

2007

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# Green River

*Regional Educational  
Cooperative*

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GRADES K–I and 2  
MATHEMATICS



2007

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*Regional Educational  
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GRADE 3  
MATHEMATICS



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**NOTE:** Each item is aligned to a standard, but does not necessarily measure the entire standard.

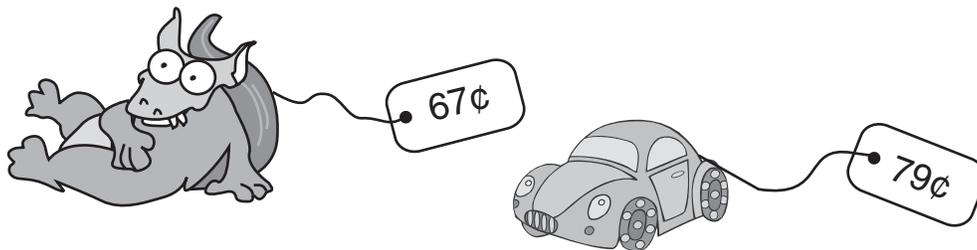
## Item 1 Jena Goes Toy Shopping

**Standard:** MA-EP-1.3.01: Number Operations — Students will analyze real-world problems to identify appropriate representations using mathematical operations, and will apply operations to solve real-world problems with the following constraints: add and subtract whole numbers with three digits or less; multiply whole numbers of 10 or less; add and subtract fractions with like denominators less than or equal to four; and add and subtract decimals related to money.

**Bloom's Taxonomy:** Application

**Depth of Knowledge:** Level 2

1. Jena has \$2.00 to spend at the store. She wants to buy the two toys shown below.



- a. How much will Jena have to pay for the two toys? Show your work.
- b. How much of her \$2.00 will Jena have left after she buys the two toys? Show your work.

## Jena Goes Toy Shopping

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in adding and subtracting decimals related to money.
3	The student response demonstrates a good understanding of the concepts involved in adding and subtracting decimals related to money. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in adding and subtracting decimals related to money. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in adding and subtracting decimals related to money.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Additional Notes

Evaluate the correctness of Part b in terms of the answer the student gave to Part a. For example, if the student answered \$1.36 for Part a, then the correct answer for Part b is \$0.64 instead of \$0.54.

## Sample Response:

$$\text{Part a: } 67¢ + 79¢ = \$1.46$$

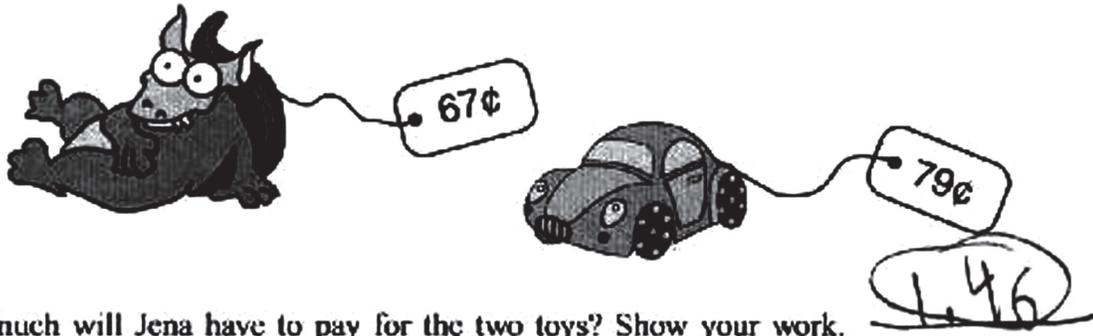
$$\text{Part b: } \$2.00 - 1.46 = \$0.54$$

*Sample Student Responses*

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**Jena Goes Toy Shopping**

Jena has \$2.00 to spend at the store. She wants to buy the two toys shown below.



a. How much will Jena have to pay for the two toys? Show your work.

$$\begin{array}{r} 79 \\ + 67 \\ \hline 146 \end{array}$$

how  
first I did  
 $79 + 67 = 146$   
total

why  
because  
I had to  
find out  
how much  
their prices  
are together  
1.46

b. How much of her \$2.00 will Jena have left after she buys the two toys? Show your work.

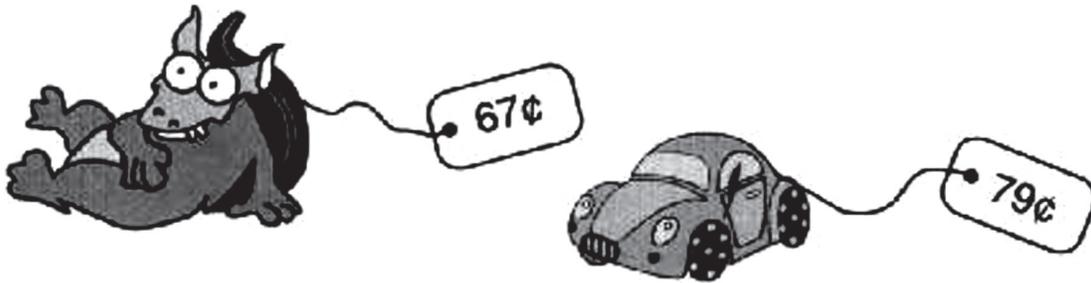
$$\begin{array}{r} 2.00 \\ - 1.46 \\ \hline 0.54 \end{array}$$

how  
First I  
did 2.00  
- 1.46

why  
because  
I had  
to find out  
how much  
would be  
left after  
she bought  
the toys.

Score Point: 4

Jena has \$2.00 to spend at the store. She wants to buy the two toys shown below.



a. How much will Jena have to pay for the two toys? Show your work.

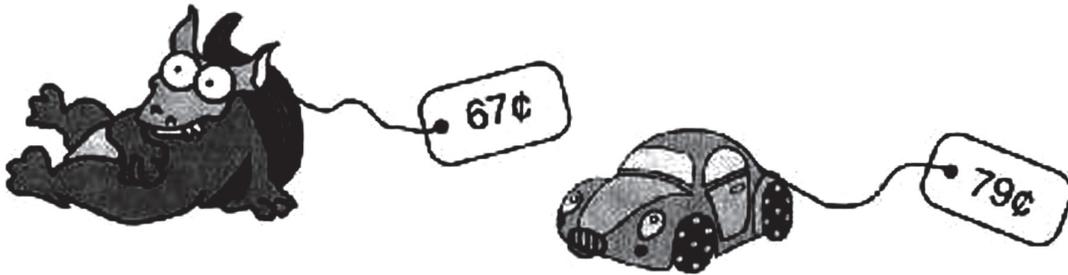
\$ 1.46

b. How much of her \$2.00 will Jena have left after she buys the two toys? Show your work.

54¢

Score Point: 3

Jena has \$2.00 to spend at the store. She wants to buy the two toys shown below.



a. How much will Jena have to pay for the two toys? Show your work.

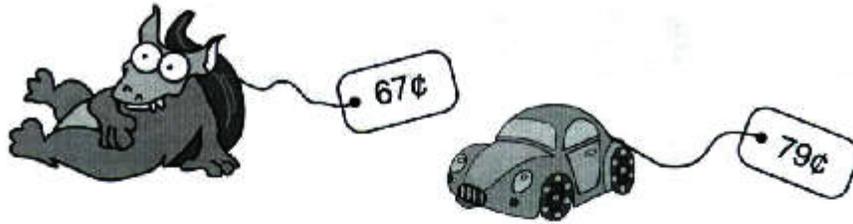
$$\begin{array}{r} 67¢ \\ + 79¢ \\ \hline \$1.46 \end{array}$$

b. How much of her \$2.00 will Jena have left after she buys the two toys? Show your work.

$$\begin{array}{r} 79 \\ - 67 \\ \hline 12¢ \end{array}$$

Score Point: 2

Jena has \$2.00 to spend at the store. She wants to buy the two toys shown below.



a. How much will Jena have to pay for the two toys? Show your work.

$$\begin{array}{r} 67 \\ +79 \\ \hline 136 \end{array}$$

b. How much of her \$2.00 will Jena have left after she buys the two toys? Show your work.

$$\begin{array}{r} 2.00 \\ -1.36 \\ \hline 0.64 \end{array}$$

Score Point: 1



## Item 2 Jon's Stamp Collection

**Standard:** MA-EP-1.3.01: Number Operations — Students will analyze real-world problems to identify appropriate representations using mathematical operations, and will apply operations to solve real-world problems with the following constraints: add and subtract whole numbers with three digits or less; multiply whole numbers of 10 or less; add and subtract fractions with like denominators less than or equal to four; and add and subtract decimals related to money.

**Bloom's Taxonomy:** Application

**Depth of Knowledge:** Level 2

2. Jon collects stamps.
  - He has 157 United States stamps.
  - He has 39 stamps from other countries.
  - a. How many stamps does Jon have in his collection? Show how you found your answer.
  - b. How many more stamps does Jon have from the United States than from other countries? Show how you found your answer.

## Jon's Stamp Collection

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in applying addition and subtraction of whole numbers to solve real-world problems.
3	The student response demonstrates a good understanding of the concepts involved in applying addition and subtraction of whole numbers to solve real-world problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in applying addition and subtraction of whole numbers to solve real-world problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in applying addition and subtraction of whole numbers to solve real-world problems.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Sample Response:

Part a:  $157 + 39 = 196$

Part b:  $157 - 39 = 118$

*Sample Student Responses*

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**Jon's Stamp Collection**

Jon collects stamps.

- He has 157 United States stamps.
- He has 39 stamps from other countries.

a. How many stamps does Jon have in his collection? Show how you found your answer.

$$\begin{array}{r} 157 \\ + 39 \\ \hline 196 \end{array} \quad 196 \text{ stamps}$$

First, I add  $157 + 39$ . Next I figured out the answer.

b. How many more stamps does Jon have from the United States than from other countries? Show how you found your answer.

$$\begin{array}{r} 4 \\ 157 \\ - 39 \\ \hline 118 \end{array}$$

118 stamps

First, I subtract  $157 - 39$ . Next, I figured out the answer.

Score Point: 4

Jon collects stamps.

- He has 157 United States stamps.
- He has 39 stamps from other countries.

a. How many stamps does Jon have in his collection? Show how you found your answer.

$$\begin{array}{r} 157 \\ + 39 \\ \hline 296 \end{array}$$

b. How many more stamps does Jon have from the United States than from other countries? Show how you found your answer.

$$\begin{array}{r} 157 \\ - 39 \\ \hline 118 \end{array}$$

Score Point: 3

Jon collects stamps.

- He has 157 United States stamps.
- He has 39 stamps from other countries.

a. How many stamps does Jon have in his collection? Show how you found your answer.

$$\begin{array}{r} 157 \\ + 39 \\ \hline 196 \end{array}$$

b. How many more stamps does Jon have from the United States than from other countries? Show how you found your answer.

$$90$$

Score Point: 2

Jon collects stamps.

- He has 157 United States stamps.
- He has 39 stamps from other countries.

a. How many stamps does Jon have in his collection? Show how you found your answer.

First, I took 157 and 39 and I add it up.  
Last, I found the answer was 286,

$$\begin{array}{r} 157 \\ + 39 \\ \hline 286 \end{array}$$

b. How many more stamps does Jon have from the United States than from other countries?  
Show how you found your answer.

Score Point: 1



### Item 3 Third-Grade Class Survey

Standard: MA-EP-4.1.03: Data Representations — Students will organize and display data.

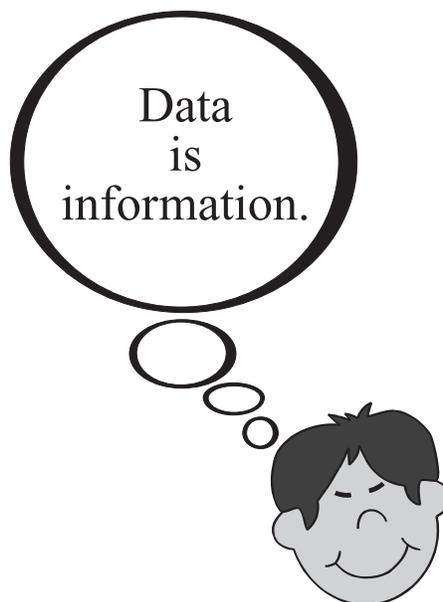
Bloom's Taxonomy: Analysis

Depth of Knowledge: Level 2

3. The third-grade class did a survey to find out their favorite sports. Here are the results.

- Alana – gymnastics
- Heather – soccer
- Michael – baseball
- Brett – hockey
- Richard – gymnastics
- Maggie – soccer
- Michelle – baseball
- Stacey – gymnastics
- Angela – soccer
- Darin – soccer
- Ryan – baseball
- Nick – soccer

- a. Make a chart or table that shows how many students chose each sport.
- b. Make a graph of the data from the survey. Make sure you label your graph.
- c. Write a statement about one thing your graph shows.



**Third-Grade Class Survey****Scoring Guide**

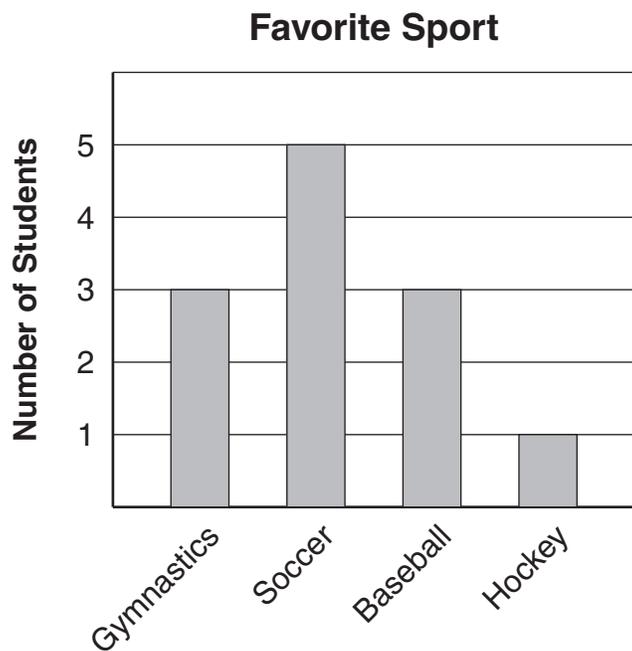
<b>Score</b>	<b>Description</b>
<b>4</b>	The student response demonstrates an exemplary understanding of the concepts involved in organizing and displaying data.
<b>3</b>	The student response demonstrates a good understanding of the concepts involved in organizing and displaying data. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
<b>2</b>	The student response demonstrates a fair understanding of the concepts involved in organizing and displaying data. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student response merits 2 points.
<b>1</b>	The student response demonstrates a minimal understanding of the concepts involved in organizing and displaying data.
<b>0</b>	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
<b>Blank</b>	No response.

Sample Response:

Part a:

Sports	Number of Students
Gymnastics	3
Soccer	5
Baseball	3
Hockey	1

Part b:



Part c: More students like soccer than any of the other sports.

*Sample Student Responses*

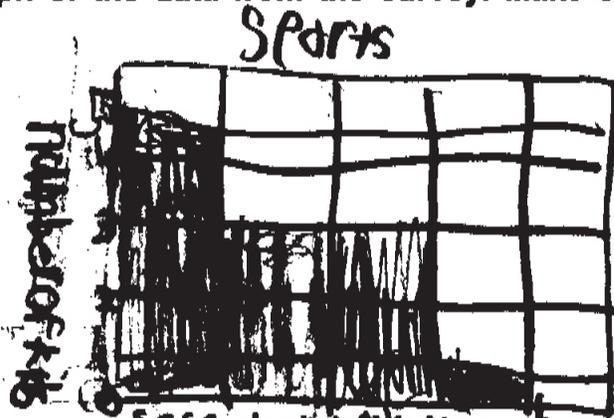
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**Third-Grade Class Survey**

a. Make a chart or table that shows how many students chose each sport.

	Tally	Total
soccer		5
baseball		3
gymnastics		3
hockey		4

b. Make a graph of the data from the survey. Make sure you label your graph.



c. Write a statement about one thing your graph shows.

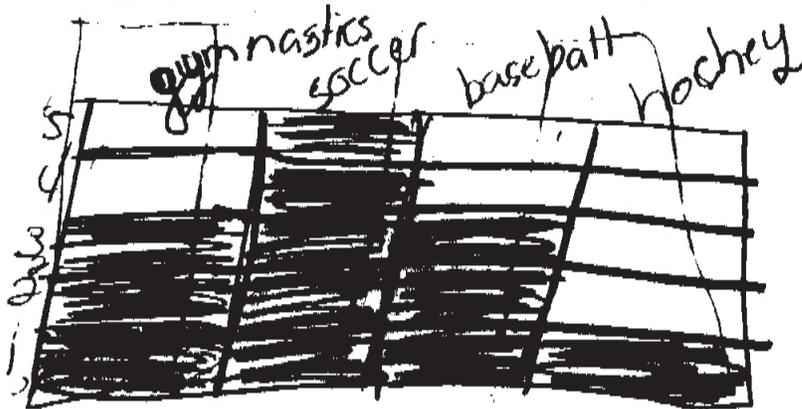
Soccer subtract hockey is 4.

Score Point: 4

a. Make a chart or table that shows how many students chose each sport.

gymnastics	soccer	baseball	hockey
Alana Richard Stacey	Heather Maggie Angela Darin Nick	Michael Michelle Ryan	Brett

b. Make a graph of the data from the survey. Make sure you label your graph.

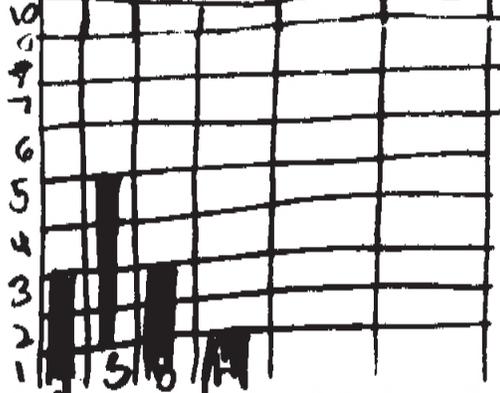


c. Write a statement about one thing your graph shows.

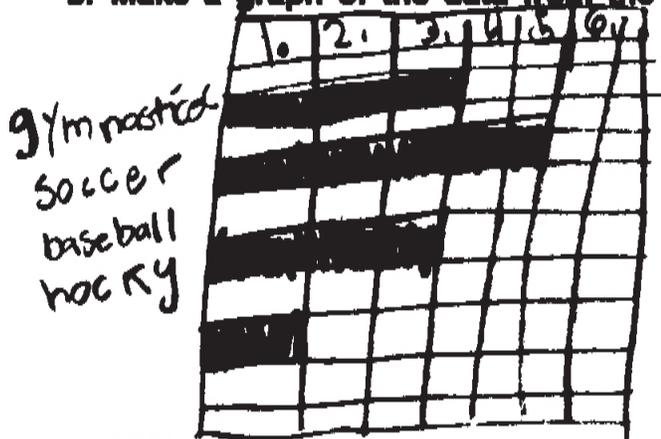
My graph shows how many sports everyone did.

Score Point: 3

a. Make a chart or table that shows how many students chose each sport.



b. Make a graph of the data from the survey. Make sure you label your graph.



c. Write a statement about one thing your graph shows.

My graph shows how many  
Each person likes for a sport.

Score Point: 2

a. Make a chart or table that shows how many students chose each sport.

3 gymnastics	5 soccer	1 hockey
3 base ball		
1		

b. Make a graph of the data from the survey. Make sure you label your graph.

gymnastics	hockey	soccer	baseball
1	1	1	1
1		1	1
1		1	1
		1	1

c. Write a statement about one thing your graph shows.

Separating 4 things the lots of peapl pick.

Score Point: 1

a. Make a chart or table that shows how many students chose each sport.

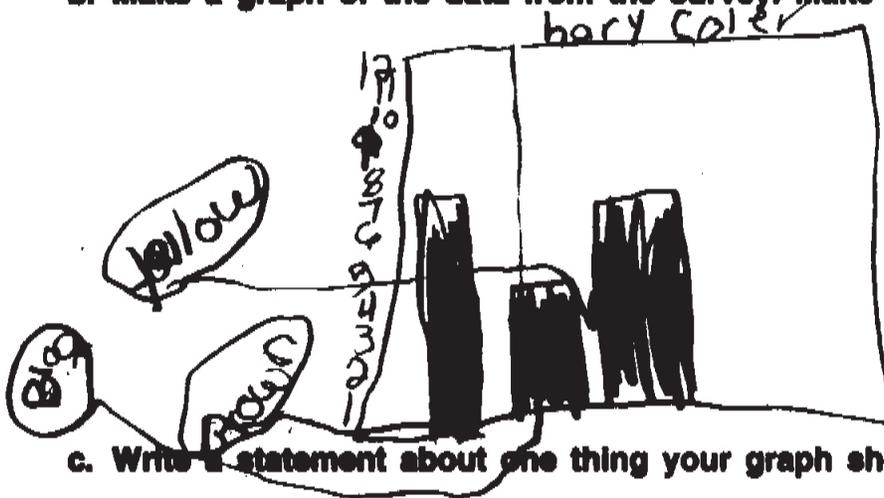
3 gymnastics

5 soccer

2 baseball

1 hockey

b. Make a graph of the data from the survey. Make sure you label your graph.



c. Write a statement about one thing your graph shows.

Score Point: 1



## Item 4 Animal Crackers

**Standard:** MA-EP-1.3.01: Number Operations — Students will analyze real-world problems to identify appropriate representations using mathematical operations, and will apply operations to solve real-world problems with the following constraints: add and subtract whole numbers with three digits or less; multiply whole numbers of 10 or less; add and subtract fractions with like denominators less than or equal to four; and add and subtract decimals related to money.

**Bloom’s Taxonomy:** Analysis

**Depth of Knowledge:** Level 2

4. Martin wants to buy some animal crackers. The sign on the machine says:

EACH ITEM—50¢. USE NICKELS, DIMES, AND QUARTERS. USE EXACT CHANGE ONLY.
---

Martin decides that one way to pay for the crackers is to use 4 dimes and 2 nickels.

- What other ways can Martin pay for the animal crackers? Show as many ways as possible that he can use nickels, dimes, and quarters to buy the animal crackers.
- Draw and label the fewest coins Martin can use.
- Draw and label the most coins Martin can use.

Animal Crackers

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in applying addition and subtraction of whole numbers to solve real-world problems.
3	The student response demonstrates a good understanding of the concepts involved in applying addition and subtraction of whole numbers to solve real-world problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in applying addition and subtraction of whole numbers to solve real-world problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in applying addition and subtraction of whole numbers to solve real-world problems.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

- Part a: 2 quarters  
 1 quarter, 2 dimes, 1 nickel  
 1 quarter, 1 dime, 3 nickels  
 1 quarter, 5 nickels  
 5 dimes  
 3 dimes, 4 nickels  
 2 dimes, 6 nickels  
 1 dime, 8 nickels  
 10 nickels

Part b:



2 Quarters

Part c:



10 Nickels

*Sample Student Responses*

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**Animal Crackers**



Martin wants to buy some animal crackers. The sign on the machine says:

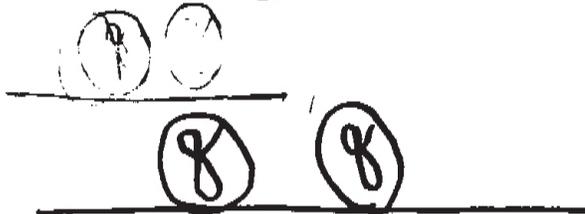
EACH ITEM—50¢.  
 USE NICKELS, DIMES, AND QUARTERS.  
 USE EXACT CHANGE ONLY.

Martin decides that one way to pay for the crackers is to use 4 dimes and 2 nickels.

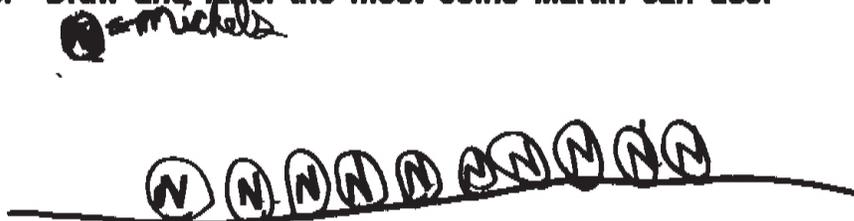
- a. What other ways can Martin pay for the animal crackers? Show as many ways as possible that he can use nickels, dimes, and quarters to buy the animal crackers.

Two quarters, Five dimes, ten nickels  
one quarter, two dimes and one nickel.

- b. Draw and label the fewest coins Martin can use.



- c. Draw and label the most coins Martin can use.



Score Point: 3

Martin wants to buy some animal crackers. The sign on the machine says:

EACH ITEM—50¢.  
 USE NICKELS, DIMES, AND QUARTERS.  
 USE EXACT CHANGE ONLY.

Martin decides that one way to pay for the crackers is to use 4 dimes and 2 nickels.

- a. What other ways can Martin pay for the animal crackers? Show as many ways as possible that he can use nickels, dimes, and quarters to buy the animal crackers.

Two Quarters  
 Ten Nickels  
 Five Dimes

- b. Draw and label the fewest coins Martin can use.

  
 2 Quarters

- c. Draw and label the most coins Martin can use.

  
 10 Nickels

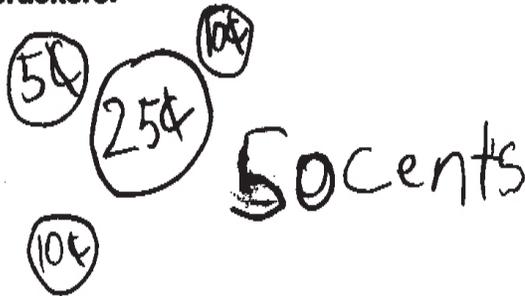
Score Point: 2

Martin wants to buy some animal crackers. The sign on the machine says:

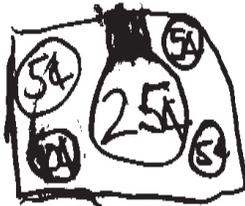
EACH ITEM—50¢.  
USE NICKELS, DIMES, AND QUARTERS.  
USE EXACT CHANGE ONLY.

Martin decides that one way to pay for the crackers is to use 4 dimes and 2 nickels.

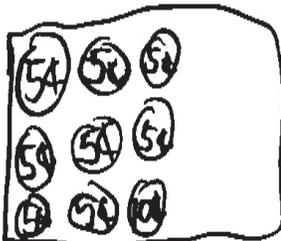
- a. What other ways can Martin pay for the animal crackers? Show as many ways as possible that he can use nickels, dimes, and quarters to buy the animal crackers.



- b. Draw and label the fewest coins Martin can use.



- c. Draw and label the most coins Martin can use.



Score Point: 1

Martin wants to buy some animal crackers. The sign on the machine says:

EACH ITEM—50¢.  
USE NICKELS, DIMES, AND QUARTERS.  
USE EXACT CHANGE ONLY.

Martin decides that one way to pay for the crackers is to use 4 dimes and 2 nickels.

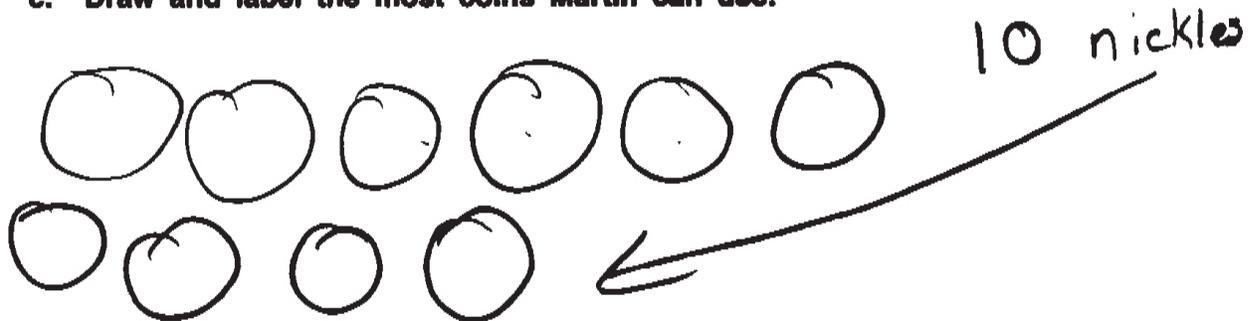
- a. What other ways can Martin pay for the animal crackers? Show as many ways as possible that he can use nickels, dimes, and quarters to buy the animal crackers.



- b. Draw and label the fewest coins Martin can use.



- c. Draw and label the most coins Martin can use.



Score Point: 1



Table of Contents

K–1

Item 1 Triangles and Squares ..... p.3

Standard: MA-EP-3.1.02: Shapes and Relationships

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Grade 1

Item 2 Jen’s Money ..... p. 13

Standard: MA-EP-2.2.01: Systems of Measurement

Scoring Guide..... p. 14

Sample Student Responses ..... pp. 15–22

Grade 2

Item 3 August Calendar ..... p. 23

Standard: MA-EP-2.2.01: Systems of Measurement

Scoring Guide..... pp. 24–25

Sample Student Responses ..... pp. 26–36

Grade 2

Item 4 Mr. Wong’s Farm ..... p. 37

Standard: MA-EP-1.3.01: Number Operations

Scoring Guide..... p. 38

Sample Student Responses ..... pp. 39–45

**Note:** Each item is aligned to a standard, but does not necessarily measure the entire standard.

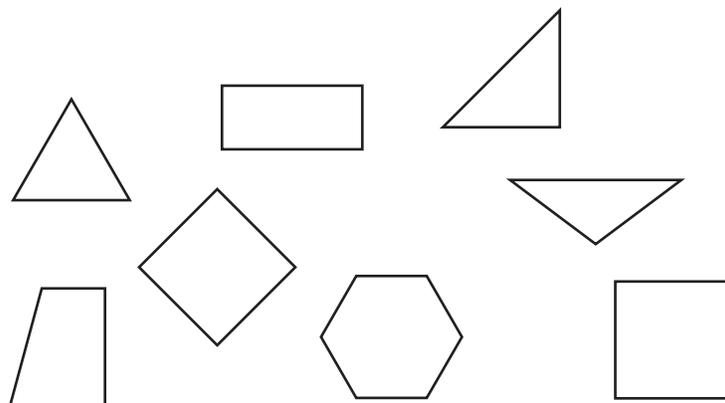
Item 1 Triangles and Squares (K-1)

**Standard:** MA-EP-3.1.02: Shapes and Relationships — Students will describe and provide examples of basic two-dimensional shapes (circles, triangles, squares, rectangles, trapezoids, rhombuses, hexagons), and will apply these shapes to solve real-world and mathematical problems.

**Bloom's Taxonomy:** a. Knowledge  
b. Comprehension  
c. Knowledge  
d. Comprehension

**Depth of Knowledge:** Level 2

1. Use the shapes below to answer this question.



- Put a **T** in **every triangle** shown above.
- Explain how you know that the shapes you marked with a **T** are triangles.
- Put an **S** in **every square** shown above.
- Explain how you know that the shapes you marked with an **S** are squares.

Triangles and Squares

Scoring Guide

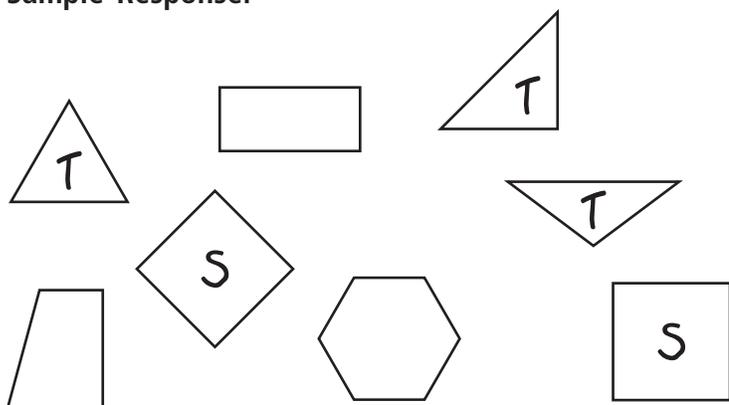
Score	Description
4	The student response demonstrates an exemplary understanding of the Geometry concepts involved in identifying and describing triangles and squares.
3	The student response demonstrates a good understanding of the Geometry concepts involved in identifying and describing triangles and squares. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Geometry concepts involved in identifying and describing triangles and squares. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Geometry concepts involved in identifying and describing triangles and squares.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Additional Notes

Part b response may address 3 angles (or “points”) rather than the 3 sides. The student may not include additional incorrect information, e.g., all acute angles, sides of equal length.

Note that there are 3 requirements for a completely correct response in Part d: 4 sides (or angles), sides of equal length (can be described as “even”), and equal angles (or right angles).

Sample Response:

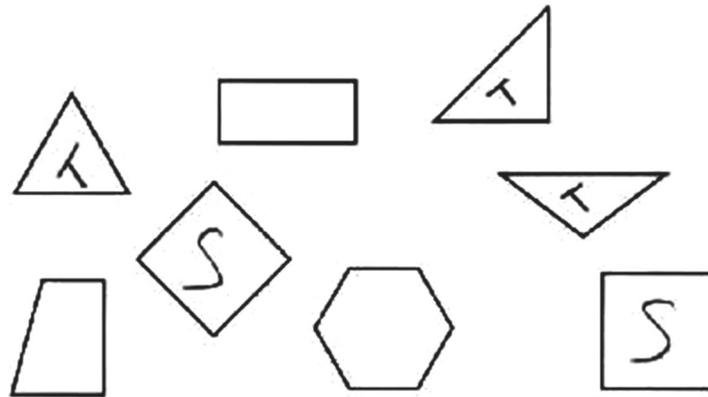


*Sample Student Responses*

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**Triangles and Squares**

Use the shapes below to answer this question.



- Put a **T** in every **triangle** shown above.
- Explain how you know that the shapes you marked with a **T** are **triangles**.

because they have 3 Sides and 3 angles

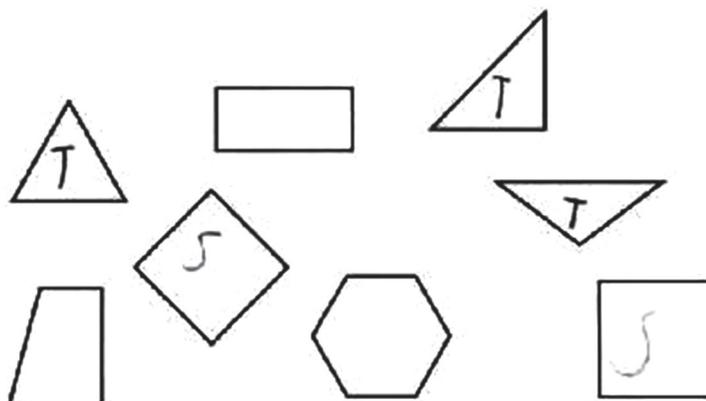
- Put an **S** in every **square** shown above.

- Explain how you know that the shapes you marked with an **S** are **squares**.

because they have 4 equal sides and angles

Score Point: 4

Use the shapes below to answer this question.



- Put a T in every triangle shown above.
- Explain how you know that the shapes you marked with a T are triangles.

Each triangle has three sides.

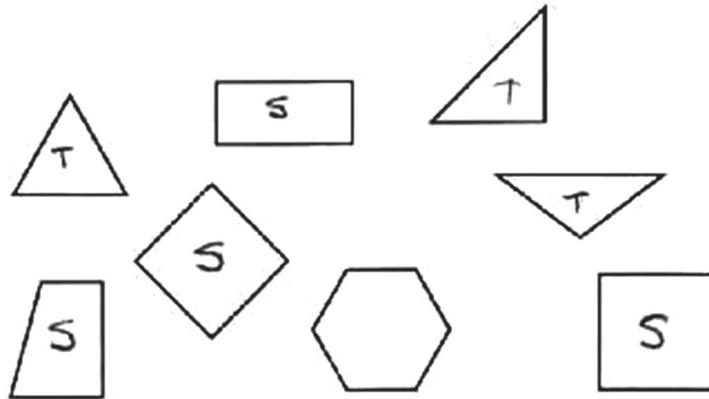
- Put an S in every square shown above.

- Explain how you know that the shapes you marked with an S are squares.

Squares have equal angles and all lines are equal.

Score Point: 3

Use the shapes below to answer this question.



- a. Put a **T** in every **triangle** shown above.
- b. Explain how you know that the shapes you marked with a **T** are triangles.

*They each have three points.*

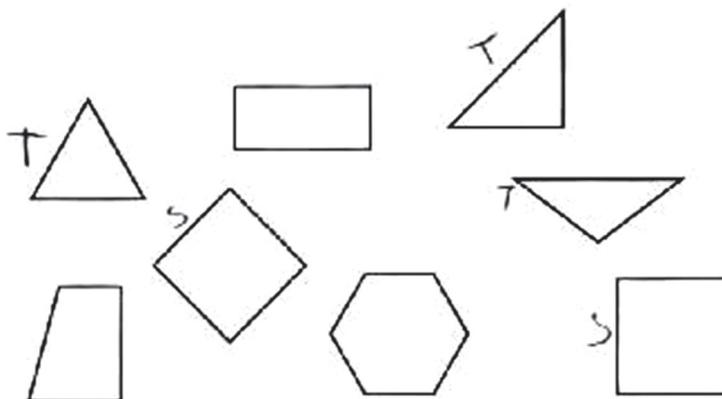
- c. Put an **S** in every **square** shown above.

- d. Explain how you know that the shapes you marked with an **S** are squares.

*They all have 4 sides*

Score Point: 2

Use the shapes below to answer this question.



- a. Put a **T** in every **triangle** shown above.
- b. Explain how you know that the shapes you marked with a **T** are triangles.

*I looked at the shapes*

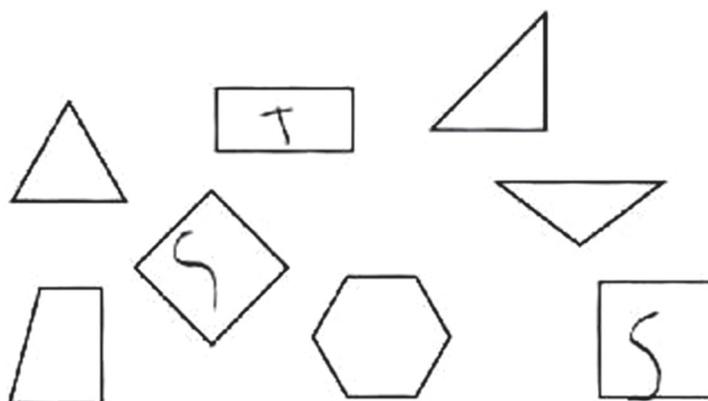
- c. Put an **S** in every **square** shown above.

- d. Explain how you know that the shapes you marked with an **S** are squares.

*I looked at the shapes*

Score Point: 2

Use the shapes below to answer this question.



- Put a T in every **triangle** shown above.
- Explain how you know that the shapes you marked with a T are triangles.

I knew the shape was a triangle because the sides are longer than the top and bottom.

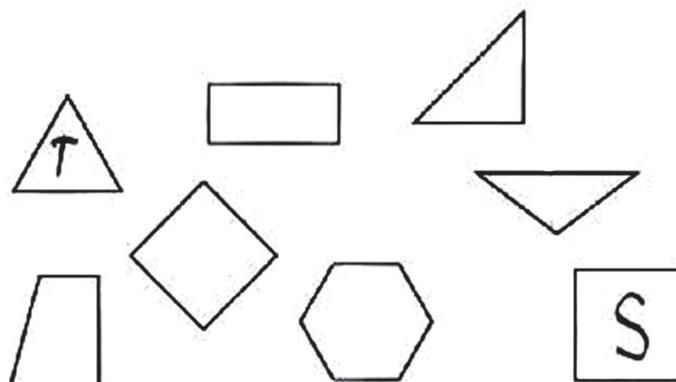
- Put an S in every **square** shown above.

- Explain how you know that the shapes you marked with an S are squares.

I knew it was a square because each side is the same.

Score Point: 1

Use the shapes below to answer this question.



- a. Put a **T** in every **triangle** shown above.
- b. Explain how you know that the shapes you marked with a **T** are triangles.

- c. Put an **S** in every **square** shown above.

- d. Explain how you know that the shapes you marked with an **S** are squares.

Because Square starts with S so you put an S in the ones that are squares just like you would for t for Triangle.

Score Point: 1



Item 2 Jen's Money (Grade 1)

Standard: MA-EP-2.2.01: Systems of Measurement — Students will describe, define, give examples of, and use to solve real-world and mathematical problems nonstandard and standard (U.S. customary, metric) units of measurement to include length (in., cm) time, money, temperature (Fahrenheit), and weight (oz., lb.).

- Bloom's Taxonomy:
- a. Knowledge
  - b. Synthesis
  - c. Synthesis
  - d. Analysis

Depth of Knowledge: Level 3

2. Jen had the coins shown below.



- a. Fill in the blanks to tell how many of each kind of coin Jen has.  
 \_\_\_\_\_ quarters, \_\_\_\_\_ dimes, \_\_\_\_\_ nickels, \_\_\_\_\_ pennies.
- b. Jen gave 15¢ to Adam. Put circles around the coins Jen could have given to Adam.
- c. Then Jen gave 40¢ to Maria. Put an **X** on the coins Jen could have given to Maria.
- d. How much money does Jen have left?  
 \_\_\_\_\_ ¢

## Jen's Money

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Measurement concepts involved in identifying coins and determining the value of sets of coins to solve real-world problems.
3	The student response demonstrates a good understanding of the Measurement concepts involved in identifying coins and determining the value of sets of coins to solve real-world problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Measurement concepts involved in identifying coins and determining the value of sets of coins to solve real-world problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Measurement concepts involved in identifying coins and determining the value of sets of coins to solve real-world problems.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Additional Notes

Evaluate the correctness of Part d in terms of the answer the student gave to Parts b and c; i.e., the correct answer should be the value of the coins on the student's paper with no Xs or circles.

## Sample Response:

Part a: 4 quarters, 3 dimes, 2 nickels, 5 pennies

Part b: Circles around 1 nickel and 1 dime OR 1 dime and 5 pennies OR 2 nickels and 5 pennies

Part c: Xs on 1 nickel, 1 dime, and 1 quarter OR 5 pennies, 1 dime, and 1 quarter OR 5 pennies, 2 nickels, and 1 quarter OR 3 dimes and 2 nickels OR 3 dimes, 1 nickel, and 5 pennies

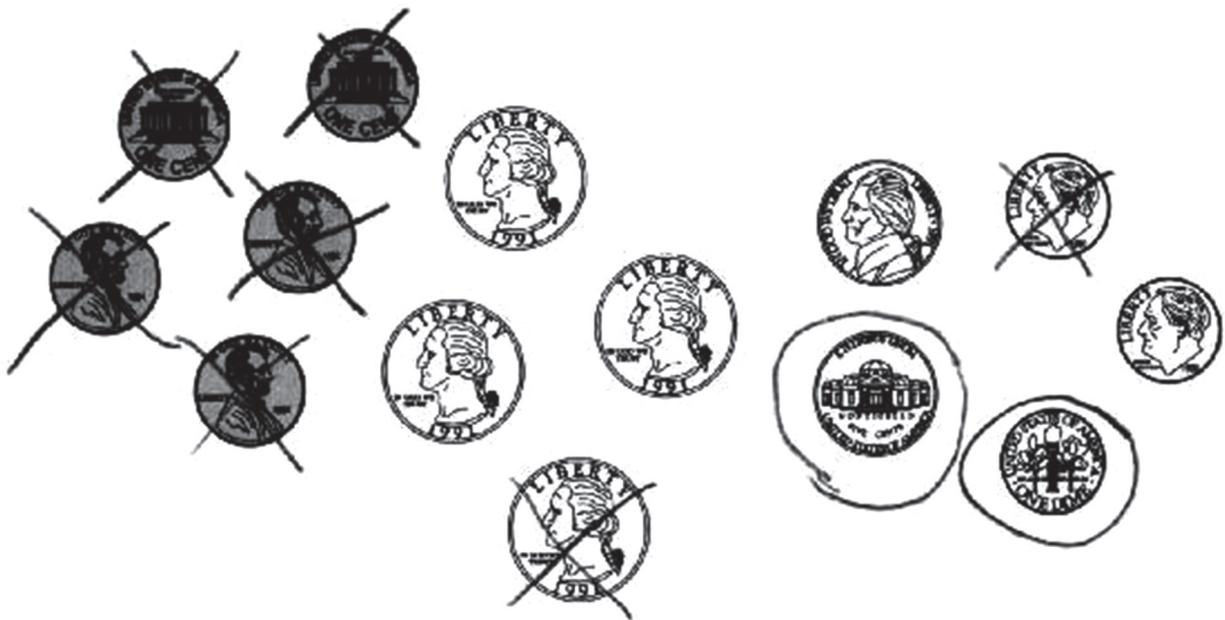
Part d: 90¢

*Sample Student Responses*

---

**Jen's Money**

Jen had the coins shown below.



a. Fill in the blanks to tell how many of each kind of coin Jen has.

4 quarters, 3 dimes, 2 nickels, 5 pennies.

b. Jen gave 15¢ to Adam. Put circles around the coins Jen could have given to Adam.

c. Then Jen gave 40¢ to Maria. Put an X on the coins Jen could have given to Maria.

d. How much money does Jen have left?

90 ¢

Score Point: 4

Jen had the coins shown below.



a. Fill in the blanks to tell how many of each kind of coin Jen has.

4 quarters, 3 dimes, 2 nickels, 5 pennies.

b. Jen gave 15¢ to Adam. Put circles around the coins Jen could have given to Adam.

c. Then Jen gave 40¢ to Maria. Put an X on the coins Jen could have given to Maria.

d. How much money does Jen have left?

90 ¢

Score Point: 4

Jen had the coins shown below.



a. Fill in the blanks to tell how many of each kind of coin Jen has.

4 quarters, 3 dimes, 2 nickels, 5 pennies.

b. Jen gave 15¢ to Adam. Put circles around the coins Jen could have given to Adam.

c. Then Jen gave 40¢ to Maria. Put an X on the coins Jen could have given to Maria.

d. How much money does Jen have left?

80 ¢

Score Point: 3

Jen had the coins shown below.



a. Fill in the blanks to tell how many of each kind of coin Jen has.

4 quarters, 3 dimes, 2 nickels, 5 pennies.

b. Jen gave 15¢ to Adam. Put circles around the coins Jen could have given to Adam.

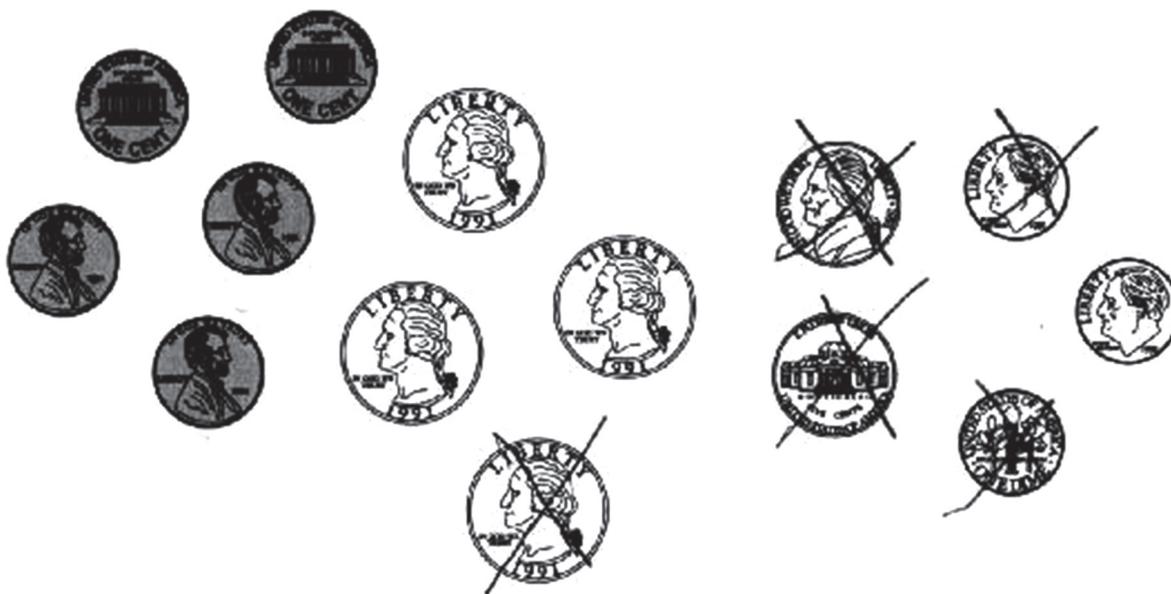
c. Then Jen gave 40¢ to Maria. Put an X on the coins Jen could have given to Maria.

d. How much money does Jen have left?

55¢

Score Point: 2

Jen had the coins shown below.



a. Fill in the blanks to tell how many of each kind of coin Jen has.

4 quarters, 3 dimes, 2 nickels, 5 pennies.

b. Jen gave 15¢ to Adam. Put circles around the coins Jen could have given to Adam.

c. Then Jen gave 40¢ to Maria. Put an X on the coins Jen could have given to Maria.

d. How much money does Jen have left?

90 ¢

Score Point: 2

Jen had the coins shown below.



a. Fill in the blanks to tell how many of each kind of coin Jen has.

4 quarters, 3 dimes, 2 nickels, 5 pennies.

b. Jen gave 15¢ to Adam. Put circles around the coins Jen could have given to Adam.

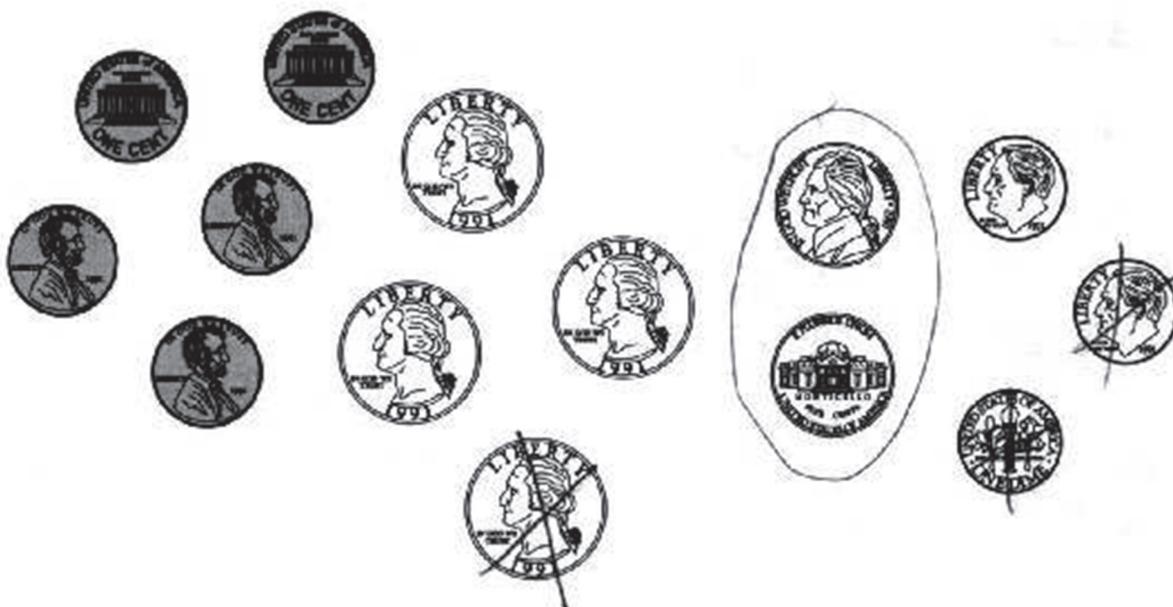
c. Then Jen gave 40¢ to Maria. Put an X on the coins Jen could have given to Maria.

d. How much money does Jen have left?

70¢

Score Point: 1

Jen had the coins shown below.



a. Fill in the blanks to tell how many of each kind of coin Jen has.

4 quarters, 3 dimes, 2 nickels, 5 pennies.

b. Jen gave 15¢ to Adam. Put circles around the coins Jen could have given to Adam.

c. Then Jen gave 40¢ to Maria. Put an X on the coins Jen could have given to Maria.

d. How much money does Jen have left?

65 ¢

Score Point: 1

Item 3 August Calendar (Grade 2)

**Standard:** MA-EP-2.2.01: Systems of Measurement — Students will describe, define, give examples of, and use to solve real-world and mathematical problems nonstandard and standard (U.S. customary, metric) units of measurement to include length (in., cm), time, money, temperature (Fahrenheit), and weight (oz., lb.).

**Bloom’s Taxonomy:** a. Knowledge  
 b. Knowledge  
 c. Application  
 d. Application

**Depth of Knowledge:** Level 2

3. Use the calendar below to answer this question.

August						
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

James is going to visit his cousin on August 7.

- a. Put an **X** on the calendar on August 7.
- b. On what day of the week is August 7?

James will stay at his cousin’s house for 10 days. Then he will go home.

- c. On what date will James go home?

School starts for James on September 4.

- d. How many days is it from the day James goes home until school starts?

## August Calendar

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Measurement concepts involved in using calendars to solve real-world problems.
3	The student response demonstrates a good understanding of the Measurement concepts involved in using calendars to solve real-world problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Measurement concepts involved in using calendars to solve real-world problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Measurement concepts involved in using calendars to solve real-world problems.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

**Additional Notes**

Evaluate the correctness of Part d in terms of the answer the student gave to Part c. For example, if the student answered August 16 for Part c, then the correct answer for Part d is 20 days.

**Sample Response:**

Part a:

August						
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
			1	2	3	4
5	6	<del>7</del>	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Part b: Tuesday

Part c: August 17

Part d: 18

*Sample Student Responses*

---

August Calendar

Use the calendar below to answer this question.

August						
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
			1	2	3	4
5	6	<del>7</del>	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

James is going to visit his cousin on August 7.

- a. Put an **X** on the calendar on August 7.
- b. On what day of the week is August 7? *Tuesday*

James will stay at his cousin's house for 10 days. Then he will go home.

- c. On what date will James go home? *17*

School starts for James on September 4.

- d. How many days is it from the day James goes home until school starts? *18 days*

Score Point: 4

Use the calendar below to answer this question.

August						
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
			1	2	3	4
5	6	<del>7</del>	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

James is going to visit his cousin on August 7.

- a. Put an X on the calendar on August 7.
- b. On what day of the week is August 7?

James will stay at his cousin's house for 10 days. Then he will go home.

- c. On what date will James go home?

School starts for James on September 4.

- d. How many days is it from the day James goes home until school starts?

B. Tuesday      c. August 17      d. 18 days

A hand-drawn calendar for August. The days of the week are written across the top. The date 7 is circled in the Tuesday column.

A hand-drawn calendar for August. The date 7 is circled. A horizontal line with an 'X' is drawn across the days from August 7 to August 17, indicating a 10-day stay.

Score Point: 4

Use the calendar below to answer this question.

August						
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
			1	2	3	4
5	6	<del>7</del>	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

James is going to visit his cousin on August 7.

a. Put an X on the calendar on August 7.

b. On what day of the week is August 7? *Tuesday*

James will stay at his cousin's house for 10 days. Then he will go home.

c. On what date will James go home? *Friday*

School starts for James on September 4.

d. How many days is it from the day James goes home until school starts? *18 days*

Score Point: 3

Use the calendar below to answer this question.

August						
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
			1	2	3	4
5	6	<del>7</del>	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

James is going to visit his cousin on August 7.

- a. Put an X on the calendar on August 7.      *tues.*
- b. On what day of the week is August 7?

James will stay at his cousin's house for 10 days. Then he will go home.

- c. On what date will James go home?      *Friday 17*

School starts for James on September 4.

- d. How many days is it from the day James goes home until school starts?

*17 days      18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 1, 2, 3, 4*

Score Point: 3

Use the calendar below to answer this question.

August						
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
			1	2	3	4
5	6	<del>7</del>	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

James is going to visit his cousin on August 7.

- Put an X on the calendar on August 7.
- On what day of the week is August 7?

Tuesday

James will stay at his cousin's house for 10 days. Then he will go home.

- On what date will James go home? 16

School starts for James on September 4.

- How many days is it from the day James goes home until school starts? 19

Score Point: 3

Use the calendar below to answer this question.

August						
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

James is going to visit his cousin on August 7.

- Put an X on the calendar on August 7.
- On what day of the week is August 7?

*2nd week*

James will stay at his cousin's house for 10 days. Then he will go home.

- On what date will James go home? *17 Friday*

School starts for James on September 4.

- How many days is it from the day James goes home until school starts?

*18 days*

Score Point: 2

Use the calendar below to answer this question.

August						
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
			1	2	3	4
5	6	<del>7</del>	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

James is going to visit his cousin on August 7.

- Put an **X** on the calendar on August 7.
- On what day of the week is August 7? *Tuesday*

James will stay at his cousin's house for 10 days. Then he will go home. *Thursday*

- On what date will James go home? *16*

School starts for James on September 4.

- How many days is it from the day James goes home until school starts? *29 days*

Score Point: 2

Use the calendar below to answer this question.

August						
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
			1	2	3	4
5	6	<del>7</del>	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

James is going to visit his cousin on August 7.

- Put an **X** on the calendar on August 7.
- On what day of the week is August 7?

Tuesday

James will stay at his cousin's house for 10 days. Then he will go home.

- On what date will James go home? Friday

School starts for James on September 4.

- How many days is it from the day James goes home until school starts?

35

Score Point: 2

Use the calendar below to answer this question.

August						
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

James is going to visit his cousin on August 7.

- Put an **X** on the calendar on August 7.
- On what day of the week is August 7? *Fri.*

James will stay at his cousin's house for 10 days. Then he will go home.

- On what date will James go home? *17*

School starts for James on September 4.

- How many days is it from the day James goes home until school starts? *14*

Score Point: 1

Use the calendar below to answer this question.

August						
Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
			1	2	3	4
5	6	<del>7</del>	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

James is going to visit his cousin on August 7.

- Put an X on the calendar on August 7.
- On what day of the week is August 7?

Friday, 7

James will stay at his cousin's house for 10 days. Then he will go home.

- On what date will James go home?

Saturday the 11<sup>th</sup>

School starts for James on September 4.

- How many days is it from the day James goes home until school starts?

3 more days

Score Point: 1

Item 4 Mr. Wong's Farm (Grade 2)

**Standard:** MA-EP-1.3.01: Number Operations — Students will analyze real-world problems to identify appropriate representations using mathematical operations, and will apply operations to solve real-world problems with the following constraints: add and subtract whole numbers with three digits or less; multiply whole numbers of 10 or less; add and subtract fractions with like denominators less than or equal to four; and add and subtract decimals related to money.

**Bloom's Taxonomy:** Analysis

**Depth of Knowledge:** Level 2

4. Bobbie's class went on a field trip to Mr. Wong's farm.

There were 17 cows and 8 horses in the barn.

a. How many animals were in the barn? Show your work.

Bobbie counted 14 pigs.

Julie counted 9 pigs.

b. How many more pigs did Bobbie count than Julie? Show your work.

Mr. Wong has 26 more chickens than he has ducks.

He has 8 ducks.

c. How many chickens does Mr. Wong have? Show your work.

## Mr. Wong's Farm

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Number Properties and Operations concepts involved in applying addition and subtraction of whole numbers to solve real-world problems.
3	The student response demonstrates a good understanding of the Number Properties and Operations concepts involved in applying addition and subtraction of whole numbers to solve real-world problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Number Properties and Operations concepts involved in applying addition and subtraction of whole numbers to solve real-world problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Number Properties and Operations concepts involved in applying addition and subtraction of whole numbers to solve real-world problems.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Additional Notes

Correct work may include the algorithm, pictures, or other evidence of counting up or down.

## Sample Response:

Part a:  $17 + 8 = 25$

Part b:  $14 - 9 = 5$

Part c:  $8 + 26 = 34$

*Sample Student Responses*

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**Mr. Wong's Farm**

Bobbie's class went on a field trip to Mr. Wong's farm.

There were 17 cows and 8 horses in the barn.

25 animals in the barn

a. How many animals were in the barn? Show your work.



Bobbie counted 14 pigs.

Julie counted 9 pigs.

b. How many more pigs did Bobbie count than Julie? Show your work.

$$\begin{array}{r}
 14 \\
 - 9 \\
 \hline
 5
 \end{array}$$

Bobbie counted 5 more pigs than Julie

Mr. Wong has 26 more chickens than he has ducks.

He has 8 ducks.

c. How many chickens does Mr. Wong have? Show your work.

$$\begin{array}{r}
 26 \\
 + 8 \\
 \hline
 34
 \end{array}$$

Mr. Wong has 34 chickens

Score Point: 4

Bobbie's class went on a field trip to Mr. Wong's farm.

There were 17 cows and 8 horses in the barn.

a. How many animals were in the barn? Show your work.

$$\begin{array}{r} 17 \\ + 8 \\ \hline 25 \end{array}$$

Answer

25

Animals

Get your Answer here

Bobbie counted 14 pigs.

Julie counted 9 pigs.

b. How many more pigs did Bobbie count than Julie? Show your work.

Answer

5 more

Mr. Wong has 26 more chickens than he has ducks.

He has 8 ducks.

c. How many chickens does Mr. Wong have? Show your work.

Answer

34 more

$$\begin{array}{r} 26 \\ + 8 \\ \hline 34 \end{array}$$

Score Point: 3

Bobbie's class went on a field trip to Mr. Wong's farm.

There were 17 cows and 8 horses in the barn.

$$17 + 8 = 25$$

a. How many animals were in the barn? Show your work.



Bobbie counted 14 pigs.

Julie counted 9 pigs.

b. How many more pigs did Bobbie count than Julie? Show your work.

$$14 - 9 = 5$$

Mr. Wong has 26 more chickens than he has ducks.

He has 8 ducks.

c. How many chickens does Mr. Wong have? Show your work.

$$26 + 8 = 34$$

Score Point: 2

Bobbie's class went on a field trip to Mr. Wong's farm.

There were 17 cows and 8 horses in the barn.

a. How many animals were in the barn? Show your work.

$$\begin{array}{r} 17 \\ + 8 \\ \hline 25 \end{array}$$

these were 35 animals.

Bobbie counted 14 pigs.

Julie counted 9 pigs.

b. How many more pigs did Bobbie count than Julie? Show your work.

$$\begin{array}{r} 14 \\ - 9 \\ \hline 5 \end{array}$$

Bobbie counted 5 more than Julie.

Mr. Wong has 26 more chickens than he has ducks.

He has 8 ducks.

c. How many chickens does Mr. Wong have? Show your work.

$$\begin{array}{r} 26 \\ - 8 \\ \hline 18 \end{array}$$

18 more chickens

Score Point: 2

Bobbie's class went on a field trip to Mr. Wong's farm.

There were 17 cows and 8 horses in the barn.

a. How many animals were in the barn? Show your work.

$$\begin{array}{r} 8 \\ + 17 \\ \hline 25 \end{array}$$

Bobbie counted 14 pigs.

Julie counted 9 pigs.

b. How many more pigs did Bobbie count than Julie? Show your work.

$$\begin{array}{r} 14 \\ - 9 \\ \hline 5 \end{array}$$

Mr. Wong has 26 more chickens than he has ducks.

He has 8 ducks.

c. How many chickens does Mr. Wong have? Show your work.

$$\begin{array}{r} 26 \\ + 8 \\ \hline 34 \end{array}$$

Score Point: 1

Bobbie's class went on a field trip to Mr. Wong's farm.

There were 17 cows and 8 horses in the barn.

a. How many animals were in the barn? Show your work.

(|||||) (|||||) (|||||)

$$\begin{array}{r} 25 \\ 8 \overline{) 17} \\ \underline{- 16} \\ 01 \end{array}$$

Bobbie counted 14 pigs.

Julie counted 9 pigs.

b. How many more pigs did Bobbie count than Julie? Show your work.

$$\begin{array}{r} 5 \\ 14 \\ + 9 \\ \hline 23 \end{array}$$

Mr. Wong has 26 more chickens than he has ducks.

He has 8 ducks.

c. How many chickens does Mr. Wong have? Show your work.

$$\begin{array}{r} 26 \\ + 8 \\ \hline 34 \end{array}$$

Score Point: 1



2007

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# Green River

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GRADE 4  
MATHEMATICS



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**NOTE:** Each item is aligned to a standard, but does not necessarily measure the entire standard.

### Item 1 Trapezoids and Triangles

**Standard:** MA-04-5.1.01: Patterns, Relations, and Functions – Students will extend patterns (e.g., 108, 208, 308, 408, . . .) from real world and mathematical problems; compare simple patterns (e.g., numbers, pictures, words) and describe rules for simple number patterns (e.g., 1, 3, 4, 7, . . .; 5, 10, 15, 20, . . .; 30, 27, 24, 21, . . .).

**Bloom’s Taxonomy:** a. Comprehension  
 b. Application

**Depth of Knowledge:** Level 3

*Trapezoids and triangles were used to make a pattern.*

Level 1:



Level 2:



Level 3:



1. a. Fill in the chart in your Student Response Booklet to show how many trapezoids and triangles are used to build each level. Decide how many trapezoids and triangles would be needed to build Levels 4 and 5, and record the numbers in your chart. The first level in the chart has been completed for you.
- b. If the pattern above continues, how many TRAPEZOIDS are needed to build Level 10? Explain how you know you are right.
- c. If the pattern above continues, how many TRIANGLES are needed to build Level 10? Explain how you know you are right.

**Trapezoids and Triangles****Scoring Guide**

<b>Score</b>	<b>Description</b>
<b>4</b>	The student response demonstrates an exemplary understanding of the concepts involved in extending patterns from mathematical problems.
<b>3</b>	The student response demonstrates a good understanding of the concepts involved in extending patterns from mathematical problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
<b>2</b>	The student response demonstrates a fair understanding of the concepts involved in extending patterns from mathematical problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
<b>1</b>	The student response demonstrates a minimal understanding of the concepts involved in extending patterns from mathematical problems.
<b>0</b>	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
<b>Blank</b>	No response.

*Sample Student Responses*

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**Trapezoids and Triangles**

a,

H.

	Number of □	Number of ▲
Level 1	1	2
Level 2	2	3
Level 3	3	4
Level 4	4	5
Level 5	5	6

b. 10



c. <sup>11</sup> I know, because, I made Level 10, then I counted the triangles for Level 10 and there were 11 triangles

Score Point: 4

a.

		
L1	1	2
L2	2	3
L3	3	4
L4	4	5
L5	5	6

10. Because every level B. has a new trapezoid.

11. Because the first one C. 2.

Score Point: 3

YOU Need 10  
TRAPEZoids.

you need 11  
TRIANGLES, I know

BECAUSE I counted

them!

Score Point: 2

A. L = Level

	Number of	Number of $\Delta$
L1	1	2
L2	2	3
L3	3	4
L4	4	5
L5	5	6

B. You need 10 trapezoids because you need one trapezoid for each level  $1 \times 10 = 10$ . That's why you need 10 trapezoids.

C. You need 20 triangles because you need two triangles to make a level and you need 10 trapezoids to make a level so  $10 \times 2 = 20$ . That's how I got my answer.

Score Point: 2

(a)

	Number of 	Number of 	G.
Level 1	1	2	
Level 2	2	3	
Level 3	3	4	
Level 4	4	5	
Level 5	6	7	
level 6	7	8	
level 7	9	10	
level 8	10	11	
level 9	11	12	
level 10	12	13	

(b) There are 12  in level 10

(c) There are 13  in level 10.

Score Point: 2

	Number of 	Number of 
Level 1	1	2
level 2	2	4
level 3	3	6
level 4	4	8
level 5	5	10

10 Trapezoids will be needed to  
build level 10

20 Triangles will be need to build  
level 10

Score Point: 1

Level 1: 

Level 2: 

Level 3: 

I'm right because  
you can't the shapes.

you would have 22  
triangles.

Score Point: 0

## Item 2 Jacob's Chores

**Standard:** MA-04-1.5.01: Properties of Numbers and Operations – Students will identify and determine odd numbers, even numbers, multiples of a number, and composite factors of a number, and will apply these numbers to solve real-world problems.

**Bloom's Taxonomy:** a. Comprehension  
b. Application

**Depth of Knowledge:** Level 2

2. Jacob's mother made the schedule shown below for Jacob's chores for the first 60 days of summer vacation.
- Walk the dog every 2nd day starting on day 2.
  - Brush the dog every 3rd day starting on day 3.
  - Water the plants every 4th day starting on day 4.
- a. On what day will Jacob first walk **and** brush the dog? Show or explain how you found your answer.
- b. On what day will Jacob first do **all three** chores? Show or explain how you found your answer.
- c. How many times in the 60 days will Jacob do all three chores on the same day? Show or explain how you found your answer.

## Jacob's Chores

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Number Operations and Procedures concepts involved in determining multiples of numbers to solve real-world problems.
3	The student response demonstrates a good understanding of the Number Operations and Procedures concepts involved in determining multiples of numbers to solve real-world problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Number Operations and Procedures concepts involved in determining multiples of numbers to solve real-world problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Number Operations and Procedures concepts involved in determining multiples of numbers to solve real-world problems.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Sample Response:

Part a: 6 because 6 is the least common multiple of both 2 and 3.

Part b: 12 because 12 is the least common multiple of 2, 3, and 4.

Part c: 5 times. He will do all three chores on days 12, 24, 36, 48, and 60.

*Sample Student Responses*

---

**Jacob's Chores**

walk dog on day 2, 4, 6, 8, 10

a.) on the 6<sup>th</sup> day brush his dog on day 3, 6, 9, 12

b.) on the 12<sup>th</sup> day

walk dog on day 2, 4, 6, 8, 10, 12  
 Brush dog on day 3, 6, 12, 15, 18  
 water plants on day 4, 8, 12, 16

c.) 5 times

water 4, 8, 12, 16, 20, 24, 28, 32, 36  
 plant 40, 44, 48, 52, 56, 60

walk dog 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 39, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60

brush dog 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, 60

Score Point: 4

$$A) 2+2+2=6 = \text{day } 6$$

$$3+3=6 = \text{day } 6$$

$$B) 4+4+4=12$$

$$2+2+2+2+2+2=12 = \text{day } 12$$

$$3+3+3+3=12$$

$$C) 4 \times 6 = 24 = \text{day } 24$$

$$3 \times 8 = 24$$

$$2 \times 12 = 24$$

only 2 times on  
day 12 and on day  
24.

Score Point: 3

(a) Day 6 he will do both. I found this by listing their least common multiples,  
 2, 4, 6  
 3, 6

(b) Day 12 he will do all three. This is because they all have the multiple of 12 in common.  
 2, 4, 6, 8, 10, 12  
 3, 6, 9, 12  
 4, 8, 12

(c) He will do all 4 times in 60 days.

2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22,  
 24, 26, 28, 30, 32, 34, 36, 38, 40  
 42, 44, 46, 48, 50, 52, 54, 56, 58,  
 60

3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36,  
 39, 42, 45, 48, 51, 54, 57, 60, 63, 66

4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60

Score Point: 3

- A. Second and first day. It tells you.
- B. 5th day. It goes in order.
- C. 
$$\begin{array}{r} 5 \overline{) 60} \\ \underline{-50} \\ 10 \\ \underline{-10} \\ 0 \end{array}$$
 (12)

Score Point: 2

- (a) Day 12 will be the first day Jacob does both  
I found this out with a compassine.
- (b) Day 12 will also be the day he does  
all 3 I found this out by a graph
- (c) 3 times he will do all 3 I found  
this out by graph

Score Point: 1

- a. Jacob can't brush and walk the dog on 2 days. So I picked day 4.
- b. Jacob can do his chores on the 4<sup>th</sup> day because he didn't do it on day 2 or 3.
- c. 1,218,240. First, I multiply  $234 \times 60$ . Next, I figure out the answer.

Score Point: 0



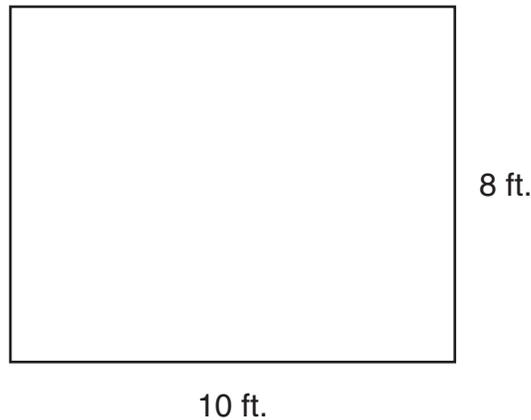
Item 3 Ricardo's Garden

Standard: MA-04-2.1.01: Measuring Physical Attributes – Students will apply standard units to measure length (to the nearest quarter-inch or nearest centimeter) and to determine: weight (ounce, pound; gram, kilogram); perimeter; area (figures that can be divided into rectangular shapes); time (nearest five minutes); and temperature (Fahrenheit and Celsius).

Bloom's Taxonomy: Application

Depth of Knowledge: Level 3

3. Ricardo has exactly enough fencing to go around the rectangular garden shown below.



- How many feet of fencing does Ricardo have? Show or explain how you found your answer.
- What is the area in square feet of the garden shown above? Show or explain how you found your answer.
- Maria has the same amount of fencing as Ricardo has.
  - She made a rectangular garden that is only 6 feet wide.
  - She used all her fencing.

What is the length in feet of Maria's garden? Show or explain how you found your answer.

BE SURE TO LABEL YOUR RESPONSES a, b, AND c.

## Ricardo's Garden

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Measurement concepts involved in determining area and perimeter to solve real-world problems.
3	The student response demonstrates a good understanding of the Measurement concepts involved in determining area and perimeter to solve real-world problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Measurement concepts involved in determining area and perimeter to solve real-world problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Measurement concepts involved in determining area and perimeter to solve real-world problems.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Sample Response:

Part a: 36 feet because  $10 + 8 + 10 + 8 = 36$ .

Part b: 80 square feet because  $10 \times 8 = 80$ .

Part c: 12 feet. Ricardo and Maria both used 36 feet of fencing. Maria's garden is 6 feet long, so she used 12 feet for the widths. That left  $36 - 12 = 24$  feet for the two lengths, and  $24 \div 2 = 12$ .

*Sample Student Responses*

---

**Ricardo's Garden**

A. 
$$\begin{array}{r} 8 \\ 18 \\ 10 \\ +10 \\ \hline 36 \end{array}$$
 36 ft.

B. 
$$\begin{array}{r} 8 \\ \times 10 \\ \hline 80 \end{array}$$
 80 square ft.

C. 
$$\begin{array}{r} 6 \\ 16 \\ 12 \\ +12 \\ \hline 36 \end{array}$$
 6 feet wide  
12 feet tall

Score Point: 4

A. Ricardo has 36 feet of fencing.

B. The area is 80 sq. feet and I got the answer by  $8 \times 10$  so it will equal 80.

C. The length of Maria's garden is 13

because  $6 + 6 = 12$  so  $36 - 12 = 24$  and then  $24 \div 2 = 12$ .

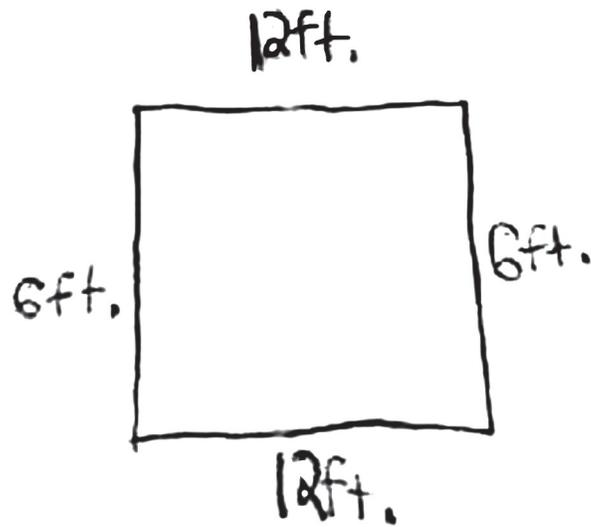
$$\begin{array}{r} 1 \\ 10 \\ 10 \\ 8 \\ + 8 \\ \hline 36 \end{array}$$

Score Point: 3

A.  $8+8+10+10=36$

B. 80

C.  $6+6+12+12=36$



Score Point: 3

a) Ricardo has 36 ft. of fencing. I did the length  $\times 2$  + then the width  $\times 2$ . After that I added them together.

b) 80 ft. = area. I did the length  $\times$  the width.  
example:  
 $l \times w = \text{area}$

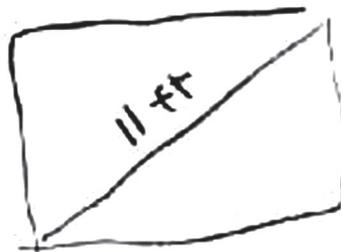
c) 6 ft. long. 6 ft + 36 ft. (from above) I did  $36 \div 6$  +  
I got 6 ft. long.

Score Point: 2

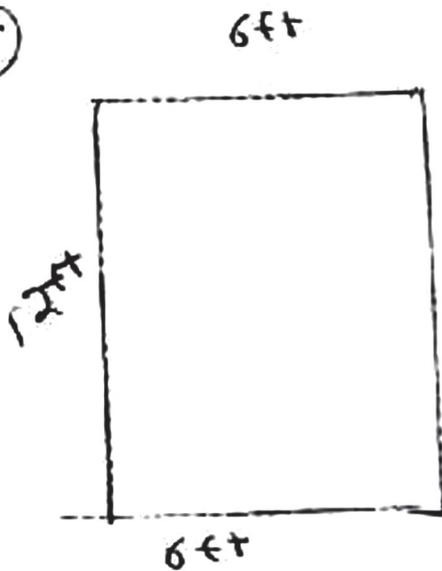
$2 \times 10\text{ft} = 20\text{ft}$   
 (a)  $2 \times 8\text{ft} = 16\text{ft}$   
 $\quad +$   
 $\quad \underline{\quad}$   
 $36\text{ft}$

Ricardo has 36ft of fencing

(b) 11ft



(c)



$\frac{36}{12}$   
 $\underline{\quad}$   
 $24$   
 $\rightarrow$   
 you half  
 that

Score Point: 2

- a. He has 116 ft. of fencing.  $10 \times 10 \times 8 \times 8 = \underline{116}$ .
- b. 80 square feet.  $8 \times 10 = \underline{80}$ .
- c. Maria's garden is 60 ft.  $6 \times 10 = \underline{60}$ .

Score Point: 1

$$\begin{array}{r} A \\ + \\ 10 \\ 10 \\ 8 \\ 8 \\ \hline 46 \end{array}$$

$$\begin{array}{r} B \\ 10 \\ 10 \\ 16 \\ \hline 46 \end{array}$$

$$\begin{array}{r} C \\ 6 \\ 12 \\ 10 \\ 10 \\ \hline 38 \end{array}$$

32ft

Score Point: 1

A of 8 because if he puts it all around he would have to add 8+10= which is 80 feet

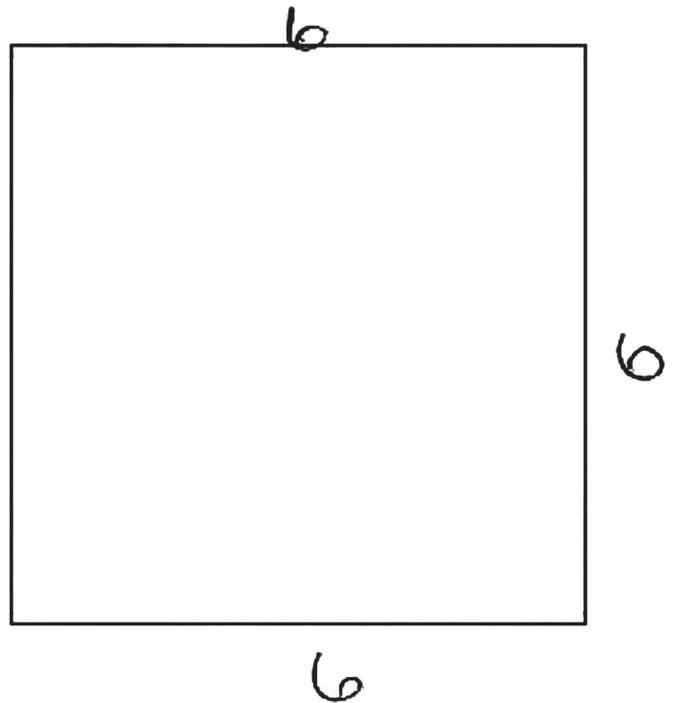
B  
 $10+10=20$   
 $8+8=16$   


---

 36 feet

$12+12=24$  feet

Because you have to add all sides,



Score Point: 0



## Item 4 Product Patterns

**Standard:** MA-04-5.1.01: Patterns, Relations, and Functions – Students will extend patterns (e.g., 108, 208, 308, 408, . . .) from real world and mathematical problems; compare simple patterns (e.g., numbers, pictures, words) and describe rules for simple number patterns (e.g., 1, 3, 4, 7, . . .; 5, 10, 15, 20, . . .; 30, 27, 24, 21, . . .).

**Bloom's Taxonomy:** Comprehension

**Depth of Knowledge:** Level 3

Use the pattern below to answer question 4.

	Product
$2 \times 2 =$	4
$2 \times 2 \times 2 =$	8
$2 \times 2 \times 2 \times 2 =$	16
$2 \times 2 \times 2 \times 2 \times 2 =$	32

You can find the next product in the pattern by doing the multiplication shown below.

$$2 \times 2 \times 2 \times 2 \times 2 \times 2 =$$

4. a. Show or describe an easier way to find this product.
- b. What are the next THREE products?
- c. If the pattern shown continues, could 375 be one of the products in the pattern? Explain how you know.

BE SURE TO LABEL YOUR RESPONSES (a), (b), AND (c).

## Product Patterns

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in extending patterns and describing rules for patterns from a mathematical problem.
3	The student response demonstrates a good understanding of the concepts involved in extending patterns and describing rules for patterns from a mathematical problem. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in extending patterns and describing rules for patterns from a mathematical problem. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in extending patterns and describing rules for patterns from a mathematical problem.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Additional Notes

For Part b, also accept 128, 256, 512 as a correct answer (based on the “next product” after the expression provided in the item rather than the product following 32).

## Sample Responses:

Part a: double the number for the pattern before

Part b: 64, 128, 256 OR 128, 256, 512

Part c: No because 375 is not an even number so it doesn't fit in this pattern of even numbers.

OR

No because it skips from 256 to 512.

*Sample Student Responses*

---

**Product Patterns**

(A)

$$\begin{array}{r} 32 \\ \times 2 \\ \hline 64 \end{array}$$

(B) The next 3 products are 128, 256, and 512.

C. No 375 can't be in the pattern because it doesn't come up with the other numbers.

$$\begin{array}{r} 32 \\ \times 2 \\ \hline 64 \\ \times 2 \\ \hline 128 \end{array} \quad \begin{array}{r} 128 \\ \times 2 \\ \hline 256 \\ \times 2 \\ \hline 512 \end{array}$$

Score Point: 4

(A) The next three products are 64, 128, and 256 because there is a pattern that doubles the number. (B) 375 could not be one of the numbers because you would have to double 256 and that equals 512.

Score Point: 4

$32 \times 2 = 64 \times 2 = 128 \times 2 = 256 \times 2 = 512$   
 it would not be  
 because I x it and  
 got 512.

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

$$\begin{array}{r} 1 \\ 256 \\ \times 2 \\ \hline 512 \end{array}$$

Score Point: 3

(A)

Adding  
the  
problem  
up in  
your  
head!

(B)

$$2 \times 2 \times 2 \times 2$$
$$2 \times 2 \times 2 = 128$$

256

512

(C)

No; because  
if the pattern  
did go on the  
number 256  
would have  
to be 375  
if that was  
in the  
pattern;

Score Point: 3

A  $2 \times 2 \times 2 \times 2 \times 2 \times 2 = 64$

B The sixth product is 128  
The seventh product is 256  
The eighth product is 512

C 375 wouldn't be in the pattern because  $2 \times 2$  is 4 and  $4 \times 4$  is 8 and  $8 \times 8$  is 16 and  $16 \times 16$  is 32 and  $32 \times 32$  is 64 and  $64 \times 64$  is 128 and  $128 \times 128$  is 256 and 256 and is 512

Score Point: 3

a)  $2 \times 2 \times 2 \times 2 \times 2 \times 2 = \boxed{64}$

b) 128, 256, 412

c) no because it goes from 256 to 412

$$\begin{array}{r} 64 \\ 64 \\ \hline 128 \end{array}$$

$$\begin{array}{r} 128 \\ 128 \\ \hline 256 \end{array}$$

$$\begin{array}{r} 256 \\ 256 \\ \hline 412 \end{array}$$

Score Point: 2

9.  $2 \times 2 \times 2 \times 2 \times 2 = 64$

---

B  $2 \times 2 = 512$

---

C NO because it has to end with a multiple of two.

Score Point: 1

B  $7 \times 2 =$   
C  $8 \times 2 =$   
D  $9 \times 2 =$  C No, it would not be.

Score Point: 0



2007

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GRADE 5  
MATHEMATICS



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**NOTE:** Each item is aligned to a standard, but does not necessarily measure the entire standard.

Item 1 Grandfather’s Garden

**Standard:** MA-05-1.1.01: Number Sense – Students will apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to represent whole numbers (0 to 99,999,999); apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, symbols) to describe commonly-used fractions, mixed numbers, and decimals through thousandths; apply these numbers to represent real-world problems; and explain how the base-10 number system relates to place value.

**Bloom’s Taxonomy:** a. Knowledge  
                               b. Knowledge  
                               c. Application

**Depth of Knowledge:** Level 2

- Jennie, Tom, and Chris weeded Grandfather’s garden. The picture below shows the parts of the garden each of them weeded.

**Grandfather’s Garden**

Jennie	Tom
	Tom
	Chris

- Write a fraction that tells how much of the whole garden Jennie weeded.
- Write a fraction that tells how much of the whole garden Chris weeded. Use pictures or words to show how you found your answer.
- Grandfather gave the children \$24 for weeding the garden. The children decided to share the money based on how much weeding each of them did. How much money should each of them get? Explain or show how you found your answer.

BE SURE TO LABEL YOUR RESPONSES a, b, AND c.

## Grandfather's Garden

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Number Properties and Operations concepts involved in applying multiple representations to describe commonly used fractions and solve real-world problems.
3	The student response demonstrates a good understanding of the Number Properties and Operations concepts involved in applying multiple representations to describe commonly used fractions and solve real-world problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Number Properties and Operations concepts involved in applying multiple representations to describe commonly used fractions and solve real-world problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Number Properties and Operations concepts involved in applying multiple representations to describe commonly used fractions and solve real-world problems.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Sample Response:

Part a:  $\frac{1}{2}$

Part b: He weeded  $\frac{1}{6}$  of the garden. I divided Jennie's part into 3 equal sections. So Chris's part is one out of 6 equal parts.

Part c: Jennie:  $\frac{1}{2}$  of \$24 is \$12.

Chris:  $\frac{1}{6}$  of \$24 is \$4.

Tom gets the rest:  $24 - 12 - 4 = \$8$

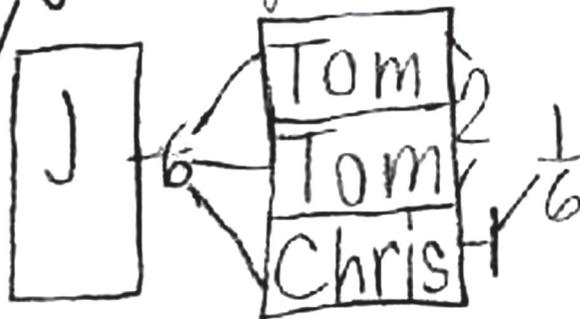
*Sample Student Responses*

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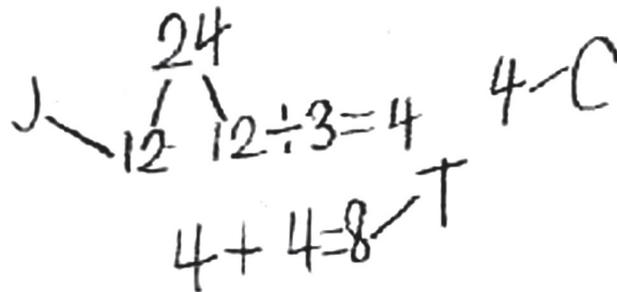
**Grandfather's Garden**

A)  $\frac{1}{2}$  of the garden.

B)  $\frac{1}{6}$



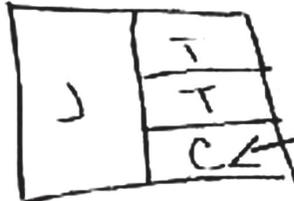
C) J\$12/T\$8/C\$4



Score Point: 4

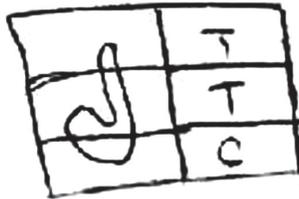
a.  $\frac{3}{6}$  or  $\frac{1}{2}$

b.  $\frac{1}{6}$



the graph can be divided by sixths so he did one sixth.

or



c. Jeanie \$12 Tom \$8  
 Chris \$4  $6 \overline{)24}$   $\textcircled{4}$

| whole garden

each sixth of the garden is  
 Jeanie =  $\frac{1}{2}$   
 Tom =  $\frac{1}{3}$  or  $\frac{2}{6}$   
 Chris =  $\frac{1}{6}$   
 \$4.

Score Point: 4

a  $\frac{1}{2}$  of the garden

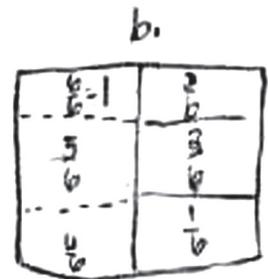
b  $\frac{1}{6}$  of the garden

c

Jermie = \$12  
tom = \$8  
Chris = \$4

Score Point: 3

a.  $\frac{1}{2}$  of the garden b.  $\frac{1}{6}$  of the garden



c. Jennie - \$12 Tom - \$7 Chris - \$5

Since Jennie did half the lawn, she should get half the money. Since Tom did less than half, he should get a little less than half the money. Since Chris did the least, he should get the least money.

Score Point: 3

$$a. \frac{3}{6}$$

$$b. \frac{1}{6}$$

C. Jennie gets \$8

Tom gets \$6.50

Chris gets \$5.50

Score Point: 2

a.  $\frac{1}{2} = \text{Jennie}$

b.  $\frac{1}{4}$    $= \frac{1}{4}$  for chris

c. Jennie = \$12 because she did half the garden & half of 24 is 12.

Tom should get \$8 because he did the 2<sup>nd</sup> most. Chris should get \$4 because he did the least amount for the garden.

Score Point: 2

a. Jennie weeded  $\frac{1}{2}$  of the yard

b. 

	J		T	2
			T	3
			C	4

 Chris weeded 1 of the small parts of the yard which =  $\frac{1}{4}$

c. Jennie gets 16¢ and Chris gets 8¢.

$$\begin{array}{r} 16¢ \\ + 8¢ \\ \hline 24¢ \end{array}$$

Score Point: 1

A.  $\frac{1}{2}$       B.  $\frac{3}{4}$       C.  $\frac{5}{8}$

Score Point: 1

a. Jennie weeded one whole part of the garden.

b. Chris weeded about  $\frac{1}{5}$  of the garden.

c. They should get six dollars each because if you multiply six and four you get twenty four dollars.

Score Point: 0

(A)  $\frac{1}{4}$

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

(C)  $\frac{\text{jennie}}{\$11}$     $\frac{\text{Tom}}{\$6}$     $\frac{\text{chris}}{\$2}$

Score Point: 0



Item 2 Schedules

Standard: MA-05-2.2.01: Systems of Measurement – Students will determine elapsed time.

Bloom’s Taxonomy: Application

Depth of Knowledge: Level 3

2. Jessica made this chart listing the activities she must do on Saturday morning and the amount of time each will take.

ACTIVITY	AMOUNT OF TIME
Practicing music	45 minutes
Cleaning bedroom	30 minutes
Snack break	15 minutes
Doing homework	45 minutes
Cleaning sink	10 minutes
Playing with sister	1 hour, 15 minutes

She will do these activities in the order listed above.

- Jessica wants to complete all her activities at noon. What is the latest time she could start her activities and still finish them at noon? Show all the steps you used to find your answer.
- Use the chart in the box below to write a schedule for Jessica listing the ending time for each of her activities. The activities should all be finished at noon.

ACTIVITY	STARTING TIME	ENDING TIME
Practicing music		
Cleaning bedroom		
Snack break		
Doing homework		
Cleaning sink		
Playing with sister		12:00

Schedules

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Measurement concepts involved in solving a problem involving elapsed time and writing a schedule.
3	The student response demonstrates a good understanding of the Measurement concepts involved in solving a problem involving elapsed time and writing a schedule. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Measurement concepts involved in solving a problem involving elapsed time and writing a schedule. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Measurement concepts involved in solving a problem involving elapsed time and writing a schedule.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

Part a:  $45 + 30 + 15 + 45 + 10 = 145$  minutes, which is 2 hours, 25 minutes.

1 hour, 15 minutes + 2 hours, 25 minutes is 3 hours 40 minutes. So she has to start 3 hours and 40 minutes before 12:00. 9:00 is 3 hours before 12:00, and 40 minutes before 9:00 is 8:20. She needs to start by 8:20.

ACTIVITY	STARTING TIME	ENDING TIME
Practicing music	8:20	9:05
Cleaning bedroom	9:05	9:35
Snack break	9:35	9:50
Doing homework	9:50	10:35
Cleaning sink	10:35	10:45
Playing with sister	10:45	12:00

*Sample Student Responses*

---

Schedules

The time that Jessica could start her activities is 8:20, 8:20-9:05-9:35-9:50-10:35-10:45-12:00  
 8:20-9:05-9:35-9:50-10:35

ACTIVITY	STARTING TIME	ENDING TIME
Practicing music	8:20	9:05
Cleaning bedroom	9:05	9:35
Snack break	9:35	9:50
Doing homework	9:50	10:35
Cleaning sink	10:35	10:45
Playing with sister	10:45	12:00

Score Point: 4

9:20

45  
30  
45  
45  
10  
~~60~~  
15  

---

220 min.

60  
60  
60  
40  

---

3h. 40min.

ACTIVITY	STARTING TIME	ENDING TIME
Practicing music	9:20	10:00
Cleaning bedroom	10:00	10:30
Snack break	10:30	10:45
Doing homework	10:45	11:30
Cleaning sink	11:30	11:40
Playing with sister	11:40	12:00

Score Point: 3

9:00

$$\begin{array}{r}
 2 \\
 45 \\
 30 \\
 15 \\
 45 \\
 10 \\
 + 75 \\
 \hline
 220
 \end{array}$$

$$\begin{array}{r}
 60 \overline{) 1201} \\
 \underline{- 80} \\
 40
 \end{array}$$
  

$$\begin{array}{r}
 4 \\
 9 \overline{) 210} \\
 \underline{- 360} \\
 100 \\
 \underline{- 900} \\
 100
 \end{array}$$

ACTIVITY	STARTING TIME	ENDING TIME
Practicing music	8:40	9:10
Cleaning bedroom	9:10	9:40
Snack break	9:40	10:00
Doing homework	10:00	10:45
Cleaning sink	10:45	11:00
Playing with sister	11:00	12:00

Score Point: 2

The latest time would be about 6:00. I used my fingers and counted from 6:00 to 12:00. I thought that it would be good to have her do stuff for six hours.

ACTIVITY	STARTING TIME	ENDING TIME
Practicing music	7:25	8:05
Cleaning bedroom	8:05	8:35
Snack break	8:35	9:50
Doing homework	9:50	10:35
Cleaning sink	10:35	11:00
Playing with sister	10:45	12:00

Score Point: 2

$12:00 - 45 \text{ min} = 11:15$   
 $11:15 - 30 \text{ min} = 10:45$   
 $10:45 - 15 \text{ min} = 10:30$   
 $10:30 - 45 \text{ min} = 9:45$   
 $9:45 - 10 \text{ min} = 9:35$

$9:35 + 1 \text{ hour } 15 \text{ min} = 8:20$   
 The latest she can start is 8:20.

ACTIVITY	STARTING TIME	ENDING TIME
Practicing music	8:20	9:00
Cleaning bedroom	9:00	9:35
Snack break	9:35	9:55
Doing homework	9:55	10:35
Cleaning sink	10:35	11:00
Playing with sister	11:00	12:00

Score Point: 2

She would have to start at 5:00 and end 12:00.

ACTIVITY	STARTING TIME	ENDING TIME
Practicing music	4:00	5:00
Cleaning bedroom	5:00	6:30
Snack break	6:30	7:00
Doing homework	7:00	8:59
Cleaning sink	9:00	10:59
Playing with sister	11:00	12:00

Score Point: 1

8:00 Clean bedroom, 8:30 Doing homework, 9:00 cleaning  
 Sink, 9:30 Playing with her sister, 11:00  
 10:30 Snack break, 1  
 Practicing music

ACTIVITY	STARTING TIME	ENDING TIME
Practicing music	10:30	11:00
Cleaning bedroom	8:00	8:30
Snack break	10:00	10:30
Doing homework	8:30	9:00
Cleaning sink	9:00	9:30
Playing with sister	9:30	12:00

Score Point: 1

practicing music, cleaning bedroom,  
 snack break, Doing homework, cleaning sink,  
 playing with sister,

ACTIVITY	STARTING TIME	ENDING TIME
Practicing music	45 minutes	2:20
Cleaning bedroom	30 minutes	1:40
Snack break	15 minutes	1:10
Doing homework	45 minutes	12:55
Cleaning sink	10 minutes	12:10
Playing with sister	1 hour, 15 min	12:00

Score Point: 0



### Item 3 Buying Books

Standard: MA-05-2.1.04: Measuring Physical Attributes – Students will measure volume of rectangular prisms, liquid capacity, and money using standard units and apply these skills to solve real-world and mathematical problems.

Bloom’s Taxonomy: Application

Depth of Knowledge: Level 2

3. Luis got the money shown below for his birthday. He plans to spend the money at the bookstore.



- How much money does Luis have to spend?
- Luis found two books he might want to buy. One costs \$2.45 and the other costs \$4.29. Use numbers to show whether Luis has enough money to buy both books.
- Luis decides to buy a book that costs \$4.55. He gives the clerk \$5.00. List TWO different combinations of coins the clerk can give Luis as change.

Buying Books

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Measurement concepts involved in solving problems involving money: bills and coins.
3	The student response demonstrates a good understanding of the Measurement concepts involved in solving problems involving money: bills and coins. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Measurement concepts involved in solving problems involving money: bills and coins. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Measurement concepts involved in solving problems involving money: bills and coins.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

Part a: \$6.30

Part b:  $\$2.45 + \$4.29 = \$6.74$  He doesn't have enough money.

OR

$\$2 + \$4$  is  $\$6$ .  $45\text{¢} + 29\text{¢}$  is more than  $30\text{¢}$ , so he doesn't have enough money.

Part c: • one quarter and two dimes

• one nickel and 4 dimes

*Sample Student Responses*

---

**Buying Books**

A.

He has \$6.30 to spend.

$$\begin{array}{r}
 \text{TT} \\
 \$ 2.45 \\
 + \$ 4.29 \\
 \hline
 \$ 6.74
 \end{array}$$

NO he does not. He needs 44¢ more.

c. 1 quarter and 2 dimes or 4 dimes and 1 nickel.

Score Point: 4

(A) \$6.30     \$5.00  
                        75  
                            40  
                            15  
                            —  
                            \$6.30

\$2.45  
 +9.29  
 ———  
 \$6.74

(3) No, because I add them together.  
 C. Quarter 2 dimes

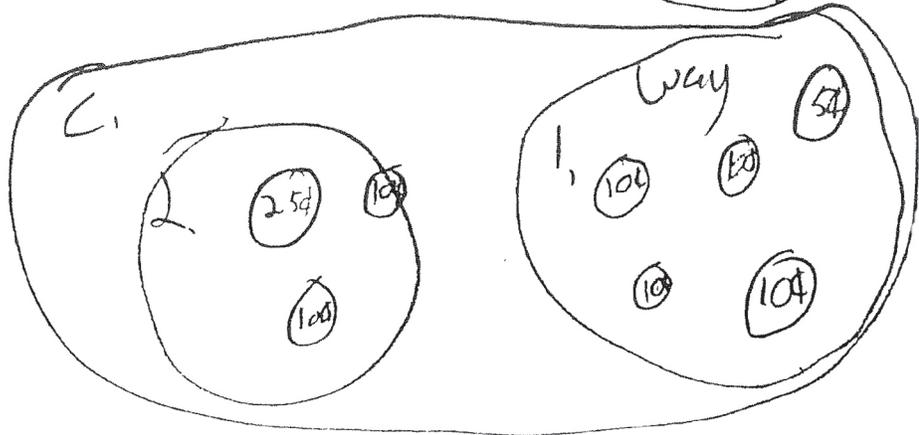
Score Point: 3

A 5,20a

B. 
$$\begin{array}{r} 4.29 \\ + 2.45 \\ \hline 6.74 \end{array}$$
 no

$$\begin{array}{r} 4910 \\ 8.00 \\ - 4.55 \\ \hline 455 \end{array}$$

(455)



Score Point: 3

A) \$6.30

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

C) 2 quarters and  
a nickel, 5 dimes  
and 5 pennies.

$$\begin{array}{r} \$2.45 \\ + 4.29 \\ \hline \$6.74 \end{array}$$

720

Score Point: 3

Luis has \$6.30 to spend.  
He doesn't have a enough

4 dimes and 1 nickel

1 quarter two dimes

Score Point: 2

$$\begin{array}{r}
 3 \\
 5.00 \\
 25 \\
 25 \\
 25 \\
 -55 \\
 55 \\
 + 10 \\
 10 \\
 10 \\
 10 \\
 \hline
 13.00
 \end{array}$$

a.

$$\begin{array}{r}
 1291 \\
 13.00 \\
 2.45 \\
 -4.29 \\
 \hline
 5.36
 \end{array}$$

yes he does

$$\begin{array}{r}
 491 \\
 8.00 \\
 -4.55 \\
 \hline
 0.45
 \end{array}$$

he could get 4 dimes and 1 nickel

or 1 quarter and 2 dimes

Score Point: 2

Ⓐ 6 dollars and 30¢

Ⓑ no she doesn't

Ⓒ on nickel and five cents

Score Point: 1

Luis has \$6.20. Luis does not have enough money he has 6.20. The books cost \$6.74. He get's back a dollar and twenty cents back.

Score Point: 1



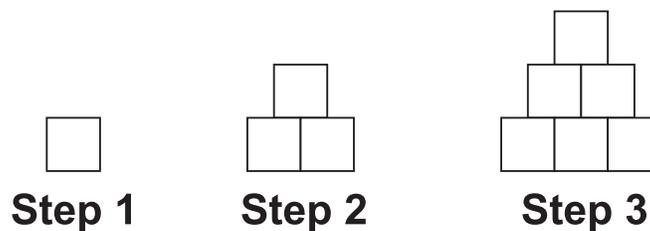
Item 4 Pattern Made of Squares

Standard: MA-05-5.1.01: Patterns, Relations, and Functions – Students will extend patterns, find the missing term(s) in a pattern, or describe rules for patterns (e.g., numbers, pictures, tables, words) from real-world and mathematical problems.

Bloom’s Taxonomy: Comprehension

Depth of Knowledge: Level 3

4. Carol is making a pattern using small squares. The first three steps in her pattern are shown below.



- a. Draw a picture of Step 4 in the pattern.
- b. Complete the chart in the box below.

Step	1	2	3	4	5	6
<b>Number of squares used</b>	1	3	6			

- c. How many squares are needed for Step 10? Show or explain how you found your answer.

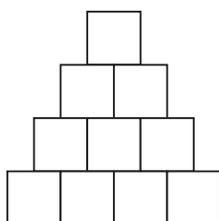
Pattern Made of Squares

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in extending a geometric pattern using pictures and numbers.
3	The student response demonstrates a good understanding of the concepts involved in extending a geometric pattern using pictures and numbers. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in extending a geometric pattern using pictures and numbers. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in extending a geometric pattern using pictures and numbers.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

Part a:



Part b:

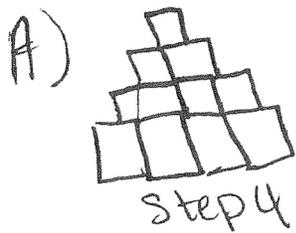
Step	1	2	3	4	5	6
Number of squares used	1	3	6	10	15	21

Part c: 55. I started with 21. Then I added  $21 + 7 + 8 + 9 + 10 = 55$ .

*Sample Student Responses*

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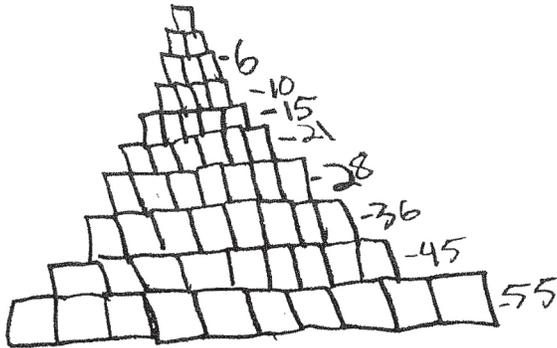
Pattern Made of Squares



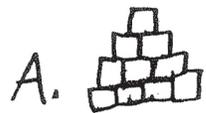
B)

Step	1	2	3	4	5	6
# of squares used	1	3	6	10	15	21

C) 55

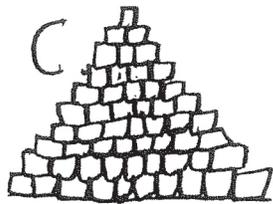


Score Point: 4



B.

step	1	2	3	4	5	6
number of squares used	1	3	6	10	15	21



Score Point: 3



B

	1	2	3	4	5	6
	1	3	6	10	15	21

a pattern +2 +3 ect

28 36 45 55 (60)

Score Point: 3

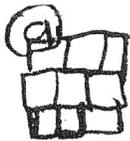
4	5	6	7	8
10	15	21	27	35

35 patterns for carol

Score Point: 2



Score Point: 1



b.

steps	1	2	3	4	5	6
	1	3	6	9	12	15

I

c.

7	8	9	10
18	21	24	27

I just added 3 to each number until I got to ten.

Score Point: 0



2007

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# Green River

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GRADE 6  
MATHEMATICS



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**Note:** Each item is aligned to a standard, but does not necessarily measure the entire standard.

## Item 1 Ron's Birds

Standard: MA-06-2.2.01: Systems of Measurement – Students will convert units within the same measurement system and use these units to solve real-world problems.

Bloom's Taxonomy: Application

Depth of Knowledge: Level 2

1. Ron's class is studying birds. He has been looking up information about hummingbirds, chickens, and ostriches. He found that the hummingbird, which is about two inches tall, is one of the world's smallest birds. The ostrich, which is about eight feet tall, is the world's largest bird.
  - a. About how many hummingbirds would it take to be as tall as an ostrich? Show how you found your answer.

Ron also read that an ostrich egg is eight inches long and 30 times heavier than a chicken egg.
  - b. If a chicken egg weighs an eighth of a pound, what is the weight of an ostrich egg? Show how you found your answer. (NOTE: 1 pound = 16 ounces)

## Ron's Birds

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in solving problems involving customary units.
3	The student response demonstrates a good understanding of the concepts involved in solving problems involving customary units. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in solving problems involving customary units. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student response merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in solving problems involving customary units.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Sample Response:

Part a:  $8 \text{ feet} = 8 \times 12 = 96 \text{ inches}$   
 $96 \div 2 = 48 \text{ hummingbirds}$

Part b:  $16 \div 8 = 2$ . Each chicken egg weighs 2 ounces.  
 $2 \times 30 = 60$ . Each ostrich egg weighs 60 ounces.

*Sample Student Responses*

---

**Ron's Birds**

A. ostrich = 96 inches ( $8ft \times 12 = 96$ ) hummingbird = 2 inches

$$2 \overline{) 96} \begin{array}{r} 48 \\ \hline \end{array}$$

Answer: you can fit 48 hummingbirds end to end to match the height of an ostrich.

B Chicken egg =  $\frac{1}{8}$  of lb = 2oz      ostrich  $30 \times 2oz = 60oz.$

$$16 \overline{) 60} \begin{array}{r} 3.75 \\ \hline 48 \\ \hline 120 \\ \hline 112 \\ \hline 80 \end{array}$$

ostrich egg =  $3\frac{3}{4}$  lbs,  
3.75 lbs

$$16oz = 1lb.$$

Score Point: 4

A. 48 humming birds.

B. 60oz. Ostrich egg.

$$2 = \frac{1}{8}$$
$$16 = \frac{1}{12}$$

$$\begin{array}{r} 2 \\ \times 30 - \text{How heavy?} \\ \hline 60 \text{ oz.} \end{array}$$

Score Point: 3

A. 48, because  $2 \times 6 = 12 \times 8 = 96$   $6 \times 8 = 48$

B 3 lbs 12 ozs because  $16 \times \frac{1}{8} = 2 \times 30 = 60 \div 16 = 3 \frac{12}{16}$

Score Point: 3

a.  $\frac{12 \text{ inches (1ft.)}}{2 \text{ inches}}$   
 $\frac{6}{6}$

6 humming birds in 1 ft.  
 x 8 ft height of ostriches  
48 humming birds go to  
 one ostrich.

b. ~~30~~ times heavier than chicken egg  
 x 16 eggs in one pound

$$\begin{array}{r} 180 \\ + 300 \\ \hline \end{array}$$

480 is the weight of an ostrich egg.

Score Point: 2

①	$12'' = 1 \text{ foot}$
②	$\begin{array}{r} 8' \\ \times 12 \\ \hline 96' \end{array}$ ostrich
③	$\begin{array}{r} 48 \\ 2 \overline{)96} \\ \underline{48} \\ 16 \end{array}$
④	48 humming birds to equal a ostrich

Score Point: 2

a) about 46, It's just a guess, I don't know what to do.

B)  $2\frac{1}{2}$  pounds, also a guess.

Score Point: 1



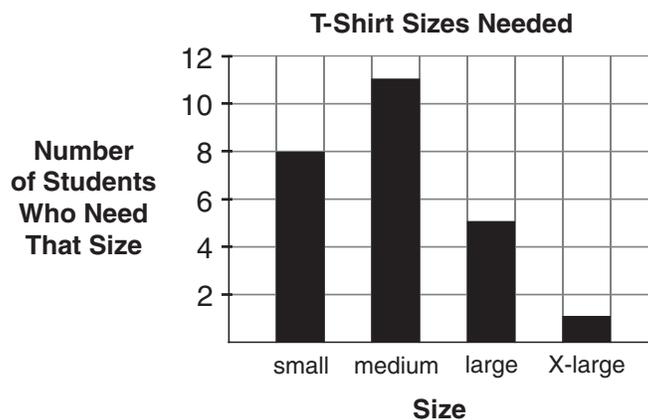
Item 2 T-Shirt Sizes

Standard: MA-06-1.3.01: Number Operations – Students will add, subtract, multiply, and divide whole numbers, fractions, and decimals to solve real-world problems and apply order of operations to simplify numerical expressions.

Bloom’s Taxonomy: Analysis

Depth of Knowledge: Level 2

2. Students in Ms. Gwin’s class want to order school T-shirts. The number of each size they need is shown on the graph below.



The prices of the T-shirts are shown below.

- \$6.00 for a package of 4, all the same size
- \$2.50 for each individual shirt

Copy the order form below into your Student Response Booklet.

Order Form

Size	Small	Medium	Large	X-Large
Number of packages of 4 shirts each (\$6 per package)				
Number of individual shirts (\$2.50 per shirt)				

- a. Complete the order form in your Student Response Booklet so that
- the order includes **at least** all the shirts that are needed and
  - the price of the entire order is the **lowest possible price**.

Show all your work. Explain how you know that the price of the order is the lowest possible price.



- b. What is the price of the entire order? Show or explain how you found your answer.

T-Shirt Sizes

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Number Properties and Operations concepts involved in solving real-world problems that require addition and multiplication of whole numbers and decimals.
3	The student response demonstrates a good understanding of the Number Properties and Operations concepts involved in solving real-world problems that require addition and multiplication of whole numbers and decimals. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Number Properties and Operations concepts involved in solving real-world problems that require addition and multiplication of whole numbers and decimals. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Number Properties and Operations concepts involved in solving real-world problems that require addition and multiplication of whole numbers and decimals.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

Order Form

Size	Small	Medium	Large	X-Large
Number of packages of 4 shirts each (\$6 per package)	2	3	1	
Number of individual shirts (\$2.50 per shirt)			1	1
Total Price	\$12	\$18	\$8.50	\$2.50

Since packages are cheaper than 3 or 4 individual shirts, I used packages when the package was cheaper than the number of individual shirts I needed. Total Price: \$41.00

*Sample Student Responses*

---

**T-Shirt Sizes**

Size	Small	medium	large	X-large
Number of packages of 4 shirts each. (\$6 per pack)	2	3	2	1
Number of individual shirts (\$2.50 per shirt)	8	11	5	1

= 8 packages at \$48  
- or -  
= 25 shirts at \$62.50

- or -

	SM	MED	LG	X-LG
packages of 4 shirts at \$6 a pack	2	3	1	
individual shirts at \$2.50 a shirt			1	1

= \$36 for 8 packs  
→ \$5 for 2 shirts

Total price of shirts = **\$41**

**B** This is the lowest price possible because I didn't spend \$6 more dollars for a package when all I needed was one shirt. Two packs of smalls is all I needed because there were 8 shirts even. Three packs of medium is cheaper than two packs and three individual. One package of large and one individual was cheaper than two packs of large. Only one person wanted x-large so I ordered a single.

Score Point: 4

Size	small	medium/large	x-large	
Number of packages of 4 shirts each (\$6 per package)	2	3	1	0
Number of individual shirts (\$2.50 per shirt)	0	0	1	1

small = 8 shirts  
 2 packages = \$12 dollars  
 8 shirts separate = \$20

medium = 11 shirts  
 3 packages = \$18  
 1 extra  
 2 packages = \$12  
 3 separate = \$7.50  $\frac{12}{12}$   
 \$19.50

Large = 5 shirts  
 2 packages = \$12  
 1 package w/ 1 individual = \$8.50

x-Large = 1 shirt  
 1 individual = \$2.50  
 1 package = \$6.00

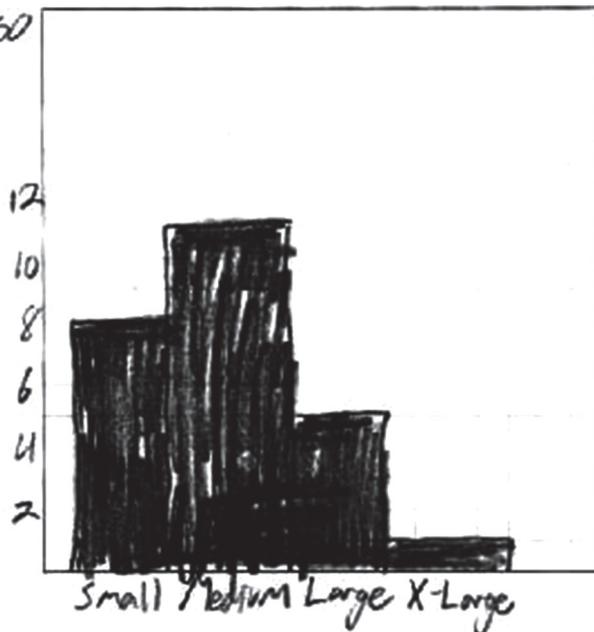
Score Point: 3

size	Small	Medium	Large	X-L
Number of packages of 4 shirts (\$6 per package)	2	2	1	0
Number of individual shirts (\$2.50 per shirt)	0	3	1	1

$5 \cdot 6 = 30$       $3 \cdot 2.5 = 7.50$   
 $5 \cdot 2.5 = 12.50$   
 $30.00$   
 $12.50$   
 $\hline 42.50$

Total = \$42.50

Small -  $4 \cdot 8 = 32$   
 Medium -  $4 \cdot 11 = 44$   
 Large -  $4 \cdot 5 = 20$   
 X-Large -  $4 \cdot 3 = 12$



Score Point: 2

$$8 + 11 + 5 + 1 = 25$$

$$\$2.50 \times 25 = \$62.5$$

$$4 \overline{) 62.5}$$

$$6.25 \times 6 = \boxed{\$37.5}$$

The package of 4  
because it is \$25  
cheaper.

$$62.5 - 37.5 = 25$$

Score Point: 1

Item 3 Field Trip

**Standard:** MA-06-1.3.01: Number Operations – Students will add, subtract, multiply, and divide whole numbers, fractions, and decimals to solve real-world problems and apply order of operations to simplify numerical expressions.

**Bloom’s Taxonomy:** a. Knowledge  
b. Analysis

**Depth of Knowledge:** Level 2

3. A total of 132 sixth-grade students are going on a field trip. They may go by vans only, by buses only, or by vans and buses. The chart below gives information about the two types of vehicles.

Type of Vehicle	Number of Students Vehicle Can Hold	Cost per Day
Van	9	\$65
Bus	48	\$300

- List **all** the different combinations of vehicles that can be used to take the 132 students on the field trip. Show your work. (You do not need to count drivers and chaperones.)
- What is the **least** amount of money that it will cost to use the vehicles to take the students on the field trip? Show or explain how you found your answer.

Field Trip

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Number Properties and Operations concepts involved in solving and justifying real-world problems that require multiplication and addition of whole numbers.
3	The student response demonstrates a good understanding of the Number Properties and Operations concepts involved in solving and justifying real-world problems that require multiplication and addition of whole numbers. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Number Properties and Operations concepts involved in solving and justifying real-world problems that require multiplication and addition of whole numbers. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Number Properties and Operations concepts involved in solving and justifying real-world problems that require multiplication and addition of whole numbers.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

# Buses	# Vans	# Passengers	Cost
3	0	$144 + 0 = 144$	$900 + 0 = \$900$
2	4	$96 + 36 = 132$	$600 + 260 = \$950$
1	10	$48 + 90 = 138$	$300 + 650 = \$950$
0	15	$0 + 135 = 135$	$0 + 975 = \$975$

Part a: 3 buses – 0 vans, 2 buses – 4 vans, 1 bus – 10 vans, 0 buses – 15 vans

Part b: 3 buses with 0 vans cost \$900.  
 2 buses with 4 vans cost \$860.  
 1 bus with 10 vans cost \$950.  
 0 buses with 15 vans cost \$975.

*Sample Student Responses*

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**Field Trip**

a.

bus	vans
3	0
2	4
1	10
0	15

$$\begin{array}{r} 2 \\ 132 \\ \underline{48} \\ 84 \end{array}$$

$$\begin{array}{r} 2 \\ 96 \\ \underline{48} \\ 48 \end{array}$$

$$\begin{array}{r} 21 \\ 132 \\ \underline{96} \\ 36 \end{array}$$

$$\begin{array}{r} 9 \\ 184 \\ \underline{81} \\ 103 \end{array}$$

$$\begin{array}{r} 15 \\ 132 \\ \underline{96} \\ 36 \end{array}$$

$$\begin{array}{r} 4 \\ 15 \\ \underline{12} \\ 3 \end{array}$$

$$\begin{array}{r} 65 \\ 132 \\ \underline{65} \\ 67 \end{array}$$

b.

bus	vans	\$
3	0	900
2	4	860
1	10	950
0	15	975

$$\begin{array}{r} 265 \\ \underline{4} \\ 260 \end{array}$$

$$\begin{array}{r} 265 \\ \underline{15} \\ 325 \end{array}$$

975

the best way is 2 buses 4 vans = ~~860~~

Score Point: 4

$$\begin{array}{r} 14 \text{ r. } 6 \\ 9 \overline{) 132} \\ \underline{-9} \\ 34 \\ \underline{-36} \\ 6 \end{array}$$

- 15 vans with 3 seats extra  
- 3 buses with 12 seats extra

$$\begin{array}{r} 48 \overline{) 132} \\ \underline{-96} \\ 36 \end{array}$$

- 2 buses with 4 vans to have exactly 132 students fit in 6 vehicles.

$$\begin{array}{r} 2 \\ 48 \\ + 3 \\ \hline 144 \\ - 132 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 48 \\ + 48 \\ \hline 96 \\ + 96 \\ \hline 192 \\ - 132 \\ \hline 60 \end{array}$$

b) By using 2 buses and 4 vans you can fit 132 students in 6 vehicles and pay less. By using only 2 buses and 4 vans you have to pay

$$\begin{array}{r} 25 \\ 25 \\ 25 \\ \hline 75 \\ 300 \\ 300 \\ \hline 600 \\ + 260 \\ \hline 860 \end{array}$$

\$860.00 dollars, but if you use 3 buses to try fit 132 students you'll waste 900 dollars, and by using vans you'll waste more

Score Point: 3

$$\begin{array}{r}
 a - 10 \text{ vans} = 90 \text{ students} \\
 1 \text{ bus} = 48 \text{ students} \\
 \hline
 2 \text{ BUSES} = 96 \text{ students} \\
 4 \text{ vans} = 36 \text{ students} \\
 \hline
 \end{array}
 = 132$$

$$\begin{array}{r}
 b - 2 \text{ buses} = \$600 \\
 4 \text{ vans} = \frac{\$260}{\$860}
 \end{array}$$

the least they will spend is  $\$860$  because that holds exactly 132 students.

Score Point: 2

A: 48 96 105 114 123 132  
 bus, bus, van, van, van, van

A = 2 buses + 4 vans

B: 
$$\begin{array}{r} 300 \\ + 300 \\ \hline 600 \end{array}$$

$$\begin{array}{r} 65 \\ + 65 \\ \hline 130 \end{array}$$

$$\begin{array}{r} 600 \\ + 260 \\ \hline 860 \end{array}$$

B = 860 dollars because

$$\begin{array}{r} 600 \\ + 260 \\ \hline 860 \end{array} \$$$

Score Point: 1



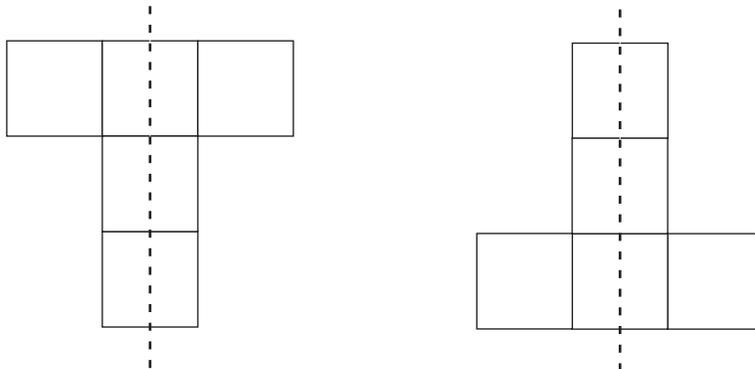
### Item 4 Symmetry

**Standard:** MA-06-3.2.01: Transformations of Shapes – Students will describe, provide examples of, and apply line symmetry to real-world and mathematical problems.

**Bloom's Taxonomy:** Application

**Depth of Knowledge:** Level 3

Use the picture below to answer question 4.

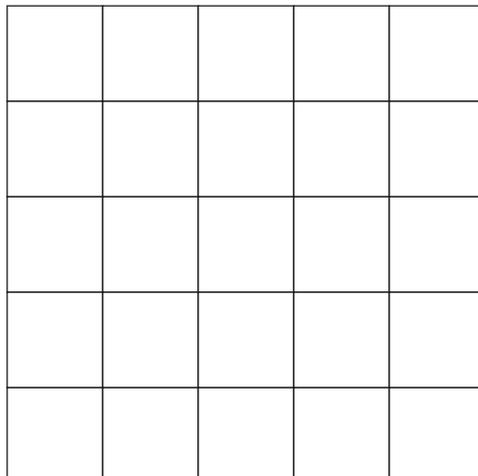


(Note: These are the same shape.)

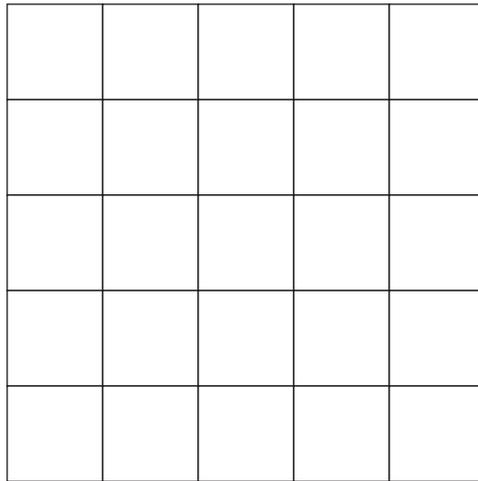
4. The five squares shown above are arranged so that the figure has only one line of symmetry. Use the following rule to answer parts a through d.

**Rule: Each square must share at least one complete side with another square.**

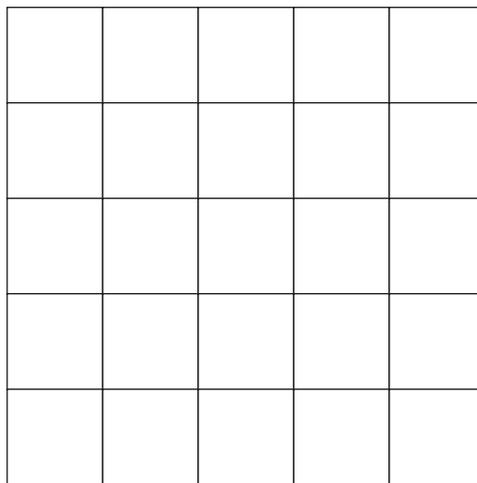
- a. In your Student Response Booklet, draw an arrangement of five squares that is different than the shape shown above and has only **one line of symmetry**. Include the line of symmetry in your drawing.



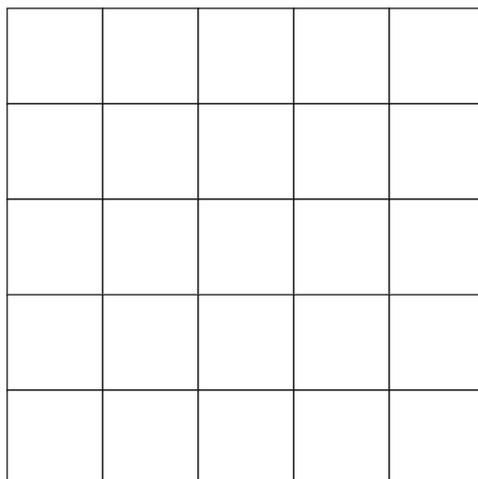
- b. Draw an arrangement of five squares that has only **two lines of symmetry**. Include the lines of symmetry in your drawing.



- c. Draw an arrangement of five squares that has only **four lines of symmetry**. Include the lines of symmetry in your drawing.



- d. Draw an arrangement of five squares that has **no lines of symmetry**.



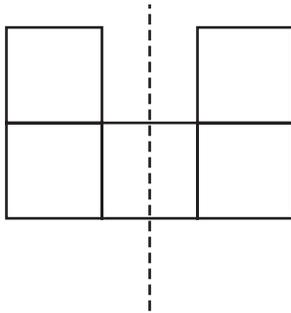
## Symmetry

## Scoring Guide

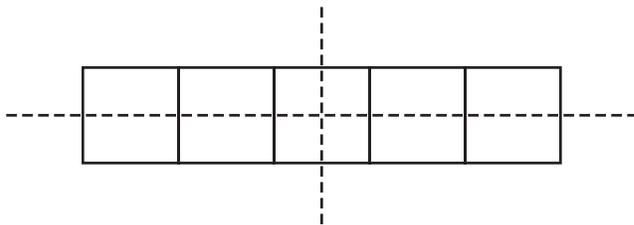
Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in providing examples of symmetric figures made up of five congruent squares with different numbers of lines of symmetry.
3	The student response demonstrates a good understanding of the concepts involved in providing examples of symmetric figures made up of five congruent squares with different numbers of lines of symmetry. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in providing examples of symmetric figures made up of five congruent squares with different numbers of lines of symmetry. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in providing examples of symmetric figures made up of five congruent squares with different numbers of lines of symmetry.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

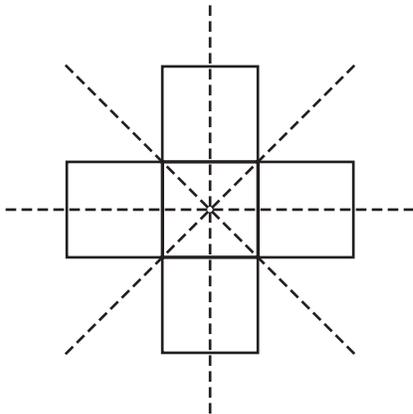
Part a:



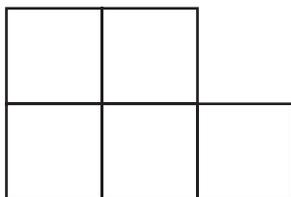
Part b:



Part c:



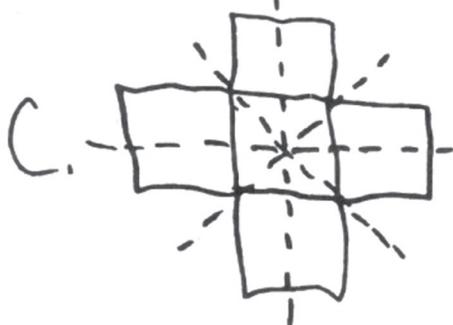
Part d:



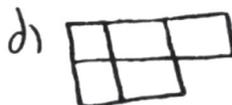
*Sample Student Responses*

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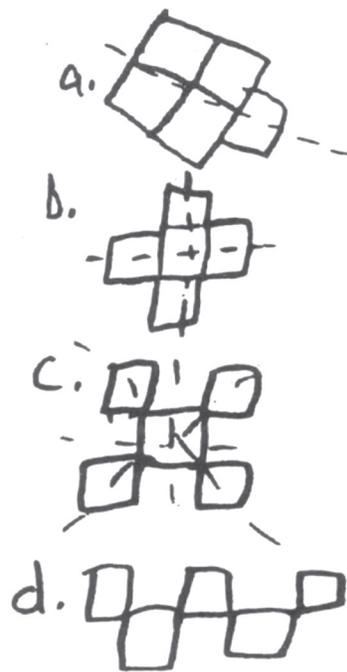
**Symmetry**



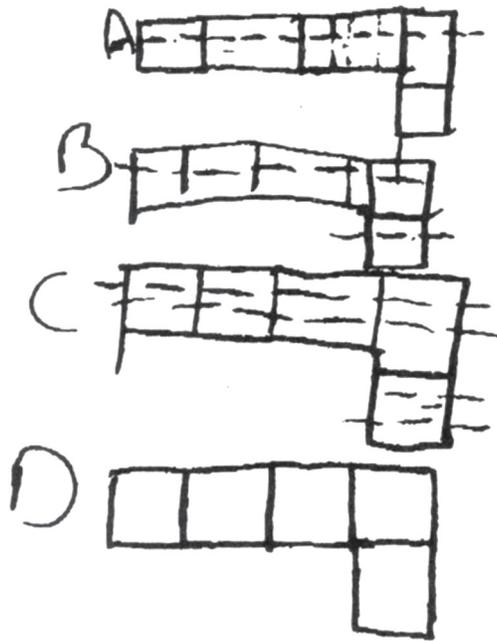
Score Point: 4



Score Point: 3



Score Point: 2



Score Point: 1



2007

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GRADE 7  
MATHEMATICS



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**NOTE:** Each item is aligned to a standard, but does not necessarily measure the entire standard.

## Item 1 Chris's Money

**Standard:** MA-07-1.1.03: Number Sense – Students will convert among whole numbers, fractions, decimals, percents, and pi, and will compare and order these numbers.

**Bloom's Taxonomy:** Comprehension

**Depth of Knowledge:** Level 2

1. Chris spent \$9 of the \$12 his grandmother gave him.
  - a. Julie said that Chris spent exactly  $\frac{2}{3}$  of his money. Explain why Julie is correct or incorrect.
  - b. Jessie said that Chris spent exactly 0.75 of his money. Explain why Jessie is correct or incorrect.
  - c. Mary said that Chris spent exactly 80% of his money. Explain why Mary is correct or incorrect.

## Chris's Money

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in converting among whole numbers, fractions, decimals, and percents to compare numbers.
3	The student response demonstrates a good understanding of the concepts involved in converting among whole numbers, fractions, decimals, and percents to compare numbers. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in converting among whole numbers, fractions, decimals, and percents to compare numbers. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in converting among whole numbers, fractions, decimals, and percents to compare numbers.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Sample Response:

Part a:  $\frac{2}{3} \times 12 = 8$ , so Julie is incorrect.

Part b:  $0.75 \times 12 = 9$ , so Jessie is correct.

Part c:  $12 \times 80\% = 12 \times .8 = 9.6$ , so Mary is incorrect.

*Sample Student Responses*

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**Chris's Money**

a. Julie is incorrect because he spent \$9 out of the \$12 which is  $\frac{3}{4}$  of the money his grandmother gave him.

b. Jessie is correct because if you divide 3 by 4, your answer is 0.75.

c. Mary is incorrect because 0.75 would be 75%.

Score Point: 4

- Ⓐ JULIE SAID THAT CHRIS SPENT EXACTLY  $\frac{2}{3}$  OF HIS MONEY.  
\* JULIE IS INCORRECT BECAUSE  $\frac{2}{3}$  OF HIS MONEY IS \$8.
- Ⓑ JESSIE SAID THAT CHRIS SPENT EXACTLY 0.75 OF HIS MONEY. JESSIE IS CORRECT BECAUSE  $\frac{9}{12}$  IS 0.75 OF HIS MONEY.
- Ⓒ MARY SAID THAT CHRIS SPENT EXACTLY 80% OF HIS MONEY. MARY IS INCORRECT BECAUSE  $\frac{9}{12}$  IS NOT EQUAL TO 80%.

Score Point: 3

The answer is (b) because if you put 9 over 12 ( $\frac{9}{12}$ ) and divide both the numerator and denominator by 3 ( $\frac{9 \div 3}{12 \div 3}$ ) you get 3 over 4 which is equal to 0.75 — because 3 divided by 4 is 0.75.

Score Point: 2

a. Julie was right because  $\frac{2}{3}$  of 12  
is 8

b. Jessie was wrong

c. Mary was wrong

Score Point: 1



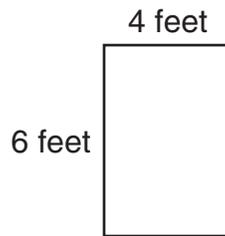
Item 2 Kevin's Garden

Standard: MA-07-2.1.01: Measuring Physical Attributes – Students will measure lengths (to the nearest eighth of an inch or the nearest centimeter) and will determine and use in real-world and mathematical problems: area and perimeter of triangles; area and perimeter of quadrilaterals (rectangles, squares, trapezoids) (using the Pythagorean theorem will not be required as a strategy); area and circumference of circles; and area and perimeter of compound figures composed of triangles, quadrilaterals, and circles.

Bloom's Taxonomy: a. Comprehension  
b. Application

Depth of Knowledge: Level 2

2. The measurements of Kevin's garden are shown below.



a. What is the area of Kevin's garden?

Next summer, Kevin wants a garden that has twice as much area as the one he has now.

b. Describe how Kevin can enlarge his garden so the area will double. Show or explain how you know you are right.

c. Jill thinks that Kevin can double the area of his garden by doubling both the length and the width. Use words, pictures, or numbers to show that Jill is either correct or incorrect.

BE SURE TO LABEL YOUR RESPONSES (a), (b), AND (c).

## Kevin's Garden

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in determining the area of a rectangle to solve real-world problems.
3	The student response demonstrates a good understanding of the concepts involved in determining the area of a rectangle to solve real-world problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in determining the area of a rectangle to solve real-world problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in determining the area of a rectangle to solve real-world problems.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Sample Response:

Part a: 24 square feet

Part b: He could double the width to 8 feet. The area would be  $6 \times 8 = 48$

Part c: Jill is wrong. If both the length and width are doubled, the area would be  $12 \times 8 = 96$  sq. ft.

96 is 4 times 24.

*Sample Student Responses*

---

**Kevin's Garden**

(a)  $4\text{ft} \times 6\text{ft} = 24\text{ft}^2$

(b) he wants the area to be  $48\text{ft}^2$  so  
you just take factors of 48

12 and 4

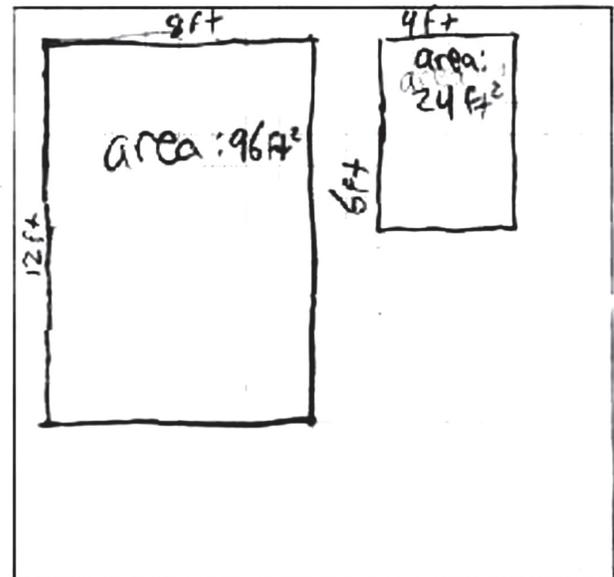
6 and 8

3 and 16

2 and 24

1 and 48

(c) Jill is not correct  
because if you look  
at the gardens →  
the area is 4 times  
larger



Score Point: 4

a.  $6 \times 4 = 24$       Area = 24 feet

b. Double the length or width  
This will create:  $\underline{12} \times 4 = 48$  or  $6 \times \underline{8} = 48$   
48 feet is double the garden's area

c. She is incorrect because  
double both the width  
and height will four  
too much area

ex:  $12 \times 8 = 96$

Score Point: 3

a) area = 24 ft

- next summer = 48 ft

b) add 2 ft to length and width

~~6~~  $6 + 2 = 8$      $8 \times 6 = 48 \text{ ft}$

$4 + 2 = 6$

c) incorrect

$4 \cdot 4 = 16$

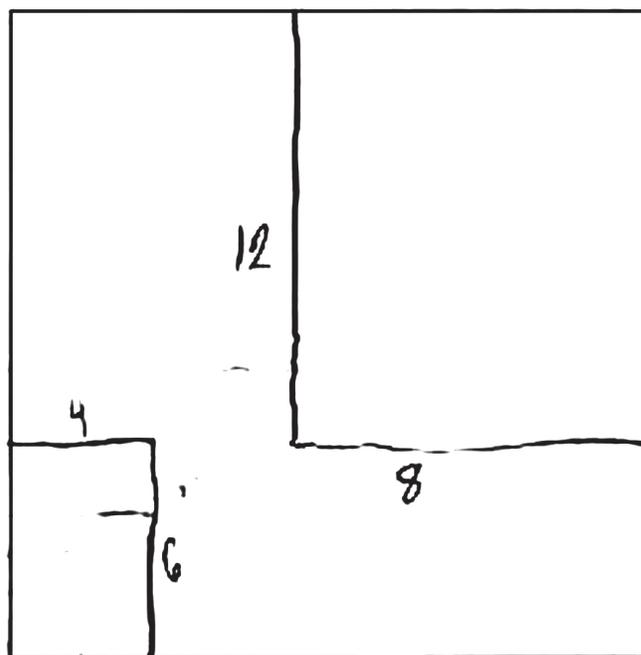
$6 \cdot 6 = 36$

Score Point: 2

a. 29 feet

b. All he has to do is add 6 to the 6 and  
4 to the 4,

c. She's correct



Score Point: 1



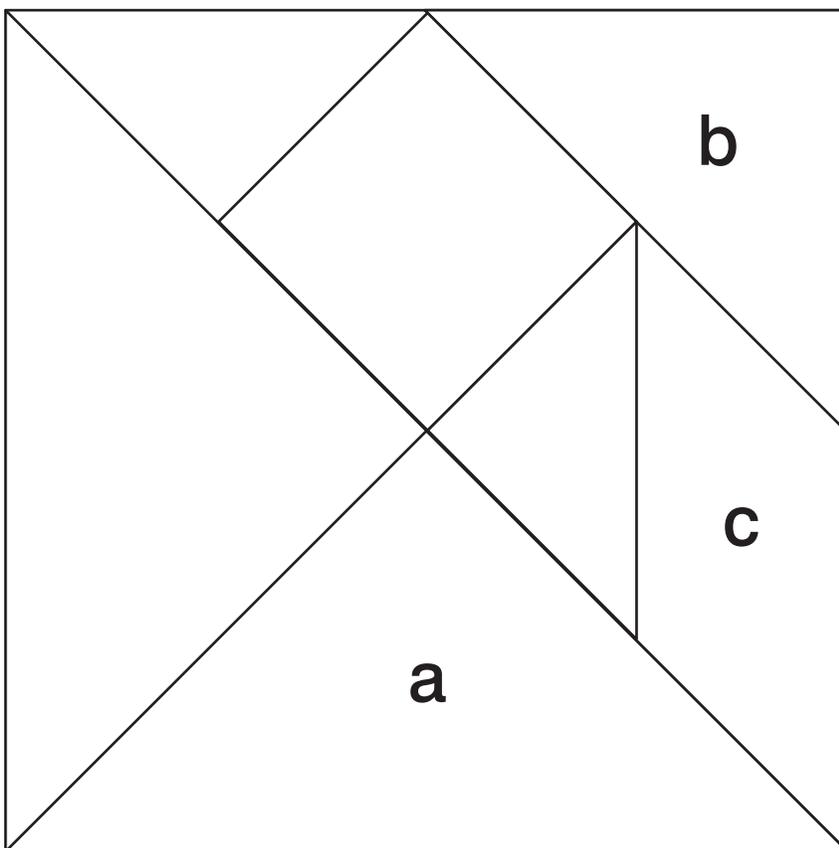
Item 3 Maple Avenue Math Club

**Standard:** MA-07-1.3.01: Number Operations – Students will add, subtract, multiply, and divide whole numbers, fractions, and decimals to solve real-world problems and apply order of operations (including positive whole number exponents) to simplify numerical expressions.

**Bloom’s Taxonomy:** Application

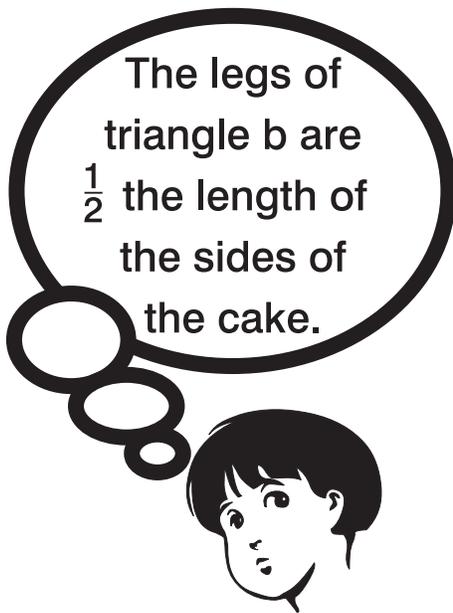
**Depth of Knowledge:** Level 2

Use the picture below and the tangram from your white envelope to answer question 3.



3. The Maple Avenue School mathematics club is having a bake sale to raise \$48. A huge cake was baked and cut like a tangram. Each piece is priced based on its size. The sum of the cost of all of the pieces is \$48.

- a. What is the price of triangle a? Show your work or explain how you found your answer.
- b. What is the price of triangle b? Show your work or explain how you found your answer.
- c. What is the price of parallelogram c? Show your work or explain how you found your answer.



## Maple Avenue Math Club

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in multiplying whole numbers and fractions to solve real-world and mathematical problems.
3	The student response demonstrates a good understanding of the concepts involved in multiplying whole numbers and fractions to solve real-world and mathematical problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in multiplying whole numbers and fractions to solve real-world and mathematical problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student response merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in multiplying whole numbers and fractions to solve real-world and mathematical problems.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Sample Response:

Part a: Triangle a is  $\frac{1}{4}$  of the square.  $\frac{1}{4} \times 48 = 12$ . \$12

Part b: Triangle b is  $\frac{1}{8}$  of the square because  $\frac{1}{2}bh = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$ .  $\frac{1}{8} \times 48 = 6$ . \$6

Part c: Parallelogram c can be made from two of the smallest triangles. The smallest triangles are half of triangle b, so parallelogram c has the same area as triangle b. \$6

*Sample Student Responses*

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**Maple Avenue Math Club**

A. \$12 A is  $\frac{1}{4}$  of the whole square,  $\frac{1}{4}$  of \$48 = \$12

B. \$6 B is  $\frac{1}{8}$  of square,  $\frac{1}{8}$  of \$48 = \$6

C. \$6 C is  $\frac{1}{8}$  of square,  $\frac{1}{8}$  of \$48 = \$6

total = \$24

total left = \$24

Score Point: 4

a. \$2.00 for triangle A. Triangle 8 is the length of one side. There are 4 sides so divide 48 by 4 = 12,

b. \$6.00 for triangle B. The length of triangle b is half the length of the sides of the cake. Since the whole cake is \$48 and there are four sides, you divide 48 by 4 = 12, 12 is the length of one side, so you divide 12 by 2 = 6.

c. 7.50 for parallelogram c, The length of parallelogram is a little over half the length of one side. The side is 4 in. long. The side on the edge is 2 in. The side going in is 1 1/2 in long. If half of the side is \$6.00 than half (2" + 1 1/2") + a little over half is \$7.50

Score Point: 3

- Ta) Triangle a would be \$12.  
 Tb) Triangle b would be \$6.  
 Pc) Parallelogram c would be \$6.

$$\begin{array}{r}
 24 \quad 12 \\
 + 24 \quad +12 \\
 \hline
 48 \quad \cancel{36} \\
 \phantom{48} 12
 \end{array}$$

$$\begin{array}{r}
 6 \\
 +6 \\
 \hline
 12
 \end{array}$$

Score Point: 2

- a piece a would be \$11. I got that by saying half of 40 is 20 and half of that is 11.
- b piece b should be \$0.
- c piece c should be \$6.

Score Point: 2

3x1 $\frac{1}{2}$  they sell by the producer

a) = \$12

b) = \$3

c) \$3

24 + 8 =

Score Point: 1



### Item 4 Random Ball Selection

**Standard:** MA-07-4.4.02: Probability – Students will determine theoretical probabilities of simple events; determine probabilities based on the results of an experiment; and make inferences from probability data.

**Bloom's Taxonomy:** a. Application  
b. Knowledge  
c. Comprehension

**Depth of Knowledge:** Level 3

4. A box contains six balls of the same size, numbered 1 through 6. One ball will be selected at random from this box.
- What is the probability of selecting an even-numbered ball? Explain your reasoning.
  - What is the probability of selecting a ball with a number greater than 3? Explain your reasoning.
  - Suppose you add balls of the same size, numbered 7 through 20, to the box. How would the probabilities you found in parts a and b change? Justify your reasoning.

BE SURE TO LABEL YOUR RESPONSES (a), (b), AND (c).

## Random Ball Selection

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in finding the theoretical probability of an event.
3	The student response demonstrates a good understanding of the concepts involved in finding the theoretical probability of an event. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in finding the theoretical probability of an event. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student response merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in finding the theoretical probability of an event.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Sample Response:

Part a:  $\frac{\text{number of even balls}}{\text{number of all balls}} = \frac{3}{6} = \frac{1}{2}$

Part b:  $\frac{\text{number of balls greater than 3}}{\text{number of all balls}} = \frac{3}{6} = \frac{1}{2}$

Part c:  $\frac{\text{number of even balls}}{\text{number of all balls}} = \frac{10}{20} = \frac{1}{2}$

The probability of getting an even-numbered ball is the same because half of the numbers added are even.

$$\frac{\text{number of balls greater than 3}}{\text{number of all balls}} = \frac{17}{20}$$

The probability of getting a ball with a number greater than 3 would increase if you add more numbers greater than 3.

*Sample Student Responses*

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**Random Ball Selection**

Ⓐ  $\frac{1}{2}$  of the six balls in the box, 3 of them are even numbered (2, 4, 6) and 3 of them are odd numbered (1, 3, 5)  $\frac{3 \text{ even}}{6 \text{ total}} = \frac{1}{2}$  (or 1:2)

Ⓑ  $\frac{1}{2}$  of the 6 balls in the box, 3 of them are greater than 3 (4, 5 and 6)  $\frac{3 \text{ higher than 3}}{6 \text{ total}} = \frac{1}{2}$

Ⓒ the answer to (a) would stay the same because 10 of the balls would be even (2, 4, 6, 8, 10, 12, 14, 16, 18, 20) and 10 of them would be odd (1, 3, 5, 7, 9, 11, 13, 15, 17, 19)

$$\frac{10 \text{ even}}{20 \text{ total}} = \frac{1}{2}$$

the answer to (b) would change because all of the new balls would be greater than 3 so, the new probability ratio would be  $\frac{17 \text{ balls higher than 3}}{20 \text{ total}} = \frac{17}{20}$

Score Point: 4

- a)  $\frac{1}{2}$  because there are 3 even numbers out of the six balls.
- b)  $\frac{1}{2}$  because there are three numbers greater than three and three numbers less than three.
- c) a would not change but b would have a 17 in 20 chance to pick a ball greater than three because 4-20 are all greater than three.

Score Point: 3

a) It is a 50/50 chance. There are 3 of each ball, the probability of picking an even-numbered ball is the same as picking an odd-numbered ball.

b) It is still another 50/50 chance. There are 3 balls (1-3 and 4-6) the chance of picking a ball from 4-6 is the same as picking a ball from 1-3.

c) The 50/50 chance wouldn't change. All that would happen is that more balls are added and there is 10 even and 10 odd instead of 3 each.

In question b the probability of now picking a ball with a number greater than 3 has increased. You now have a 3:17 ratio (3 being #'s 1-3 and 17 all above 3) instead of a 3:3 ratio. It also would seem more likely to pick a ball now anywhere from 4 to 20.

Score Point: 2

- (A) The probability of picking an even-numbered ball is 50%. That is because you have 3 even-numbered balls (2, 4, 6) and 3 odd-numbered balls (1, 3, 5).
- (B) The probability of picking a ball numbered greater than 3 would be 33.3%. This is because there are 2 above 3 and 6 total giving us a ratio of 2:6. This can be represented as  $\frac{2}{6}$  and  $2 \div 6$  equals .33 which we represent as 33.3%.
- (C) If you added balls 7-10 the probabilities would go down drastically because there would be more to choose from lessening the chance of picking the marked ones.

Score Point: 1



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GRADE 8  
MATHEMATICS



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Standard: MA-08-1.4.01: Ratios and Proportional Reasoning  
Scoring Guide..... p. 22  
Sample Student Responses ..... pp. 23–27

Item 4 School Breakfast Menu ..... p. 29  
Standard: MA-08-4.4.01: Probability  
Scoring Guide..... p. 30  
Sample Student Responses ..... pp. 31–35

**Note:** Each item is aligned to a standard, but does not necessarily measure the entire standard.

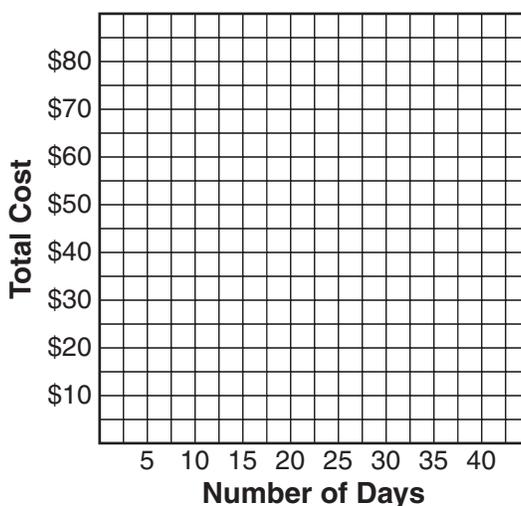
### Item 1 Swimming Pass

**Standard:** MA-08-3.3.01: Coordinate Geometry – Students will identify and graph ordered pairs on a coordinate system; correctly identify the origin, axes, and ordered pairs; and will apply graphing in the coordinate system to solve real-world and mathematical problems.

**Bloom’s Taxonomy:** a. Application  
 b. Knowledge  
 c. Knowledge  
 d. Analysis

**Depth of Knowledge:** Level 2

1. On the grid in your Student Response Booklet, copy the scales and labels shown below.



Haley wants to determine the cheapest way to pay for swimming at the local pool.

- A one-month pass of unlimited swimming costs \$45.
- A one-day swimming pass costs \$2.

Chart 1, on the following page, shows the cost of swimming using a one-month pass. Copy Chart 2 into your Student Response Booklet.

Chart 1

Number of Days of Actual Swimming	Cost Using One-Month Pass
10	\$45
20	\$45
30	\$45

Chart 2

Number of Days of Actual Swimming	Cost Using One-Day Pass
10	
20	
30	

- Complete Chart 2 to show the cost of swimming using **one-day** passes.
- Plot the points from Chart 1 on the graph in your Student Response Booklet. Draw a line to show the cost of swimming different numbers of times using the one-month pass.
- Plot the points from Chart 2 on the same graph. Draw a line to show the cost of swimming different numbers of times using one-day passes.
- What is the **fewest** number of days that Haley would have to swim to make the one-month pass cheaper than buying one-day passes? Explain how you found your answer.

Swimming Pass

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Geometry concepts involved in graphing ordered pairs and applying graphing in the coordinate system to solve real-world problems.
3	The student response demonstrates a good understanding of the Geometry concepts involved in graphing ordered pairs and applying graphing in the coordinate system to solve real-world problems. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Geometry concepts involved in graphing ordered pairs and applying graphing in the coordinate system to solve real-world problems. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Geometry concepts involved in graphing ordered pairs and applying graphing in the coordinate system to solve real-world problems.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

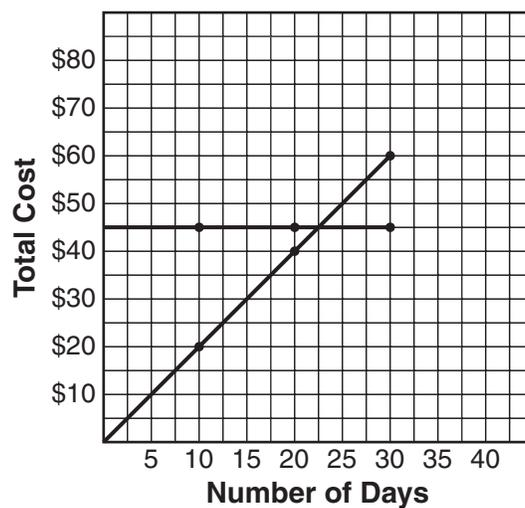
Sample Response:

Part a:

Chart 2

Number of Days of Actual Swimming	Cost Using One-Day Pass
10	\$20
20	\$40
30	\$60

Parts b and c:



Part d: 22 one-day passes cost \$44 but 23 one-day passes cost \$46.  
So the one-month pass is cheaper if she swims 23 days.

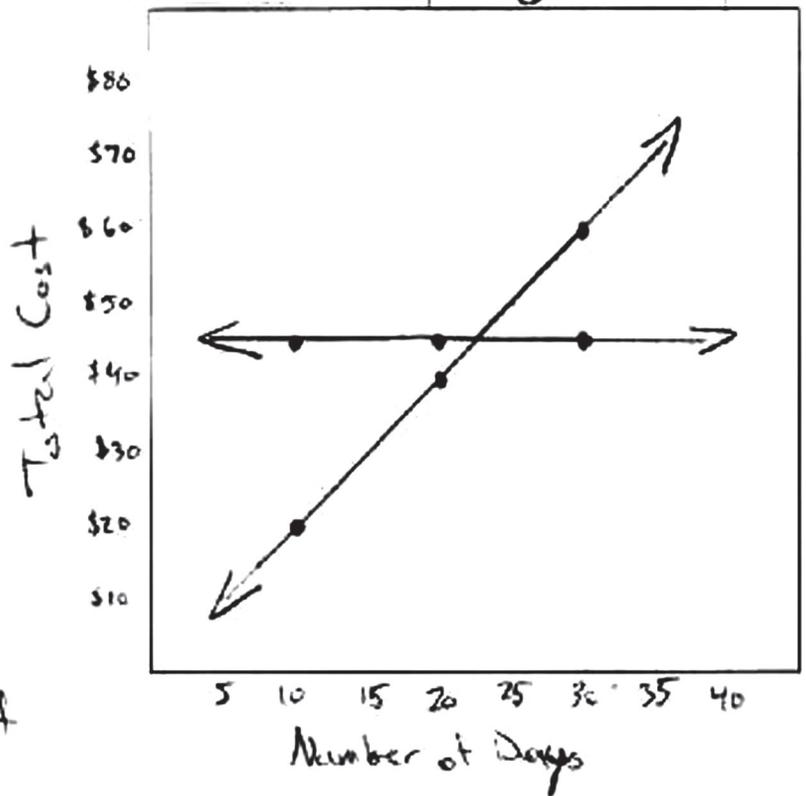
*Sample Student Responses*

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**Swimming Pass**

A

# of Days of Actual Swimming	Cost Using one-day Passes
10	20
20	40
30	60



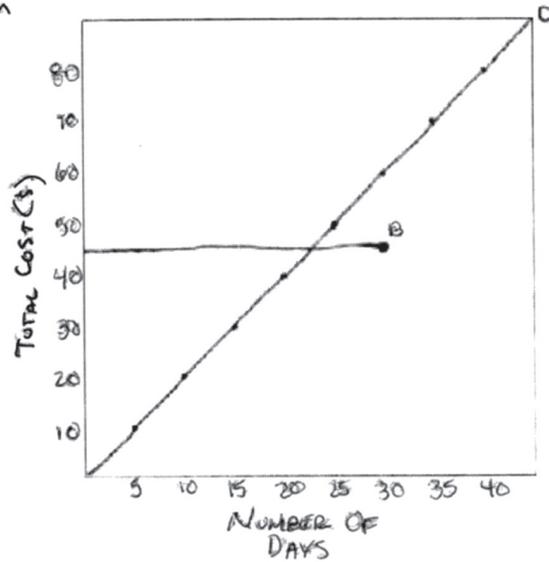
D.23. I got 23 because for 23 days with an one-day pass it would cost \$46. For a month pass it would cost \$15. That is the fewest amount of days.

Score Point: 4

A)

NUMBER OF DAYS	COST w/ ONE DAY PASS
10	20
20	40
30	60

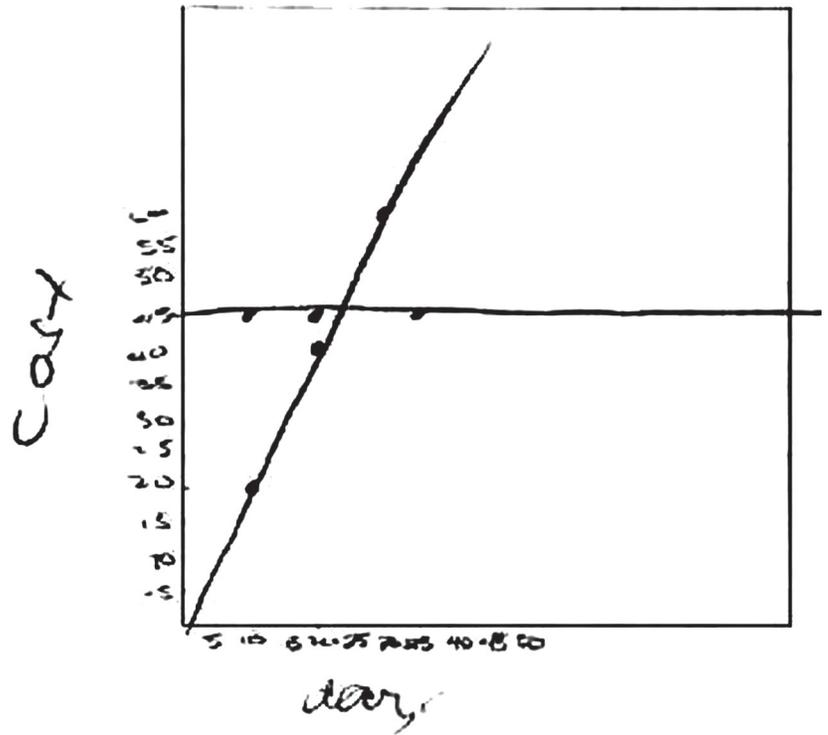
D) SHE WOULD HAVE TO SWIM  
23 DAYS



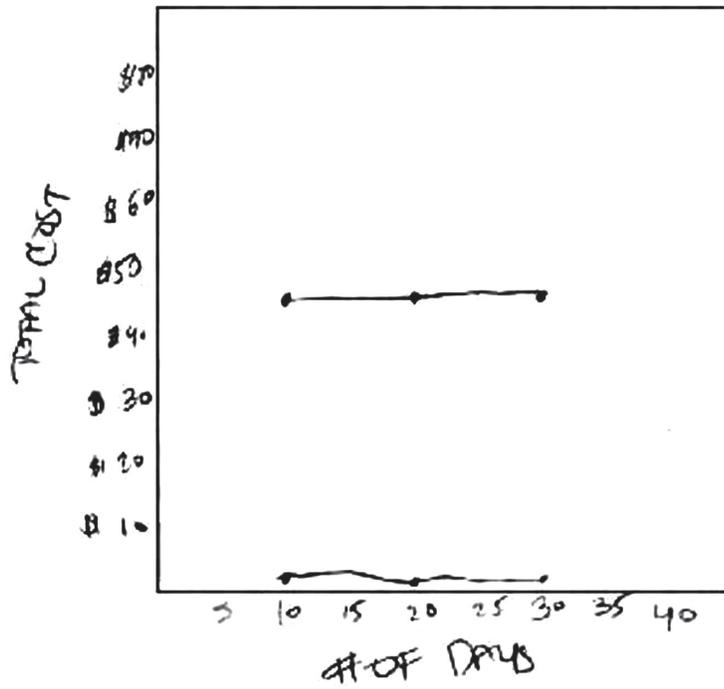
Score Point: 3

# of days swim	one day pass
10	45
20	45
30	45

# days	Pass
10	20
20	40
30	60



Score Point: 2



Score Point: 1



### Item 2 One-Day Bus Rental

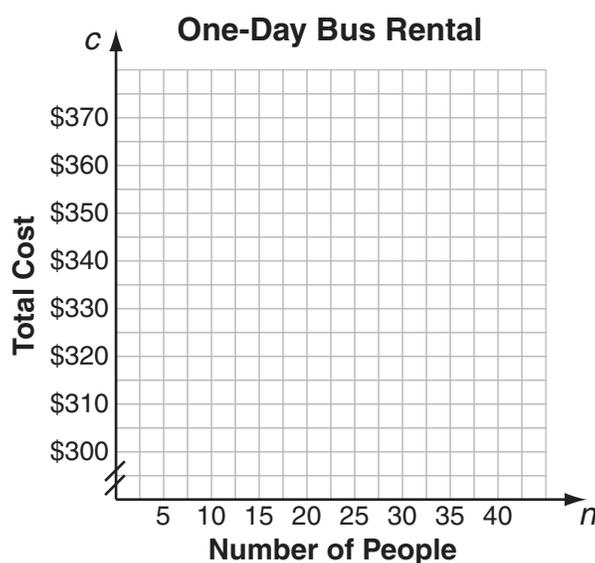
**Standard:** MA-08-5.1.02: Patterns, Relations, and Functions – Students will represent, analyze, and generalize simple first and second degree relationships using tables, graphs, words, and algebraic notations, and will apply the relationships to solve real-world and mathematical problems.

**Bloom’s Taxonomy:** a. Knowledge  
 b. Comprehension  
 c. Knowledge

**Depth of Knowledge:** Level 2

2. Mr. Bennett’s class is renting a bus for a field trip. The bus company charges \$300 for a one-day rental plus \$2 for each person who rides the bus.
  - a. Create a table that shows the cost for a one-day rental when transporting the following groups of people:
    - a group of 10 people,
    - a group of 20 people, and
    - a group of 30 people.
  - b. Write an equation that shows the relationship between the total cost,  $c$ , of a one-day bus rental and the number,  $n$ , of people transported.

On the grid in your Student Response Booklet, copy the scales and labels shown below.



- c. Graph the equation you wrote in part b.

One-Day Bus Rental

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in representing a simple first-degree relationship using tables, graphs, and algebraic notations.
3	The student response demonstrates a good understanding of the concepts involved in representing a simple first-degree relationship using tables, graphs, and algebraic notations. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in representing a simple first-degree relationship using tables, graphs, and algebraic notations. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in representing a simple first-degree relationship using tables, graphs, and algebraic notations.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

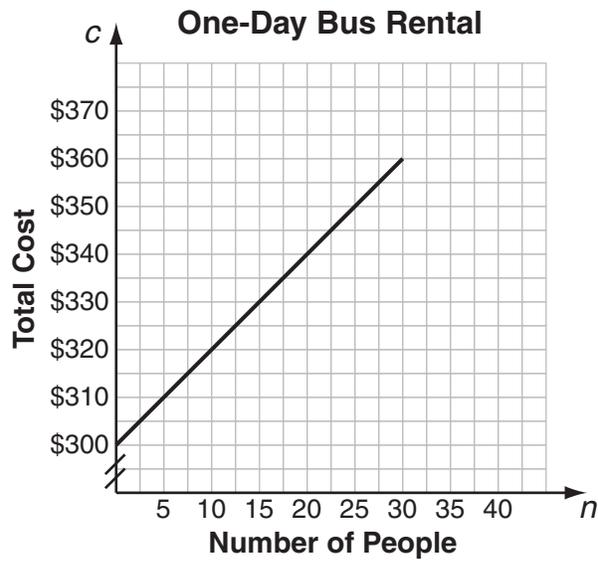
Sample Response:

Part a:

Group size	Cost
10	\$320
20	\$340
30	\$360

Part b:  $c = 2n + 300$

Part c:



*Sample Student Responses*

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**One-Day Bus Rental**

EQUATION:  $C = 300 + 2n$

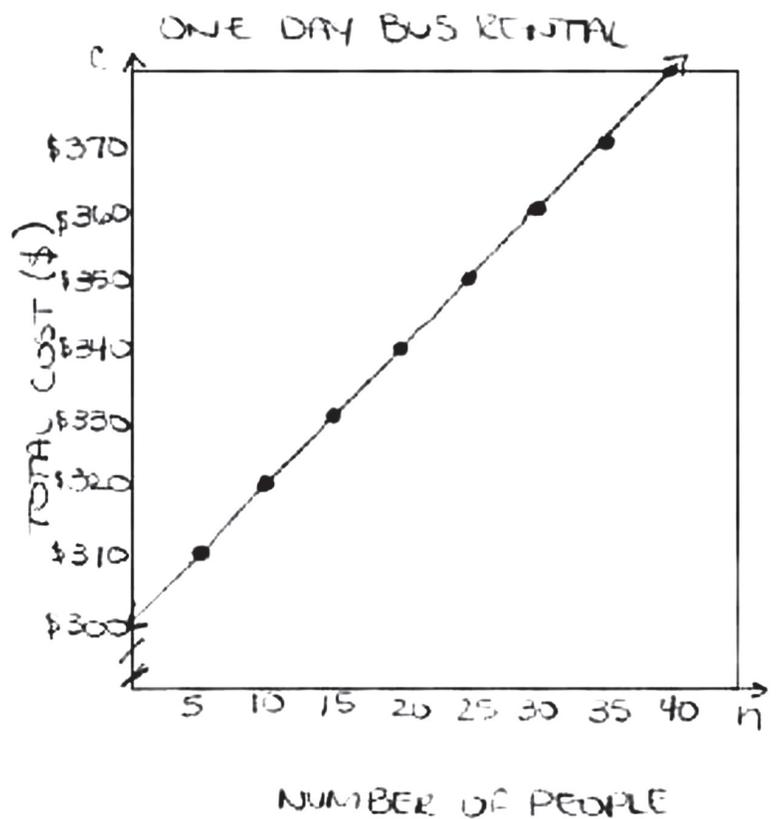
$C = 300 + 2(10) = 320$

$C = 300 + 2(20) = 340$

$C = 300 + 2(30) = 360$

TABLE

<u># OF PEOPLE</u>	<u>COST (1 DAY)</u>
10	320
20	340
30	360

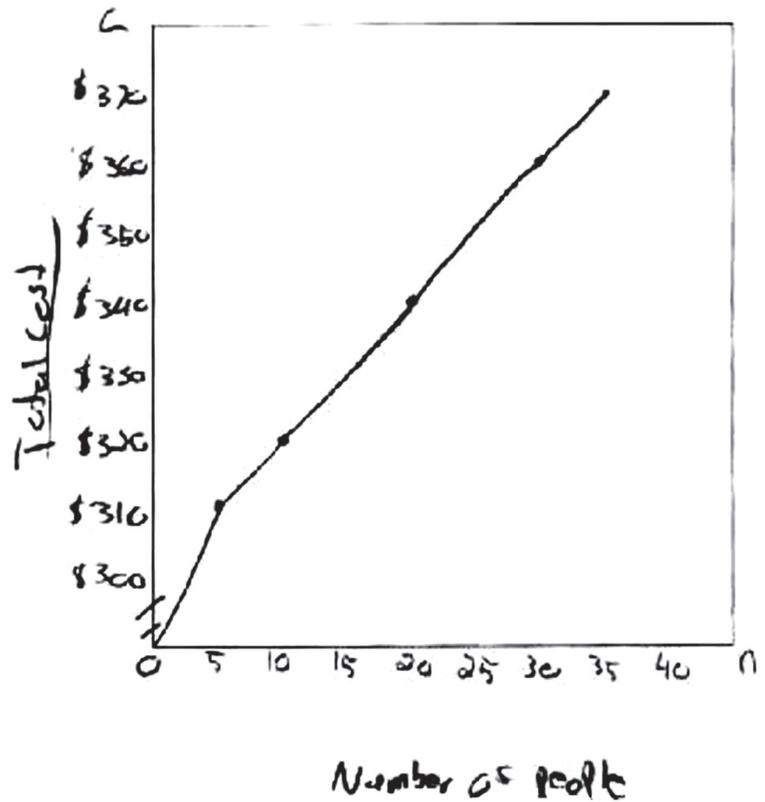


Score Point: 4

	# of people (n)	Bus rental (B)	Cost of people	Cost per day ( $C=2n+300$ )
group 1	10	300	2n	320
group 2	20	300	2n	340
group 3	30	300	2n	360

$$C = 2n + 300$$

One-Day Bus Rental



Score Point: 3

a) 10 people

\$320

20 people

\$340

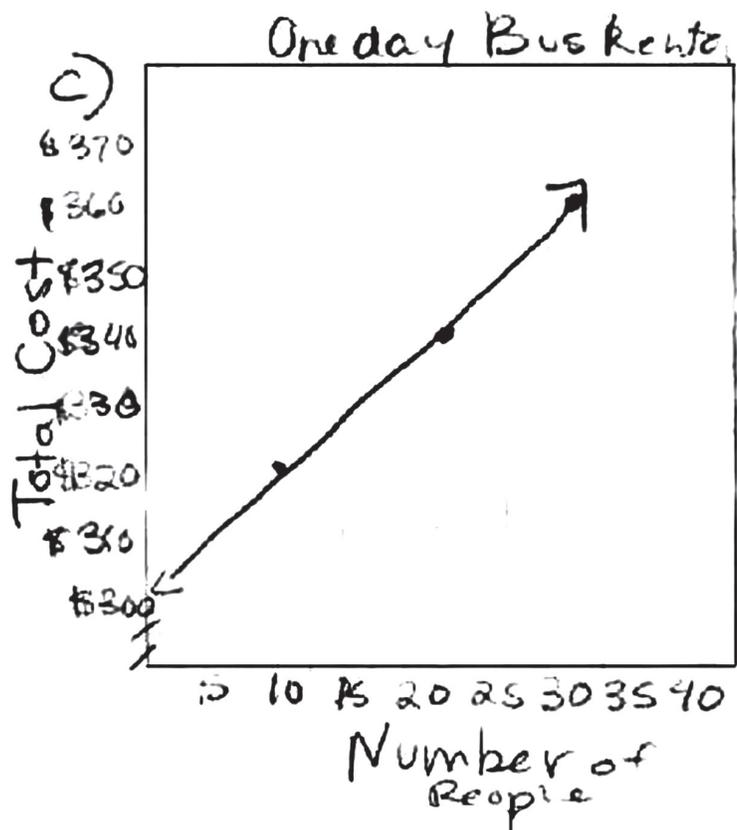
30 people

\$360

b)  $C = 300 + 2 \times 10$

$C = 300 + 2 \times 20$

$C = 300 + 2 \times 30$

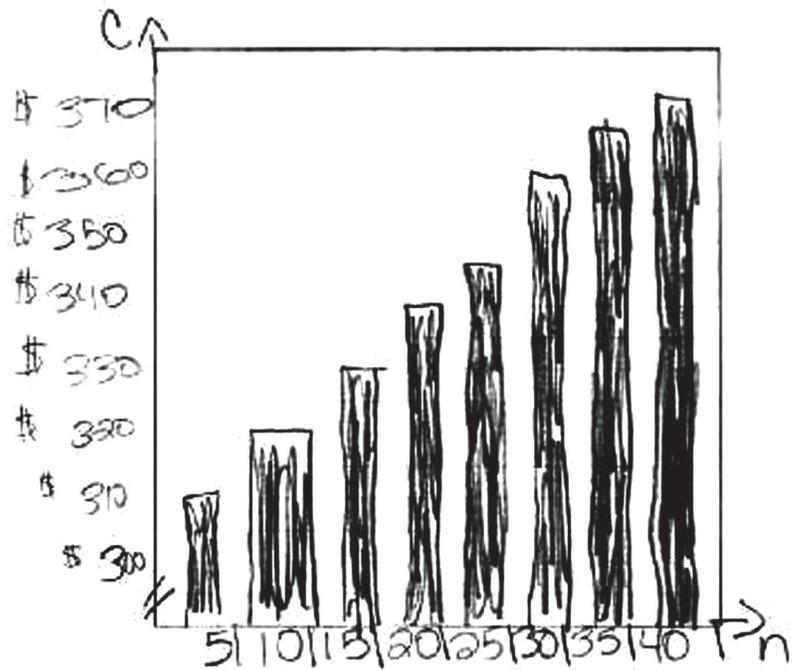


Score Point: 2

a.

People going	0	20	30
Per. Person	50	40	60

b.  $300c \div n + 2$



Score Point: 1

Item 3 Music Coupons

Standard: MA-08-1.4.01: Ratios and Proportional Reasoning – Students will apply ratios and proportional reasoning to solve real-world problems (e.g., percents, constant rate of change, unit pricing, percent of increase or decrease).

Bloom’s Taxonomy: Application

Depth of Knowledge: Level 2

Use the advertisements below to answer question 3.



3. Randy, an 8th grader, is going to buy a CD at either Melody House or Tune Barn. At both stores, the regular price of the CD he wants to purchase is \$18. Randy has a 5% coupon from Tune Barn that can be used on sale items. At which store will the CD cost less? Describe or show how you found your answer.

## Music Coupons

### Scoring Guide

Score	Description
<b>4</b>	The student response demonstrates an exemplary understanding of the concepts involved in percent of discount by using percents to accurately compute discount and additional discount.
<b>3</b>	The student response demonstrates a good understanding of the concepts involved in percent of discount and additional discount. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
<b>2</b>	The student response demonstrates a fair understanding of the concepts involved in percent of discount by correctly computing a percent of discount at least once. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
<b>1</b>	The student response demonstrates a minimal understanding of the concepts involved in percent of discount.
<b>0</b>	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
<b>Blank</b>	No response.

### Sample Responses:

Melody House  $\$18 \times 0.75 = \$13.50$

Tune Barn  $\$18 \times 0.8 = \$14.40$     $\$14.40 \times 0.95 = \$13.68$

Melody House is cheaper.

OR

Melody House  $25\% \times 18 = \$4.50$

Tune Barn  $20\% \times 18 + 5\% \times (80\% \text{ of } 18) = 3.60 + 0.72 = \$4.32$

Melody House gives the better discount.

*Sample Student Responses*

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**Music Coupons**

$$25\% \text{ off of } \$18 = \$4.50$$

$$\begin{array}{r} \$18.00 \\ - \$4.50 \\ \hline \$13.50 \end{array}$$

$$20\% \text{ off of } \$18 = \$3.60$$

$$\begin{array}{r} \$18.00 \\ - \$3.60 \\ \hline \$14.40 \end{array}$$

$$5\% \text{ off of } \$14.40 = \$0.72$$

$$\begin{array}{r} \$14.40 \\ - \$0.72 \\ \hline \$13.68 \end{array}$$

It is cheaper at Melody House.

Score Point: 4

19\$ ready house  

$$\begin{array}{r} 18.25 \\ \underline{4.50} \\ 13.75 \end{array}$$

$$\begin{array}{r} 16.00 \\ - 4.50 \\ \hline 11.50 \end{array}$$

16 Tube bath  

$$\begin{array}{r} 16.00 \\ \underline{2.00} \\ 14.00 \\ \underline{7.05} \\ 7.05 \\ \underline{.72} \\ 6.33 \end{array}$$

$$\begin{array}{r} 13.80 \\ 14.40 \\ \underline{.72} \\ 13.68 \end{array}$$

cheaper

Score Point: 3

$$\begin{array}{l} \text{Melody} \\ \text{House} \\ \$18.00 \times 25\% = \$13.50 \end{array}$$

$$\begin{array}{l} \text{Tune} \\ \text{Barn} \\ \$18.00 \times 20\% = \$4.40 \\ \$14.40 \times 5\% = \$3.68 \end{array}$$

the cd at melody  
house will cost less.

Score Point: 2

It would cost less at Tune Barn because there's 20% off all CD's plus he has the coupon.

$$18 \times 20\% = \$3.60 \times 5\% = 0.18$$

At the Melody House it would cost him  
\$4.50       $\$18 \times 25\% = 4.50$

Score Point: 1



Item 4 School Breakfast Menu

Standard: MA-08-4.4.01: Probability – Students will apply counting techniques to determine the size of a sample space for a real-world or mathematical situation.

Bloom’s Taxonomy: a. Comprehension  
 b. Analysis

Depth of Knowledge: Level 2

4. The choices for breakfast at Washington School are shown on the menu below.

School Breakfast Menu		
Cereal	Muffins	Beverages
Wheataloes	Apple Banana	Milk
Fruit Hoops	Blueberry	Orange Juice
Sugar Curls	Chocolate Chip	
	Poppy Seed	

- How many different combinations are possible if only one selection is made from each category (cereal, muffins, and beverages)? Explain or show how you found your answer.
- One more item is going to be added to one of the food categories. An item added to which category will produce the **greatest** increase in the number of possible breakfast combinations? Explain your answer.

## School Breakfast Menu

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in applying counting techniques to determine the size of a sample space for a real-world situation.
3	The student response demonstrates a good understanding of the concepts involved in applying counting techniques to determine the size of a sample space for a real-world situation. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in applying counting techniques to determine the size of a sample space for a real-world situation. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in applying counting techniques to determine the size of a sample space for a real-world situation.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Sample Responses:

Part a:  $3 \times 4 \times 2 = 24$

Part b: Adding 1 cereal, the total is  $4 \times 4 \times 2 = 32$ .

Adding 1 muffin, the total is  $3 \times 5 \times 2 = 30$ .

Adding 1 beverage, the total is  $3 \times 4 \times 3 = 36$ .

*Sample Student Responses*

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**School Breakfast Menu**

(a) there are 24 different combinations for letter a. I found this out by multiply all of the cereals by the muffins, and by the beverages.

<u>Cereals</u>	x	<u>Muffins</u>	x	<u>Beverages</u>	=	24 combinations
3		4		2		

(b) An item added to the beverage group will produce the biggest increase because it will be more to choose from and many more combinations will be able to be made.

Added to: (total)

<u>C</u>	<u>M</u>	<u>B</u>	
32	30	36	← most combinations!

Score Point: 4

Combo of breakfast

Wheatalices	Fruit Hoops	Sugar Curls
wAm	fAm	sAm
wBm	fBm	sBm
wCm	fCm	sCm
wPm	fPm	sPm
wAo	fAo	sAo
wBo	fBo	sBo
wCo	fCo	sCo
wPo	fPo	sPo

Type	# increase
Cereal	8
Muffins	10
Beverages	12

adding an item to the beverages would increase the # of combos by the most, 12.

Score Point: 3

a) There are  $\textcircled{24}$  possible combinations.  
 $3(\text{cereal}) \times 4(\text{muffins}) = 12 \times 2(\text{beverages}) = \textcircled{24}$

b) **School breakfast Menu**

Cereal	Muffins	Beverages
Wheatals	Apple Banana	Milk
Fruit & Hoops	Blueberry	Orange
Sugar Curls	Chocolate Chip	Juice
	Pumpkin Seed	
	Corn	

There are  $\textcircled{30}$  possible combinations. I added one more muffin flavor to the menu. Then I multiplied.  
 $3(\text{cereal}) \times 5(\text{muffins}) = 15$   
 $15 \times 2(\text{Beverages}) = \textcircled{30}$

Score Point: 2

a.) There are 24 different breakfast combinations. I found my answer by sorting them out and pairing them up to see all the different choices.

b.) An item to the leveraged category would increase the most possible number of combinations

Score Point: 1



2007

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# Green River

*Regional Educational  
Cooperative*

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GRADE 9  
MATHEMATICS



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**NOTE:** Each item is aligned to a standard, but does not necessarily measure the entire standard.

### Item 1 Installing Carpet

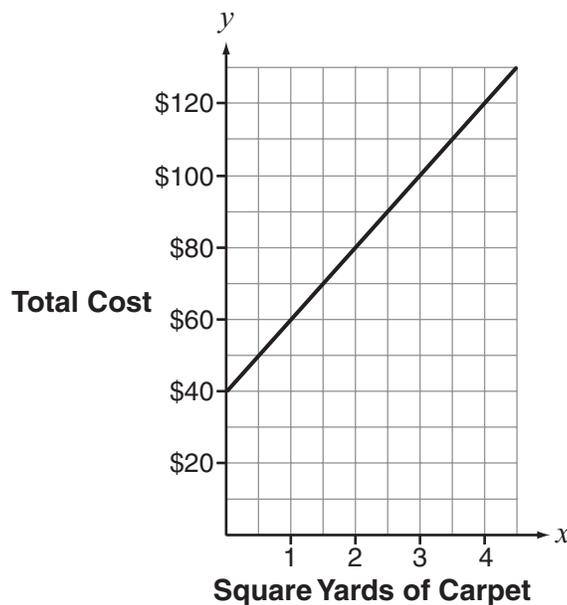
**Standard:** MA-HS-5.1.08: Patterns, Relations, and Functions – Students will identify the changes and explain how changes in parameters affect graphs of functions (linear, quadratic, absolute value, exponential) (e.g., compare  $y = x$  squared,  $y = 2x^2$ ,  $y = (x - 4)^2$ , and  $y = x^2 + 3$ ).

**Bloom’s Taxonomy:** Comprehension

**Depth of Knowledge:** Level 2

1. To install a special carpet, the Home Store charges two fees:
  - an initial preparation fee to prepare the floor for the carpet and
  - a fee for each square yard of the carpet that is installed.

The store’s salespersons use the graph below to quickly determine the total cost of installing different numbers of square yards of this carpet.



- a. Write the number that is the  $y$ -intercept of the line on the graph.
- b. Write the number that is the slope of the line.

- c. Write the equation for the line in the graph. Let  $y$  represent the total cost and  $x$  represent the number of square yards installed.
- d. Suppose that the store manager decides to increase the cost per yard of the carpet but not to change the preparation fee. Explain how this change will affect both the  $y$ -intercept and the slope of the line.
- e. Suppose that the cost per yard is not changed but the preparation fee is increased. Explain how this change will affect both the  $y$ -intercept and the slope of the line.

BE SURE TO LABEL YOUR RESPONSES a, b, c, d, AND e.

## Installing Carpet

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in identifying the values of the slope and $y$ -intercept of a line graph and explaining how changes in the scenario affect these parameters.
3	The student response demonstrates a good understanding of the concepts involved in identifying the values of the slope and $y$ -intercept of a line graph and explaining how changes in the scenario affect these parameters. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in identifying the values of the slope and $y$ -intercept of a line graph and explaining how changes in the scenario affect these parameters. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in identifying the values of the slope and $y$ -intercept of a line graph and explaining how changes in the scenario affect these parameters.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Sample Response:

Part a: \$40

Part b: 20

Part c:  $y = 20x + 40$

Part d: The slope will increase and the  $y$ -intercept will not change.

Part e: The  $y$ -intercept will increase and the slope will not change.

*Sample Student Responses*

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**Installing Carpet**

- a) \$40  
b) \$20  
c)  $y = 20x + 40$   
d) This will not change the y-intercept but will increase the slope of the line  
e) This will not change the slope of the line but will increase the y-intercept

Score Point: 4

A. \$40

B. Slope = 20

C.  $y = 20x + 40$

D. The slope would be greater because the line would be steeper. The  $y$ -intercept would get larger, also.

E. The  $y$ -intercept would get larger because you have a larger up-front fee, but the slope will stay the same

Score Point: 3

A. 40

B. 20

$$(0, 40)(1, 60) = \frac{60 - 40}{1 - 0} = \frac{20}{1} = 20$$

C.  $y = 20x + b$

$$60 = 20(1) + b, \quad 60 = 20 + b, \quad 40 = b, \quad y = 20x + b$$

D. there will be a larger slope and a steeper line,  $y$  will be larger also

E. the  $y$ -intercept will be larger and the slope will be smaller

Score Point: 2

a) \$40    b) 2    c)  $y = mx + b$

d) it will make it larger?

e) it will make it smaller?

Score Point: 1

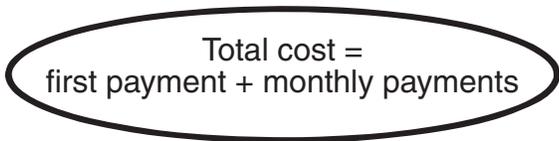
Item 2 Truck Payments

Standard: MA-HS-1.3.01: Number Operations – Students will solve real-world and mathematical problems to specified accuracy levels by simplifying expressions with real numbers involving addition, subtraction, multiplication, division, absolute value, integer exponents, roots (square, cube), and factorials.

Bloom’s Taxonomy: Application

Depth of Knowledge: Level 2

2. A truck costs \$15,600. The dealer offers two payment plans.



Total cost =  
first payment + monthly payments

- Plan A: A first payment of 20% of the cost of the truck followed by payments of \$585 per month for 24 months
- Plan B: A first payment of  $\frac{1}{3}$  of the cost of the truck followed by payments of \$905 per month for 1 year

How much more will the truck cost with Plan A than with Plan B? Show your work or explain how you found your answer.

## Truck Payments

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Number Properties and Operations concepts involved in solving real-world problems by writing and simplifying expressions with real numbers.
3	The student response demonstrates a good understanding of the Number Properties and Operations concepts involved in solving real-world problems by writing and simplifying expressions with real numbers. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Number Properties and Operations concepts involved in solving real-world problems by writing and simplifying expressions with real numbers. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Number Properties and Operations concepts involved in solving real-world problems by writing and simplifying expressions with real numbers.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Sample Response:

Plan A: first payment =  $0.20 \times 15,600 = \$3,120$

24 installments =  $24 \times 585 = \$14,040$

Total cost =  $\$3,120 + \$14,040 = \$17,160$

Plan B: first payment =  $15,600 \div 3 = \$5,200$

12 installments =  $12 \times 905 = \$10,860$

Total cost =  $\$5,200 + 10,860 = \$16,060$

Difference =  $17,160 - 16,060 = \$1,100$

*Sample Student Responses*

---

**Truck Payments**

PLAN A:

$$(15,600 \times .20) + (505 \times 24) = \$17,160.00$$

PLAN B=

$$\left(\frac{1}{3} \times 15,600\right) + (905 \times 12) = \$16,060.00$$

$$\begin{array}{r} \$17,160.00 \\ - 16,060.00 \\ \hline \end{array}$$

\$1,100.00

IT WILL COST \$1,100.00 MORE

Score Point: 4

Plan A:  $\$15,000 = 3,120 + 74,880$

$\$78,000$

Plan B:  $\$15,000 = \$5,200 + 10,800$

$\$16,000$

$$\begin{array}{r} \$78,000 \\ \$16,000 \\ \hline \$61,940 \end{array}$$

$\$61,940$

Score Point: 3

Plan A's final payment would be 17,160 plans B final payment would be 26,920. The difference between plan A and Plan B is \$9,760. The truck will cost 9,760 dollars more.

Score Point: 2

Plan A, first payment  $3150 + 585 = 3705$

Plan B, first payment  $3900 + 905 = 4805$

Plan A is 1,100 cheaper

Score Point: 1



### Item 3 Tickets

**Standard:** MA-HS-5.3.03: Equations and Inequalities – Students will model, solve, and graph first-degree, two-variable equations and inequalities in real-world and mathematical problems.

**Bloom's Taxonomy:** Application

**Depth of Knowledge:** Level 2

3. The drama club put on a play on Friday night. Some tickets were sold in advance and some tickets were sold at the door. A total of 300 tickets were sold.

a. Using  $x$  to represent the number of tickets sold in advance, write an expression that represents the number of tickets sold at the door.

The club charged \$3 for tickets sold in advance and \$4 for tickets sold at the door. The total amount of money collected from tickets was \$1072.

b. Again using  $x$  to represent the number of tickets sold in advance, write **one** equation that can be used to find the number of \$3 tickets and the number of \$4 tickets sold. Your equation should contain no variables except  $x$ .

c. How many \$3 tickets and how many \$4 tickets were sold? Show your work or explain how you found your answer.

## Tickets

## Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in modeling and solving first-degree, two-variable equations in a real-world problem.
3	The student response demonstrates a good understanding of the concepts involved in modeling and solving first-degree, two-variable equations in a real-world problem. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in modeling and solving first-degree, two-variable equations in a real-world problem. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in modeling and solving first-degree, two-variable equations in a real-world problem.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

## Additional Notes

In part c, response does not have to use an algebraic solution in order to receive full credit.

## Sample Response:

Part a:  $300 - x$

Part b:  $1072 = 3x + 1200 - 4x$

Part c:  $-128 = -x$

$$x = 128$$

So 128 tickets were sold in advance and  $300 - 128 = 172$  were sold at the door.

*Sample Student Responses*

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**Tickets**

$$\textcircled{a} \text{ \# sold at door} = 300 - x$$

$$\textcircled{b} 1072 = 3x + 4(300 - x)$$

$$\textcircled{c} 1072 = 3x + 4(300 - x)$$

$$1072 = 3x + 1200 - 4x$$

$$1072 = -x + 1200$$

$$\begin{array}{r} -1200 \\ \hline \end{array}$$

$$(-128 = -x) - 1$$

$$128 = x$$

$$300 - 128 = 172$$

$128$ - $\#3$ tickets $172$ - $\#4$ tickets
--

Score Point: 4

a.  $300 - x =$  tickets sold at the door

b.  $1072 - 3x$  tickets in advance once found will be able to find # of tickets sold at the door

c.  $x + y = 300$

$$3x + 4y = 1072$$

$$x = 300 - y$$

$$3(300 - y) + 4y = 1072$$

$$900 - 3y + 4y = 1072$$

$$\begin{array}{r} 900 - 3y + 4y = 1072 \\ -900 \quad \quad \quad -900 \\ \hline \end{array}$$

$$y = 172$$

172 tickets @ door  
were sold

$$300 - 172 = 128$$

128 tickets were  
sold in advance.

Score Point: 3

$$a. 300 - x = t$$

$$b. 1072 - 3x = x - 4(1072 - 3x)$$

c. Use the above equation

$$1072 - 3x = x - 4(1072 - 3x)$$

$$1072 - 3x = x - 4288 + 12x$$

$$1072 - 3x = 13x - 4288$$

$$5360 - 3x = 13x$$

$$\frac{5360}{16} = \frac{16x}{16}$$

$$335 = x$$

335 were #3 tickets

737 were #4 tickets

Score Point: 2

a.)  $300 - x = \# \text{ of tickets sold at door}$

b.)  $300 - 3x = 4x$

c.) 60 tickets were sold for each

$$\begin{array}{r} 300 - 3x = 4x \\ + 3x \quad + 3x \end{array}$$

$$300 = 7x$$

$$60 = x$$

Score Point: 1



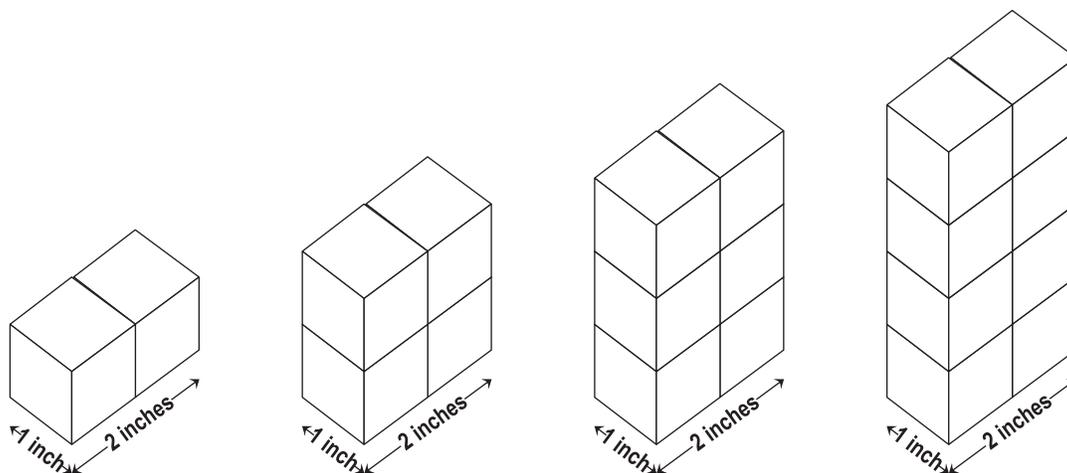
### Item 4 Fred's Towers

Standard: MA-HS-5.1.01: Patterns, Relations, and Functions – Students will identify multiple representations (tables, graphs, equations) of functions (linear, quadratic, absolute value, exponential) in real-world or mathematical problems.

Bloom's Taxonomy: Analysis

Depth of Knowledge: Level 3

4. Fred is making towers like the ones shown below. Each new tower has a different height. He glues two one-inch cubes together to form a piece one inch wide and two inches long. He stacks these to make his towers, then paints all faces of each completed tower except the bottom.



Height	# painted faces
1	8
2	14
3	20
4	26
5	
6	
7	
8	
$n$	

- a. Copy and complete the chart on the previous page into your Student Response Booklet to show the height of the towers and the number of faces painted.
- b. Describe in words a rule you could use to find the number of painted faces if you know the height.
- c. Write an algebraic expression to represent the number of cube faces covered with paint if the tower were  $n$  cubes high.

Fred's Towers

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in identifying multiple representations of a function.
3	The student response demonstrates a good understanding of the concepts involved in identifying multiple representations of a function. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in identifying multiple representations of a function. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student response merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in identifying multiple representations of a function.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

Part a:

Height	# painted faces
1	8
2	14
3	20
4	26
5	32
6	38
7	44
8	50
$n$	$6n + 2$

Part b: I added 6 to get the next number.

Part c:  $6n + 2$

*Sample Student Responses*

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**Fred's Towers**

A)

1	8
2	14
3	20
4	26
5	32
6	38
7	44
8	50
9	56

B) If you know the height  
you multiply it by 6  
and add 2 to get  
the painted sides

C)  $n \times 6 + 2 = \text{painted faces}$

Score Point: 4

Ⓐ

Height	# Painted faces
1	8
2	14
3	20
4	26
5	32
6	38
7	44
8	50
n	

Ⓑ take the height and divide it by 1 inch, that would be your # of blocks. Take that #, multiply by 6, because there 3 sides for each 1/2 tower, and add 2 because of the top of the tower.

Ⓒ

$$n \cdot 6 + 2$$

Score Point: 3

A-

Height	#painted face
1	8
2	14
3	20
4	26
5	32
6	38
7	44
8	50
n	56

B- If you look at #s 1-4 you can figure out that it goes up 6 each time.

$$C- n \times 8 = 56$$

$$n \times x = 4$$

Score Point: 2

Height	# Painted Faces
1	8
2	14
3	20
4	26
5	32
6	38
7	44
8	50
9	56
10	62

They all went  
By six

Score Point: 1

