



**NEW ENGLAND  
COMMON ASSESSMENT PROGRAM**

**Released Items  
Support Materials  
2010**

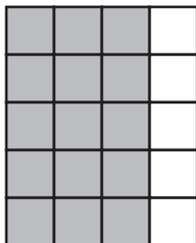
**Grade 6  
Mathematics**

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

**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 Sally planted pumpkin seeds. She shaded part of this rectangle to represent the percent of the pumpkin seeds that sprouted.



What percent of the pumpkin seeds sprouted?

- A. 15%
- B. 60%
- C. 75%
- D. 80%

**NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH**

**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 The table below shows the different weights of ingredients Melissa bought to make soup.

**Soup Ingredients**

<b>Ingredient</b>	<b>Weight (in pounds)</b>
Onions	1.09
Carrots	1.3
Potatoes	1.13
Chicken	1.22

Which list shows the weights of the ingredients in order from **least** to **greatest**?

- A. 1.3, 1.09, 1.13, 1.22
- B. 1.3, 1.13, 1.22, 1.09
- C. 1.09, 1.13, 1.22, 1.3
- D. 1.09, 1.3, 1.13, 1.22

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

**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.

- 3 Samantha ordered 61 picture frames for her business. The frames are mailed in boxes that can each hold 7 frames. What is the least number of boxes that can be used to mail Samantha's picture frames?
- A. 5
  - B. 6
  - C. 8
  - D. 9

**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.*)



- 4 Emily spent  $\frac{1}{4}$  hour fixing the broken chain on her bike and  $\frac{1}{6}$  hour filling her bike tires with air. How much time in all did Emily work on her bike?
- A.  $\frac{2}{10}$  hour
  - B.  $\frac{5}{24}$  hour
  - C.  $\frac{3}{12}$  hour
  - D.  $\frac{5}{12}$  hour

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

**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.*)

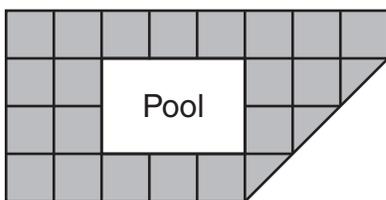


- 5 A dog shelter uses 75 pounds of dog food each day. A 25-pound bag of dog food costs \$20. How much money does the dog shelter spend on dog food for 14 days?
- A. \$ 120
  - B. \$ 280
  - C. \$ 840
  - D. \$1240

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

**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.

- 6 This diagram shows the area of grass around a pool.



What is the area of the grass in the diagram?

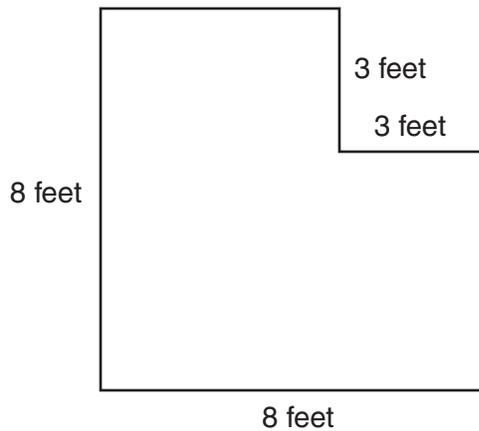
- A. 2150 square feet
- B. 2200 square feet
- C. 2300 square feet
- D. 2750 square feet

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

**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.

- 7 The diagram below shows Melanie's garden.

Melanie's Garden



Melanie plans to put a fence along the border of her garden. What is the minimum number of feet of fencing she needs?

- A. 22
- B. 32
- C. 58
- D. 64

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

**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.

- 8 Tanya is 4 feet 7 inches tall. What is her height in inches? [1 foot = 12 inches]
- A. 47 inches
  - B. 48 inches
  - C. 55 inches
  - D. 57 inches

**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.

- 9 Donna raises money for her school chorus program by walking in a race.
- Mrs. Stephens gives a total of \$5.
  - Mr. Jones gives \$2 for every mile Donna walks in the race.

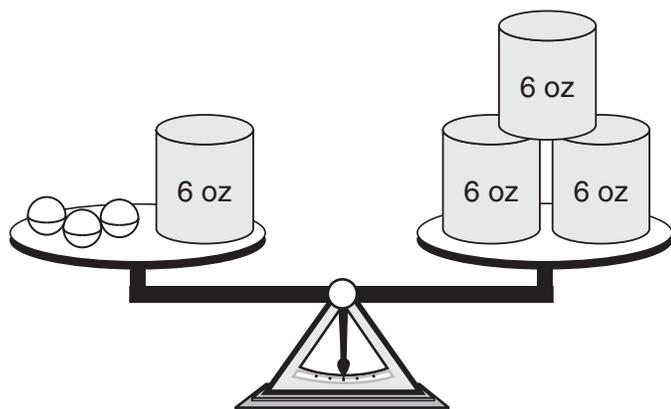
Donna walks  $m$  miles. Which expression represents the total amount of money she receives from Mrs. Stephens and Mr. Jones?

- A.  $2 + 5 \cdot m$
- B.  $5 + 2 \cdot m$
- C.  $7 \cdot m$
- D.  $7 + m$

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

**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)-5-3), 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.,  $2x + 3 = 11$ ,  $\{x: x = 2, 3, 4, 5\}$ ).

- 10 The scale below is balanced.



How many ounces does one  $\ominus$  weigh?

- A. 4 oz
- B. 8 oz
- C. 9 oz
- D. 21 oz

**NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH**

**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.*)

**11** Which number fits these two clues?

- Clue 1: It is a prime number.
- Clue 2: It is a factor of both 42 and 91.

**Scoring Guide:**

<b>Score</b>	<b>Description</b>
<b>1</b>	for correct answer, <b>7</b>
<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

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

SCORE POINT 1  
(EXAMPLE A)

11

The number is 7.

The student's answer is correct.

SCORE POINT 1  
(EXAMPLE B)

11

factors of 42

①  $\times 42$   
2  $\times 21$   
3  $\times 14$   
6  $\times 7$

$\frac{91}{7 \times 13}$

answer is ⑦ because that is a prime # and a prime # starts with 2.

The student's answer is correct. An explanation is not required.

SCORE POINT 0

11

prime # = ① 2, 3, 5, 7, 11, 13, 17, 19, 23  
factor - 42 = ① 2, 3, 6, 7, 14, 21, 42

The student's answer is incorrect.

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

**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.



12 Look at this pattern.

1, 5, 3, 7, 5, 9, 7, 11, ?, ?

What are the next two numbers in the pattern?

**Scoring Guide:**

Score	Description
1	for correct answer, <b>9, 13</b>
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

SCORE POINT 1  
(EXAMPLE A)



12

9 and 13

The student's answer is correct.

SCORE POINT 1  
(EXAMPLE B)



12

9, 13       $\frac{-11}{9}$        $\frac{+9}{13}$

The student's answer is correct.  
Showing work is not required.

SCORE POINT 0



12

9, 12

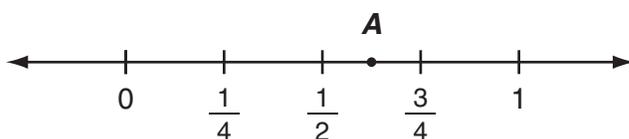
The student's answer is incorrect.

**NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH**

**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.



**13** Look at this number line.



Point  $A$  is halfway between  $\frac{1}{2}$  and  $\frac{3}{4}$ . What fraction does point  $A$  represent? Show your work or explain how you know.

**Scoring Guide:**

Score	Description
2	for correct answer, $\frac{5}{8}$ or equivalent, with sufficient explanation or work shown to indicate correct strategy
1	for correct answer with insufficient or no explanation or work shown or for sufficient strategy with incorrect or no answer
0	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:**

Instead of the number line being broken into 4 parts I broke it into 8. Point A is at  $\frac{5}{8}$ .

Student may write:  $\frac{2.5}{4}$

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

SCORE POINT 2  
(EXAMPLE A)



13

$$\frac{4}{8} = \frac{1}{2} \quad \frac{6}{8} = \frac{3}{4}$$

$$\frac{4}{8} + \frac{6}{8} = \frac{10}{8}$$

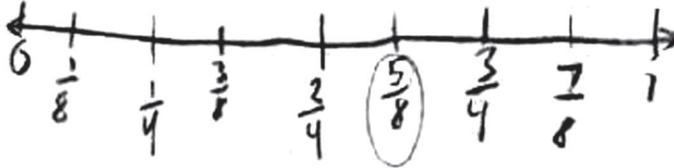
The student's answer is correct, with sufficient explanation.

SCORE POINT 2  
(EXAMPLE B)



13

point A represents  $\frac{5}{8}$  because of this.

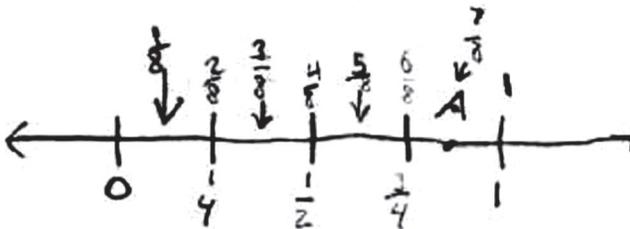


The student's answer is correct, with sufficient explanation.

SCORE POINT 1



13



A is Fraction  
 $\frac{7}{8}$

The student's strategy is correct, with an incorrect answer.

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

SCORE POINT 0  
(EXAMPLE A)



13

$$\frac{1}{2} = 50\% \quad \frac{3}{4} = 75\%$$

$$\frac{6}{10} = 60$$

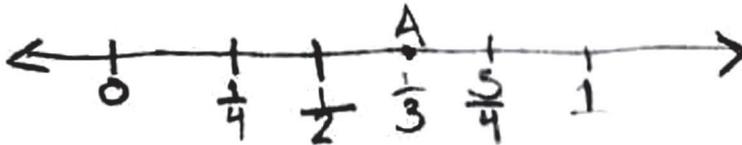
I+ could be  $\frac{6}{10}$   
because it's between  
 $\frac{1}{2}$  and  $\frac{3}{4}$ .

The student's response is incorrect.

SCORE POINT 0  
(EXAMPLE B)



13



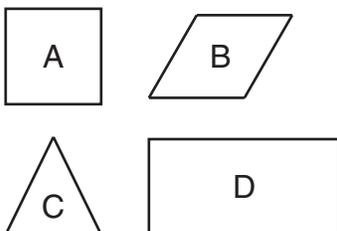
The student's response  
is incorrect.

I think it would be  $\frac{1}{3}$  because  
I think it would be in the middle  
of  $\frac{1}{2}$ .

**NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH**

**G&M 5.3** Uses properties or attributes (shape of bases, number of lateral faces, or number of bases) to identify, compare, or describe three-dimensional shapes (rectangular prisms, triangular prisms, cylinders, spheres, pyramids, or cones).

- 14 Kendrick is making a square pyramid. He will trace some of these shapes to make the faces of his pyramid. For each face, he will trace a whole shape.



- a. Which shapes will Kendrick trace?
- b. How many times will he trace each shape to make the faces of his square pyramid?

**Scoring Guide:**

Score	Description
2	for correct answers to both parts
1	for correct answer to one part or for answering both parts based on thinking that faces do not include bases
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: Shape A and Shape C

Part b: Trace Shape A: 1 time

Trace Shape C: 4 times

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

SCORE POINT 2  
(EXAMPLE A)

14

(Part A.) He will trace shape A and shape C

(Part B.) He will trace shape A once and trace  
shape C four times

The student's answer to each part is correct.

SCORE POINT 2  
(EXAMPLE B)

14

A. he will trace the triangle and the square

ix B. he will trace the triangle 4x and the square

The student's answer to each part is correct.

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

SCORE POINT 1

14

A. Kendrick will trace shapes A and C.  
B. He will trace A five times, and he will trace C four times.

a.) The student's answer is correct.

b.) The student's answer is incorrect.

SCORE POINT 0  
(EXAMPLE A)

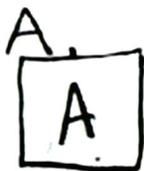
14

a = Kendrick will trace A and D  
b = A he will trace 4 times  
D he will trace 2 times

The student's answer to each part is incorrect.

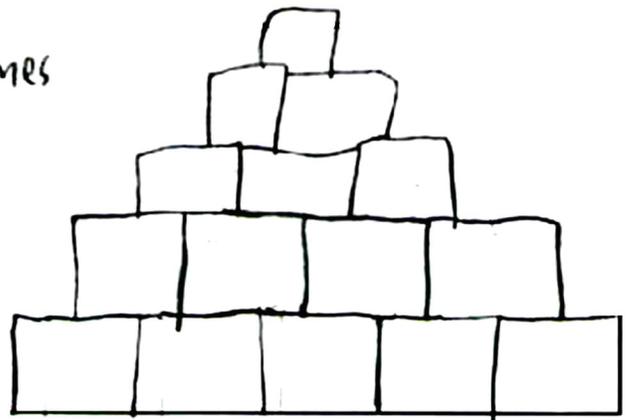
SCORE POINT 0  
(EXAMPLE B)

14



The student's answer to each part is incorrect.

15 times



**NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH**

**DSP 5.2** Analyzes patterns, trends, or distributions in data in a variety of contexts by determining or using measures of central tendency (mean, median, or mode) or range to analyze situations, or to solve problems.

- 15 This table shows Kevin's first 5 test scores in math class.

**Test Scores**

Test Number	Test Score
1	75
2	90
3	82
4	84
5	94

- a. What is Kevin's median test score?
- b. What is Kevin's mean test score?
- c. What score does Kevin need to earn on his next math test in order to have a mean score of exactly 87 for the 6 tests? Show your work or explain how you know.

**NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH**

**Scoring Guide:**

Score	Description
4	4 points
3	3 points
2	2 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: 1 point for correct answer, **84**

Part b: 1 point for correct answer, **85**

Part c: 2 points for correct answer, **97**, or correct answer based on student's answer in part b, with sufficient explanation or work shown to indicate correct strategy

OR

1 point for correct answer with insufficient or no explanation or no work shown  
or

for sufficient strategy with incorrect or no answer

**Sample Responses:**

Part c: 97

$$87 \times 6 = 522$$
$$522 - 425 = 97$$

OR

I used guess and check.

I tried 90 first.

$$425 + 90 = 515$$

$$515 \div 6 = 85.833333...$$

I knew this was too low, so I had to try a number greater than 90.

Next I tried 95.

$$425 + 95 = 520$$

$$520 \div 6 = 86.66666...$$

I knew this was still too low, so I had to try a number greater than 95, but I am very close.

I then tried 97.

$$425 + 97 = 522$$

$$522 \div 6 = 87$$

This is the answer I needed, so Kevin needs to score a 97 on his next test in order to have a mean score of 87 for all six tests.

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

SCORE POINT 4  
(EXAMPLE A)

15

A. 84

75 82 84 90, 94

a.) The student's answer is correct.

b. 85

b.) The student's answer is correct.

C. 97

$$\begin{array}{r} 87 \times 6 = 522 \\ \underline{425} \\ 97 \end{array}$$

c.) The student's answer is correct,  
with sufficient work shown.

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

SCORE POINT 4  
(EXAMPLE B)

15

75, 82, 84, 90, 94 {Answer: 84}

I got my answer by writing the numbers from least to greatest and then crossing out the end numbers until I got to the middle number.

(B) 
$$\begin{array}{r} 75 \\ 90 \\ 82 \\ + 84 \\ 94 \\ \hline 425 \end{array}$$
 
$$\begin{array}{r} 85 \\ 5 \overline{)425} \\ \underline{-40} \\ 25 \end{array}$$
 {Answer: 85}

I got my answer by adding up all the numbers and then dividing the sum by the number of numbers there were.

b.) The student's answer is correct. Showing work is not required.

(C) {Answer: He has to get + 97 percent}

I started with adding 100 and when that didn't work I added 99 then 95 and then when I added 97 to the mix and divided it by 6 I got my answer.

a.) The student's answer is correct. Showing work is not required.

c.) The student's answer is correct, with sufficient work shown.

SCORE POINT 3

15

a. 87

a.) The student's answer is incorrect.

b. 85

c.  $6 \times 87 = 522$  so  $425 + 97 = 522$  so he will need a

97

c.) The student's answer is correct, with sufficient work shown.

b.) The student's answer is correct.

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

SCORE POINT 2

15

a.) The student's answer is correct.  
Showing work is not required.

~~75, 82, 84, 90, 94~~  
 (A) The median is 84.

(B)

$$\begin{array}{r} 75 \\ 82 \\ 84 \\ 90 \\ + 94 \\ \hline 425 \end{array}$$

$$\begin{array}{r} \overline{)85} \\ 5 \overline{)425} \\ \underline{40} \phantom{0} \\ 25 \\ \underline{25} \\ 0 \end{array}$$

The mean is 85.

(C) 425, all of  
1-test added. 100  
+ 425  
525

$$\begin{array}{r} \overline{)87} \\ 6 \overline{)525} \\ \underline{48} \phantom{0} \\ 45 \\ \underline{42} \\ 3 \end{array}$$

b.) The student's answer is correct.  
Showing work is not required.

c.) The student's answer is incorrect, with  
insufficient strategy.

Kevin will need  
to score a 100  
to get a mean of  
87.

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

SCORE POINT 1

15

a. 84

a.) The student's answer is correct.

b. 70 or 69.8

b.) The student's answer is incorrect.

c.) The student's answer is incorrect, with incorrect strategy.

c. 140 because  $84 \div 6 = 14$   
and then I add a zero?

NECAP 2010 RELEASED ITEMS  
GRADE 6 MATH

SCORE POINT 0

15

A. Kevin's median test score is 82.  
B. Kevin's mean test score is either 75, 90, 82, or 94.  
C. Kevin need to have 100 on his 6th test.

b.) The student's answer is incorrect.

c.) The student's answer is incorrect, with incorrect strategy.

a.) The student's answer is incorrect.

test number	test score
1	75
2	90
3	82
4	82
5	94

## Grade 6 Mathematics Released Item Information - 2010

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

<sup>1</sup>Content Strand: NO = Numbers & Operations, GM = Geometry & Measurement, FA = Functions & Algebra,  
DP = Data, Statistics, & Probability

<sup>2</sup>Item Type: MC = Multiple Choice, SA = Short Answer, CR = Constructed Response