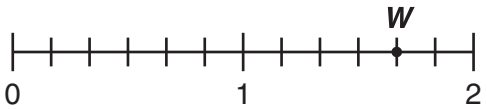
New England Common Assessment Program

Released Items Support Materials 2013

Grade 6 Mathematics

N&O 5.1 **Demonstrates conceptual understanding of rational numbers with respect to: whole numbers** from 0 to 9,999,999 through equivalency, composition, decomposition, or place value **using models, explanations, or other representations**; and **positive fractional numbers** (proper, mixed number, and improper) (halves, fourths, eighths, thirds, sixths, twelfths, fifths, or powers of ten (10, 100, 1000)), **decimals** (to thousandths), or **benchmark percents** (10%, 25%, 50%, 75% or 100%) as a part to whole relationship in area, set, or linear models **using models, explanations, or other representations**.

1 Look at this number line.



Which number is shown by point *W*?

A. $1\frac{2}{3}$

B. $1\frac{3}{4}$

C. $\frac{10}{12}$

D. $\frac{14}{6}$

N&O 5.2 **Demonstrates understanding of the relative magnitude of numbers** by ordering, comparing, or identifying equivalent positive fractional numbers, decimals, or benchmark percents within number formats (fractions to fractions, decimals to decimals, or percents to percents); or integers in context using models or number lines.

2 All students in Mr. Keller's class are reading the same book. This chart shows the fraction of the book each of four students has read.

Student Reading

Student	Fraction of Book Read
Alexandra	$\frac{7}{8}$
Grace	$\frac{3}{4}$
Noah	$\frac{5}{12}$
Spencer	$\frac{2}{3}$

Which list shows the fractions in order from least to greatest?

A. $\frac{2}{3}, \frac{3}{4}, \frac{5}{12}, \frac{7}{8}$

B. $\frac{2}{3}, \frac{3}{4}, \frac{7}{8}, \frac{5}{12}$

C. $\frac{5}{12}, \frac{2}{3}, \frac{3}{4}, \frac{7}{8}$

D. $\frac{5}{12}, \frac{3}{4}, \frac{2}{3}, \frac{7}{8}$

N&O 5.4 **Accurately solves problems involving** multiple operations on whole numbers or the use of the properties of factors, multiples, prime, or composite numbers; and addition or subtraction of fractions (proper) and decimals to the hundredths place. (Division of whole numbers by up to a two-digit divisor.) (IMPORTANT: *Applies the conventions of order of operations with and without parentheses*.)

3 At Sugarbranch Farm, it takes 40 gallons of maple tree sap to make 1 gallon of maple syrup. One maple tree can produce 70 gallons of sap in a single year. How many years would it take one maple tree to produce 28 gallons of maple syrup?

A. 12
B. 16
C. 35
D. 49

G&M 5.1 **Uses properties or attributes of angles** (right, acute, or obtuse) **or sides** (number of congruent sides, parallelism, or perpendicularity) **to identify, describe, classify, or distinguish among** different types of triangles (right, acute, obtuse, equiangular, or equilateral) or quadrilaterals (rectangles, squares, rhombi, trapezoids, or parallelograms).

4 Which two names could be given to **every** rhombus?

A. rectangle and square
B. rectangle and parallelogram
C. quadrilateral and square
D. quadrilateral and parallelogram

G&M 5.6 **Demonstrates conceptual understanding of perimeter** of polygons, **and the area of** rectangles or right triangles through models, manipulatives, or formulas, the area of polygons or irregular figures on grids, **and volume of** rectangular prisms (cubes) using a variety of models, manipulatives, or formulas. Expresses all measures using appropriate units.

5 The length of each side of a cube is 8 feet. What is the volume of the cube?

A. 24 cubic feet
B. 64 cubic feet
C. 384 cubic feet
D. 512 cubic feet

G&M 5.7 **Measures and uses units of measures appropriately and consistently, and makes conversions within systems when solving problems** across the content strands.

6 The school cook is using ground beef to make tacos.

- 480 students each ordered a taco.
- 3 ounces of ground beef are needed for each taco.

What is the total amount of ground beef needed? [1 pound = 16 ounces]

A. 10 pounds
B. 30 pounds
C. 70 pounds
D. 90 pounds

F&A 5.1 **Identifies and extends to specific cases a variety of patterns** (linear and nonlinear) represented in models, tables, sequences, or in problem situations; and writes a rule in words or symbols for finding specific cases of a linear relationship.

7 Carlos has a number machine. This table shows his results when he entered three different numbers.

Input	Output
3	7
6	13
11	23

Which table follows the same rule as Carlos's number machine?

A.

Input	Output
2	6
10	14
15	19

B.

Input	Output
2	4
10	28
15	43

C.

Input	Output
2	5
10	11
15	21

D.

Input	Output
2	5
10	21
15	31

F&A 5.3 **Demonstrates conceptual understanding of algebraic expressions** by using letters to represent unknown quantities to write linear algebraic expressions involving any two of the four operations; or by evaluating linear algebraic expressions using whole numbers.

8 An artist uses the expression $30 \cdot n + 20$ to calculate the amount of money he will earn for a portrait that takes n hours to draw. How much money will the artist earn for a portrait that takes 5 hours to draw?

A. \$750
B. \$700
C. \$170
D. \$ 55

F&A 5.4 **Demonstrates conceptual understanding of equality** by showing equivalence between two expressions using models or different representations of the expressions (expressions consistent with the parameters of M(F&A)-5-5), by solving one-step linear equations of the form $ax=c$, $x \pm b=c$, or $x/a=c$, where a, b, and c are whole numbers with $a \neq 0$; or by determining which values of a replacement set make the equation (multi-step of the form $ax \pm b=c$ where a, b, and c are whole numbers with $a \neq 0$) a true statement (e.g., $2x+3=11$, $\{x:x=2, 3, 4, 5\}$).

9 Each $\square$ represents the same value in this number sentence.

$$3 \times (\square + \square) = 54$$

What is the value of one $\square$?

A. 6
B. 9
C. 18
D. 81

DSP 5.1 **Interprets a given representation** (tables, bar graphs, circle graphs, or line graphs) to answer questions related to the data, to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems. (IMPORTANT: *Analyzes data consistent with concepts and skills in M(DSP)-5-2.*)

10 This table shows the number of players at a basketball practice who made 25 foul shots in a given number of minutes.

Foul Shots

Number of Minutes	Number of Players
0–4	3
5–9	8
10–14	5
15–19	2

What is the total number of players who took less than 10 minutes to make 25 foul shots?

A. 16
B. 11
C. 8
D. 5

N&O 5.2 **Demonstrates understanding of the relative magnitude of numbers** by ordering, comparing, or identifying equivalent positive fractional numbers, decimals, or benchmark percents within number formats (fractions to fractions, decimals to decimals, or percents to percents); or integers in context using models or number lines.

11 A restaurant owner handed out surveys to 60 customers. Only 12 of the surveys were returned. Write **two** fractions that represent the part of the surveys that were returned.

Scoring Guide:

Score	Description
1	for two correct fractions
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

Score Point 1
(Example A)

11

$\frac{2}{10}$ $\frac{1}{5}$

The student's response is correct.

Score Point 1
(Example B)

11

$\frac{12}{60}$ $\frac{120}{600}$

The student's response is correct.

Score Point 0

11

$\frac{12}{60}$ 0.012

The student's response is incorrect.

F&A 5.4 **Demonstrates conceptual understanding of equality** by showing equivalence between two expressions using models or different representations of the expressions (expressions consistent with the parameters of M(F&A)-5-5), by solving one-step linear equations of the form $ax=c$, $x \pm b=c$, or $x/a=c$, where a, b, and c are whole numbers with $a \neq 0$; or by determining which values of a replacement set make the equation (multi-step of the form $ax \pm b=c$ where a, b, and c are whole numbers with $a \neq 0$) a true statement (e.g., $2x+3=11$, $\{x:x=2, 3, 4, 5\}$).

12 Using cards, Pedro made this number sentence.

What number belongs in place of the star to make the number sentence true?

Scoring Guide:

Score	Description
1	for correct answer, **48**
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

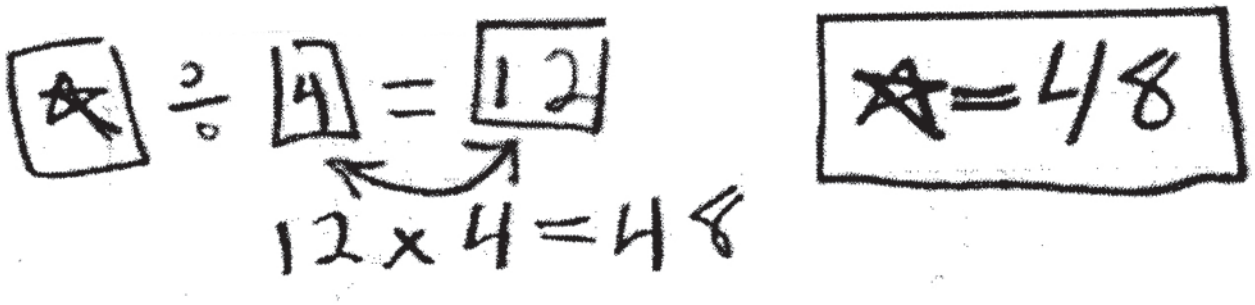
Score Point 1
(Example A)

12

The student's response is correct.

Score Point 1
(Example B)

12



The student's response is correct. (Showing work is not required.)

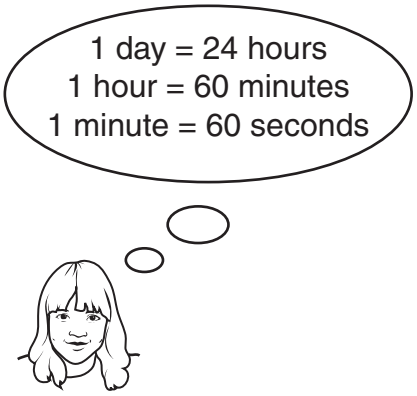
Score Point 0

12

The student's response is incorrect.

G&M 5.7 Measures and uses units of measures appropriately and consistently, and makes conversions within systems when solving problems across the content strands.

13 A satellite orbits Earth every 7200 seconds. How many times does the satellite orbit Earth in 1 day? Show your work or explain how you know.



Scoring Guide:

Score	Description
2	for correct answer, **12** (times), with sufficient explanation or work shown to indicate correct strategy
1	for correct answer with insufficient or no work shown OR for appropriate strategy with incorrect or missing answer
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

Score Point 2

13

60 second a minute 60 minutes an hour 24 hours
It will go around the earth 12 times a day.

$$\begin{array}{r} 60 \\ \times\ 60 \\ \hline 3{,}600 \end{array} \qquad \begin{array}{r} 3{,}600 \\ \times\ \ 24 \\ \hline 86{,}400 \end{array} \qquad 7{,}200\overline{)86{,}400}\ \ 12 \qquad \begin{array}{r} 86{,}400 \\ -\ 86{,}400 \\ \hline 0 \end{array}$$

The student's response is correct, with sufficient work shown.

Score Point 1

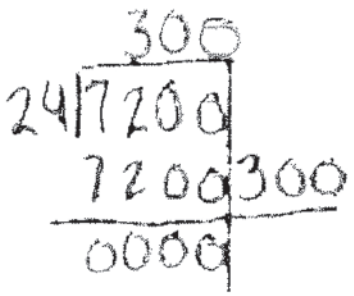
13

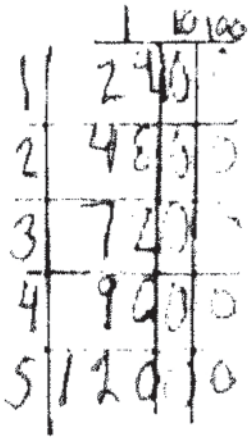
12

The student's response is correct, with no explanation or work shown.

Score Point 0

13



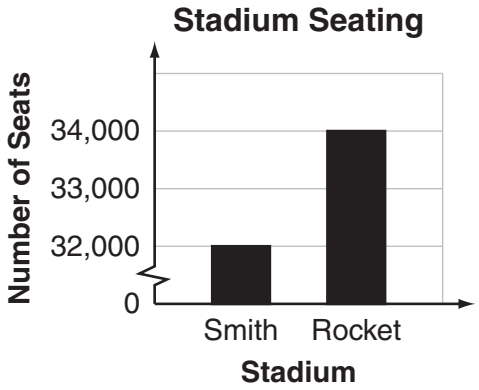


Answer
300

The student's response is incorrect.

DSP 5.3	**Identifies or describes representations or elements of representations that best display a given set of data or situation,** consistent with the representations required in M(DSP)-5-1.

14 Tyler made the graph below to show the numbers of seats at two different sports stadiums.



a. Based on the sizes of the bars in the graph, Anton thinks Rocket Stadium has three times the number of seats Smith Stadium has. Explain why this is **not** correct.

b. How could Tyler change the graph to show that the two stadiums have about the same number of seats?

Scoring Guide:

Score	Description
2	for correct answers for part a and part b
1	for correct answer to part a only OR for correct answer to part b only
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

Score Point 2

14

a. This is not correct because if it was three times the number of seats than Smith Stadium has, that means that there would be 96,000 seats in Rocket Stadium. Rocket Stadium is only 2,000 seats more than Smith Stadium.

b. Tyler could change the graph to show that the two stadiums have about the same number of seats by instead of going by one thousand, he could go by ten thousand.

Part a: The student's explanation is correct.

Part b: The student's response is correct.

Score Point 1

14

A It is not correct because the numbers on the side show it is only 2,000 above Smith and Smith is 32,000.

B. he could make the numbers closer together or he could start the graph at 0.

Part a: The student's explanation is correct.

Part b: The student's response is incorrect.

Score Point 0

14

a. becaVse it is 2 times the # of seats.

b. give smith stadiom 2 thausand more seats.

Part a: The student's explanation is incorrect.

Part b: The student's response is incorrect.

N&O 5.3 **Demonstrates conceptual understanding of mathematical operations** by describing or illustrating the meaning of a remainder with respect to division of whole numbers using models, explanations, or solving problems.

15 Pizza Palace sells large pizzas and small pizzas.

- One large pizza serves 5 people and costs $12.
- One small pizza serves 3 people and costs $7.

Mr. Spencer needs to buy enough pizzas to serve 14 people. Mr. Spencer can only buy whole pizzas.

a. Mr. Spencer wants to buy exactly 2 large pizzas and some small pizzas to serve 14 people. What is the **fewest** number of small pizzas he needs to buy in addition to the 2 large pizzas? Show your work or explain how you know.

b. How many large pizzas and how many small pizzas should Mr. Spencer buy to spend the **least** amount of money and have enough pizza to serve the 14 people? Show your work or explain how you know your answer will result in Mr. Spencer spending the **least** amount of money.

Scoring Guide:

Score	Description
4	5 points
3	4 points
2	2 – 3 points
1	1 point
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

Training Notes:

Part a: 2 points for correct answer, **2** (small pizzas), with sufficient explanation or work shown to indicate correct strategy

OR

1 point for correct answer with insufficient explanation or work shown

or

for appropriate strategy with incorrect or no answer

Part b: 3 points for correct answer, **1 large and 3 small pizzas**, with sufficient explanation or work shown to indicate this is the least expensive combination

OR

2 points for correct comparison of two or three possibilities

or

for correct and complete strategy shown in trying to find the least expensive combination to serve 14 people, but there may be one or two errors

OR

1 point for correct answer with insufficient explanation or work shown

or

for a combination that serves 15 or 16 people with a correct determination of the price, with sufficient explanation or work shown to indicate correct strategy

or

for correct and complete strategy shown in trying to find the least expensive combination to serve 14 people, but there may be 3 or 4 errors

Score Point 4

15

A. 2 small pizzas

5+5=10
+ 3
13+3=16

Part a: The student's response is correct, with sufficient work shown.

Key
L = Large
P = Pizza
S = small

B. 1 Large Pizza & 3 small pizza

L	S	#
3	0	36
0	5	35
1	3	33
2	2	38

Part b: The student's response is correct, with sufficient work shown.

SCORE POINT 3
(EXAMPLE A)

15

a. The fewest number of small pizzas Mr. Spencer can buy is 2. I know because 2 large pizzas serve only 10 people. Mr. Spencer still has to serve 4 people. 1 small pizza isn't enough because it only serves 3 people. Mr. Spencer doesn't want fractions so he has to buy a 2nd whole one.

b. Mr. Spencer would have to buy 5 small pizzas to spend the least amount of money to serve 14 people. I know because 5 small pizzas equal $35, 2 large and 2 small = $38, and 3 large = $36. $35 is the least.

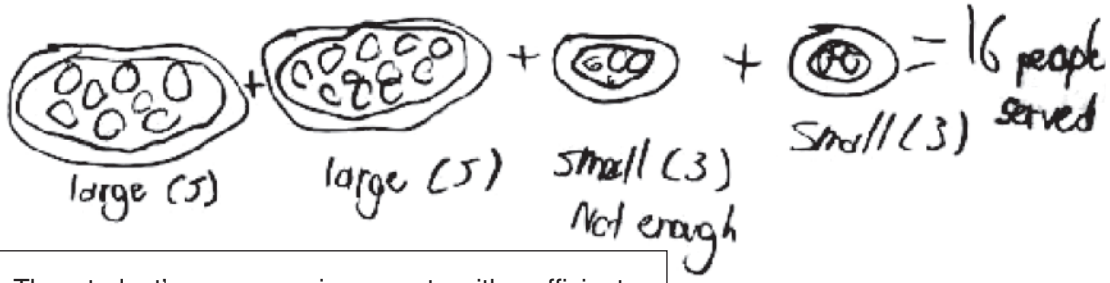
Part a: The student's response is correct, with sufficient explanation given.

Part b: The student's response is correct, with a partially complete explanation given.

Score Point 3
(Example B)

15

A



Part a: The student's response is correct, with sufficient explanation given.

B

5 small pizzas = 15 people and $35
3 large pizzas = 15 people and $36
1 large and 3 smalls = 14 people and only $33

Part b: The student's response is correct, with a partially complete explanation given.

Score Point 2
(Example A)

15

a:

Part a: The student's response is correct, with no explanation given.

b.

he will need 1 lagre and
three smalls.

Part b: The student's response is correct, with no explanation given.

Score Point 2
(Example B)

15

a.) Mr. Spencer should buy two more small pizzas because he need 14 pieces of pizza. If he only bought more he would only have enough for 13 so he would need to buy two small pizzas. That what I think he should do

b) Mr. Spencer could buy 1 large pizza and 3 small pizzas because he wouldn't spend as much money. He owes $33. That is the least amount off money he could spend on pizzas.

Part a: The student's response is correct, with sufficient explanation given.

Part b: The student's response is correct, with insufficient explanation given.

Score Point 1

15

5+9=14

Part a: The student's response is incorrect.

a) Mr Spencer Could buy exactly 9 small pizzas

Mr Spencer Could buy 1 =5 Large Pizza
And 3 =9 smalls pizzas

5+3+3+3=14

7x3=21$

12x1=12$

+21
12
33

He would spend 33 $

Part b: The student's response is correct, with insufficient explanation given.

Score Point 0

15

A Mr Spencer need to buy 4 small Pizzas because you add 5+5=10 and 10+4=14

Part a: The student's response is incorrect.

B Mr. Spencer spending the least amoont of money buying 2 Large Pizzas and 4 small ones.

Part b: The student's response is incorrect.

Grade 6 Mathematics Released Item Information – 2013

Released Item Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No Tools Allowed	✓	✓	✓												
Content Strand[1]	NO	NO	NO	GM	GM	GM	FA	FA	FA	DP	NO	FA	GM	DP	NO
GLE Code	5-1	5-2	5-4	5-1	5-6	5-7	5-1	5-3	5-4	5-1	5-2	5-4	5-7	5-3	5-3
Depth of Knowledge Code	2	2	2	2	1	2	2	1	2	2	1	1	2	2	3
Item Type[2]	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	SA	SA	SA	SA	CR
Answer Key	A	C	B	D	D	D	D	C	B	B					
Total Possible Points	1	1	1	1	1	1	1	1	1	1	1	1	2	2	4

[1]Content Strand: NO = Numbers & Operations, GM = Geometry & Measurement, FA = Functions & Algebra, DP = Data, Statistics, & Probability

[2]Item Type: MC = Multiple Choice, SA = Short Answer, CR = Constructed Response