{ salt}$$

Or other valid process

Percent Change:

$$\% \text{ change} = \frac{\text{new} - \text{original}}{\text{original}} \times 100$$

$$\frac{35.19 - 34.50}{34.50} \times 100 = \frac{0.69}{34.50} \times 100 = 2\% \text{ shovels}$$

$$\frac{6.51 - 6.20}{6.20} \times 100 = \frac{0.31}{6.20} \times 100 = 5\% \text{ salt}$$

Answer Salt and 5 %

GUIDE PAPER 1

Additional

61

Last year, a property manager bought five identical snow shovels and six identical bags of salt. The total cost of the snow shovels was \$172.50, before tax, and each bag of salt cost \$6.20, before tax.

This year, the property manager bought two identical snow shovels and four identical bags of salt. The total cost of the snow shovels was \$70.38, before tax, and the total cost of the bags of salt was \$26.04, before tax.

Determine the item with the greatest percent increase in the price from last year to this year. Be sure to include the percent increase of this item to the nearest percent.

Show your work.

Show your work.

<u>shovels</u>	<u>bags of salt</u>
<u>Year 1: $\\$172.5 \div 5 = \\34.5 per</u>	<u>Yr 1: $\\$6.20$ per</u>
<u>Year 2: $\\$70.38 \div 2 = \\35.19 per</u>	<u>Yr 2: $\\$26.04 \div 4 = \\6.51 per</u>
<u>Percent increase:</u> $\frac{\$35.19 - \$34.5}{\$34.5} = \frac{.69}{\$34.5} = \frac{.69}{\$34.5} = \frac{.69}{\$34.5} = .02090550725 \dots$ $.02090550725 \times 100\% = 2.090550725\%$ $2.090550725\% \approx 2.09\%$	<u>Percent increase:</u> $\frac{\$6.51 - \$6.20}{\$6.20} = \frac{.31}{\$6.20} = \frac{.31}{\$6.20} = \frac{.31}{\$6.20} = .049603226\dots$ $.049603226\dots \times 100\% = 4.9603226\dots\%$ $4.9603226\dots\% \approx 5\%$
Answer	<u>bags of salt</u> and <u>5</u> %

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The percent increase in the cost of each item is calculated correctly and the bags of salt are chosen as having the greatest percent increase. An incorrect statement in the work ($2\% > 5\%$) is considered an inconsequential error that does not detract from the correct solution and the demonstration of a thorough understanding.

GUIDE PAPER 2

61

Last year, a property manager bought five identical snow shovels and six identical bags of salt. The total cost of the snow shovels was \$172.50, before tax, and each bag of salt cost \$6.20, before tax.

This year, the property manager bought two identical snow shovels and four identical bags of salt. The total cost of the snow shovels was \$70.38, before tax, and the total cost of the bags of salt was \$26.04, before tax.

Determine the item with the greatest percent increase in the price from last year to this year. Be sure to include the percent increase of this item to the nearest percent.

Show your work.

The student has handwritten two calculations in ovals:

Snow shovels:

$$\frac{172.50 - 70.38}{70.38} = 0.02$$

Bag of Salt:

$$\frac{26.04 - 172.50}{172.50} = 0.05$$

Answer Bag of Salt and 5 %

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The percent increase in the cost of each item is calculated correctly and bags of salt are chosen as having the greatest percent increase.

GUIDE PAPER 3

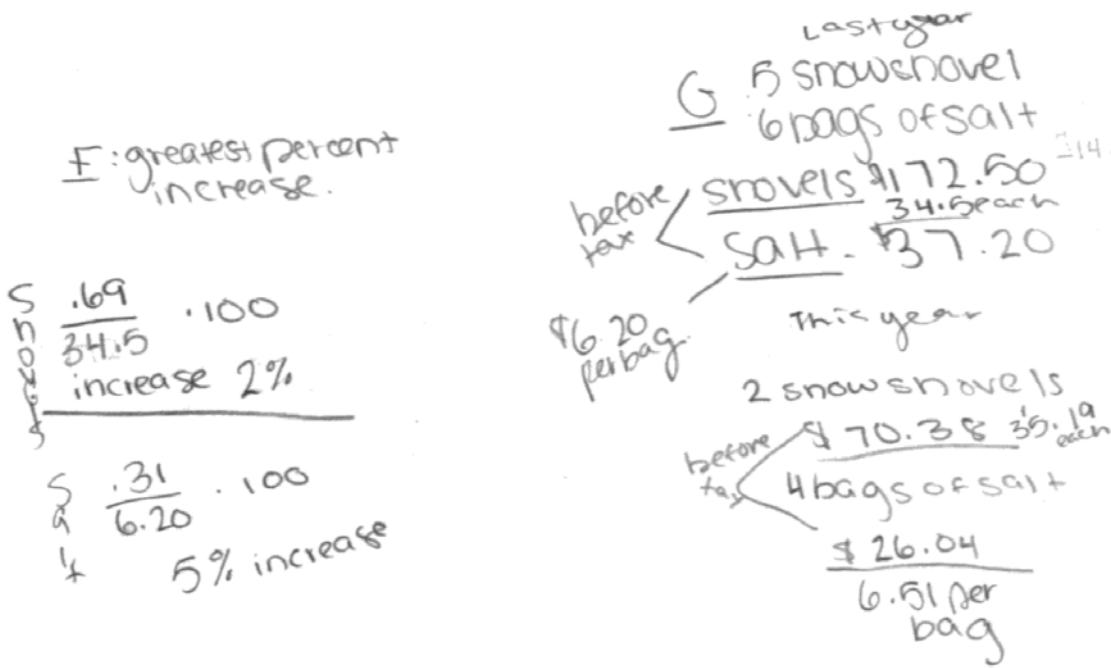
61

Last year, a property manager bought five identical snow shovels and six identical bags of salt. The total cost of the snow shovels was \$172.50, before tax, and each bag of salt cost \$6.20, before tax.

This year, the property manager bought two identical snow shovels and four identical bags of salt. The total cost of the snow shovels was \$70.38, before tax, and the total cost of the bags of salt was \$26.04, before tax.

Determine the item with the greatest percent increase in the price from last year to this year. Be sure to include the percent increase of this item to the nearest percent.

Show your work.



Answer bags of salt and 5 %

Score Point 3 (out of 3 points)

This response demonstrates a thorough understanding of the mathematical concepts in the task. The percent increase in the cost of each item is calculated correctly and the bags of salt are chosen as having the greatest percent increase.

GUIDE PAPER 4

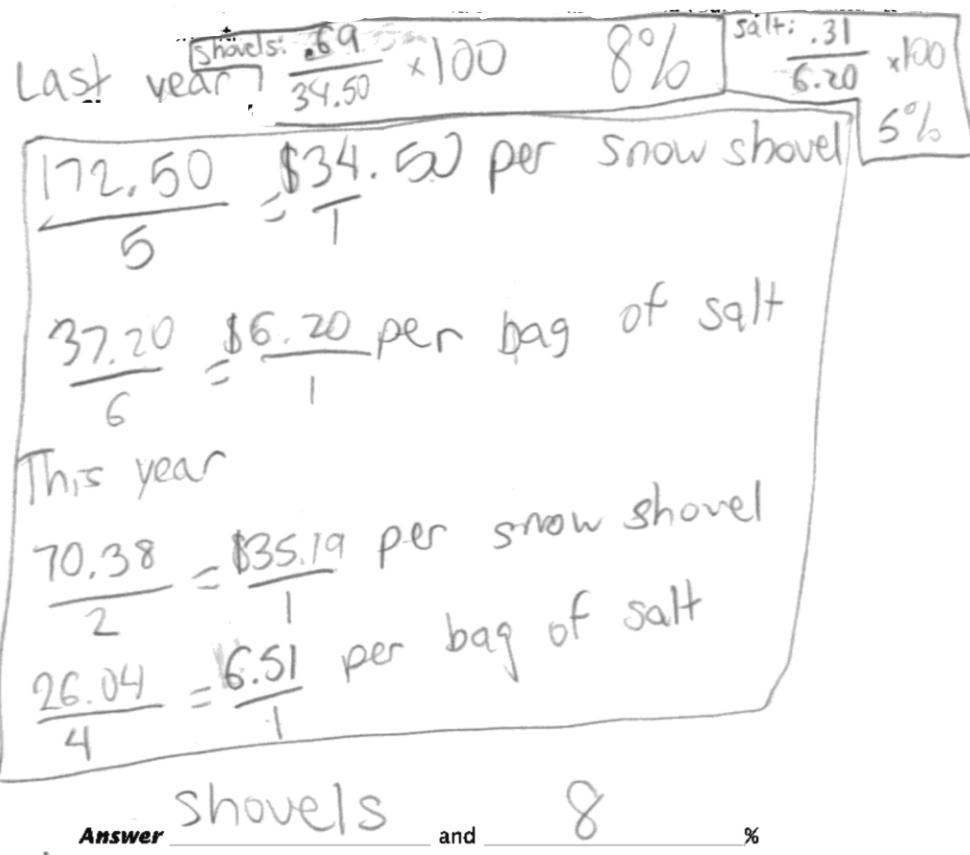
61

Last year, a property manager bought five identical snow shovels and six identical bags of salt. The total cost of the snow shovels was \$172.50, before tax, and each bag of salt cost \$6.20, before tax.

This year, the property manager bought two identical snow shovels and four identical bags of salt. The total cost of the snow shovels was \$70.38, before tax, and the total cost of the bags of salt was \$26.04, before tax.

Determine the item with the greatest percent increase in the price from last year to this year. Be sure to include the percent increase of this item to the nearest percent.

Show your work.



Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The percent increase in the price of a bag of salt is calculated correctly; however, a calculation error occurs when determining the percent increase in the price of a snow shovel ($\frac{69}{34.50} \times 100 = 8\%$), resulting in an incorrect solution. The response contains an incorrect solution but provides mathematically sound procedures.

GUIDE PAPER 5

61

Last year, a property manager bought five identical snow shovels and six identical bags of salt. The total cost of the snow shovels was \$172.50, before tax, and each bag of salt cost \$6.20, before tax.

This year, the property manager bought two identical snow shovels and four identical bags of salt. The total cost of the snow shovels was \$70.38, before tax, and the total cost of the bags of salt was \$26.04, before tax.

Determine the item with the greatest percent increase in the price from last year to this year. Be sure to include the percent increase of this item to the nearest percent.

Show your work.

$$\begin{array}{rcl} \text{Old} & \xrightarrow{\text{S.S. } \times 5} & 34.5 \\ \text{S.S. } \times 5 = & \text{B.S. } \times 6 = & 172.5 \\ \text{B.S. } \times 6 = & \text{B.S. } \times 6 = & 6.20 \end{array}$$

$$\begin{array}{l} \frac{\text{Original} - \text{new}}{\text{original}} \\ \text{New S.S.} = 35.19 \\ \text{B.S.} = 6.51 \end{array}$$

$$\begin{array}{l} \text{S.S.} = 2\% \\ \text{B.S.} = 5\% \end{array}$$

Answer Bags of Salt and 5 %

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The percent increase in the cost of each item is calculated correctly and the bags of salt are chosen as having the greatest percentage increase; however, although a formula is provided, the actual calculations are not shown. The response appropriately addresses most, but not all aspects of the task.

GUIDE PAPER 6

61

Last year, a property manager bought five identical snow shovels and six identical bags of salt. The total cost of the snow shovels was \$172.50, before tax, and each bag of salt cost \$6.20, before tax.

This year, the property manager bought two identical snow shovels and four identical bags of salt. The total cost of the snow shovels was \$70.38, before tax, and the total cost of the bags of salt was \$26.04, before tax.

Determine the item with the greatest percent increase in the price from last year to this year. Be sure to include the percent increase of this item to the nearest percent.

Show your work.

	Last year	This year
snow shovel	\$34.50 /shovel	\$35.19
	5) \$172.50	2) \$70.38
bags of salt	\$6.20	6.51
		4) \$26.04

Snow shovel

$P = \frac{8}{(Whole)}$

$\frac{.69}{34.50} = x \times (34.50)$

$.02 = x$

28

bags of salt

$P = \frac{8}{(Whole)}$

$\frac{.31}{6.20} = x \times (6.20)$

$.05 = x$

58

Answer 28 and 5 %

Score Point 2 (out of 3 points)

This response demonstrates a partial understanding of the mathematical concepts in the task. The percent increase in the cost of each item is calculated correctly; however, both increases are reported on the answer blanks and no choice is made for which item had the greatest percent increase. The response appropriately addresses most, but not all aspects of the task.

GUIDE PAPER 7

61

Last year, a property manager bought five identical snow shovels and six identical bags of salt. The total cost of the snow shovels was \$172.50, before tax, and each bag of salt cost \$6.20, before tax.

This year, the property manager bought two identical snow shovels and four identical bags of salt. The total cost of the snow shovels was \$70.38, before tax, and the total cost of the bags of salt was \$26.04, before tax.

Determine the item with the greatest percent increase in the price from last year to this year. Be sure to include the percent increase of this item to the nearest percent.

Show your work.

<p>Last year $172.50 + (6.20 \cdot 6)$ $172.50 + 37.2$ V $\\$209.70$</p>	<p>This year $70.38 + 26.04$ $\\$96.42$</p>
<p>$5 \div 172.50 \div 5$ V $\\$34.50$ each</p>	<p>$70.38 \div 2$ 35.19 each</p>
<p>$37.2 \div 6$ V $\\$6.20$ each</p>	<p>$26.04 \div 4$ $\\$6.51$ each</p>

$\frac{31}{100} \times \frac{x}{69}$

$\frac{69}{2139} \times \frac{31}{100} = 100 \times$
 $2139 = 21.39$

Answer Snow shovels and 22 %

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The absolute change in the price of each item is calculated correctly; however, an incorrect process is applied to determine the percent increase in the price. The response addresses some elements of the task correctly but reflects a lack of essential understanding.

GUIDE PAPER 8

Additional

61

Last year, a property manager bought five identical snow shovels and six identical bags of salt. The total cost of the snow shovels was \$172.50, before tax, and each bag of salt cost \$6.20, before tax.

This year, the property manager bought two identical snow shovels and four identical bags of salt. The total cost of the snow shovels was \$70.38, before tax, and the total cost of the bags of salt was \$26.04, before tax.

Determine the item with the greatest percent increase in the price from last year to this year. Be sure to include the percent increase of this item to the nearest percent.

Show your work.

$$\text{Snow shovel} - 172.50 - 70.38$$

$$\text{Bags} = 6.20 - 26.04$$

$$\frac{172.50 - 70.38}{172.50} = \frac{\square}{100} = 59.2\% \quad \begin{matrix} 59.2\% \\ \downarrow \\ 59\% \end{matrix}$$

$$\frac{26.04 - 6.20}{6.20} = \frac{\square}{100} = 320\%$$

Answer Bags of Salt and 320 %

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The formula for percent increase is used correctly and results are rounded to the nearest percent; however, the calculations use values for total cost directly from the prompt without solving for the costs per individual items. The response addresses some elements of the task correctly but reaches an inadequate solution based on faulty and incomplete reasoning.

GUIDE PAPER 9

61

Last year, a property manager bought five identical snow shovels and six identical bags of salt. The total cost of the snow shovels was \$172.50, before tax, and each bag of salt cost \$6.20, before tax.

This year, the property manager bought two identical snow shovels and four identical bags of salt. The total cost of the snow shovels was \$70.38, before tax, and the total cost of the bags of salt was \$26.04, before tax.

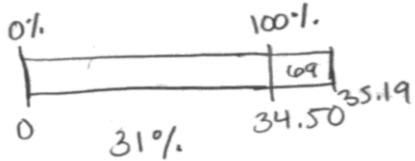
Determine the item with the greatest percent increase in the price from last year to this year. Be sure to include the percent increase of this item to the nearest percent.

Show your work.

Snow Shovels :

$$\frac{172.50}{5} = \frac{34.50}{1}$$

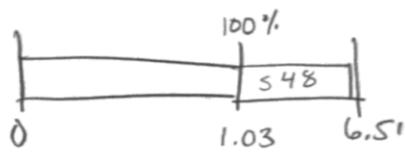
$$\frac{70.38}{2} = \frac{35.19}{1}$$



bags of Salt :

$$\frac{6.20}{6} = \frac{1.03}{1}$$

$$\frac{26.04}{4} = \frac{6.51}{1}$$



Answer 31% and 56% %

Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts in the task. The cost of one snow shovel is calculated correctly for both years; however, the cost of one bag of salt from last year is inappropriately divided by 6. Although the absolute increases from year-to-year are calculated correctly, an incorrect process is applied to determine the percent increases and both increases are reported on the answer blanks with no choice made for which item had the greatest percent increase. The response addresses some elements of the task correctly but exhibits multiple flaws related to misunderstanding of important aspects of the task.

GUIDE PAPER 10

61

Last year, a property manager bought five identical snow shovels and six identical bags of salt. The total cost of the snow shovels was \$172.50, before tax, and each bag of salt cost \$6.20, before tax.

This year, the property manager bought two identical snow shovels and four identical bags of salt. The total cost of the snow shovels was \$70.38, before tax, and the total cost of the bags of salt was \$26.04, before tax.

Determine the item with the greatest percent increase in the price from last year to this year. Be sure to include the percent increase of this item to the nearest percent.

Show your work.

$$\begin{array}{r} p = 6.20 - \text{before tax} \\ q = x - \text{tax} \\ w = 172.50 - \text{before tax} \end{array}$$

$$\frac{6.20}{172.50} = \frac{x}{172.50}$$

$$x = 12.30\% \text{ last year}$$

$$\begin{array}{r} 172.50 \\ \times 6 \\ \hline 1035 \\ 1725 \\ \hline 1040 \end{array}$$

$$\begin{array}{r} 26.04 \\ \times 4 \\ \hline 104 \\ 104 \\ \hline 104 \\ 104 \\ \hline 1040 \end{array}$$

$P = 6.20 - \text{before tax}$
 $q = x - \text{tax}$
 $w = 70.38 - \text{before tax}$

$$\frac{26.04}{70.38} = \frac{x}{70.38}$$

$$x = 3.34\% \text{ last year}$$

Answer 12.30 and 3.34 %

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 numbers of each item purchased are not taken into account and ratios are taken that inappropriately mix values for shovels and for salt. The percentages obtained are incorrect and are not supported by the work.

GUIDE PAPER 11

Additional

61

Last year, a property manager bought five identical snow shovels and six identical bags of salt. The total cost of the snow shovels was \$172.50, before tax, and each bag of salt cost \$6.20, before tax.

This year, the property manager bought two identical snow shovels and four identical bags of salt. The total cost of the snow shovels was \$70.38, before tax, and the total cost of the bags of salt was \$26.04, before tax.

Determine the item with the greatest percent increase in the price from last year to this year. Be sure to include the percent increase of this item to the nearest percent.

Show your work.

$$\begin{aligned} \frac{\$172.50 - \$70.38}{\$70.38} &= \frac{\$102.12}{\$70.38} = 1.456 \quad (0.592) \\ \$26.04 - \$6.20 &= \$19.84 = 3.2 \quad (0.032) \\ 0.032 & \\ 0.592 & \end{aligned}$$

Answer Snow shovels and 60 increase %

Score Point 0 (out of 3 points)

Holistically, this response is not sufficient to demonstrate even a limited understanding of the mathematical concepts in the task. Similar to Guide Paper 8, the calculations use values for total cost directly from the prompt without solving for the costs per individual items; however, multiple additional errors are made. The percent increase of the shovels is incorrectly rounded, the work for the percent increase of the bags of salt does not show the division by \$6.20, and the decimal form of the increase for the bags of salt is misinterpreted as the percentage directly (3.2 → 3.2% rather than 320%).