



**NEW ENGLAND  
COMMON ASSESSMENT PROGRAM**

**Released Items  
Support Materials  
2013**

**Grade 7**

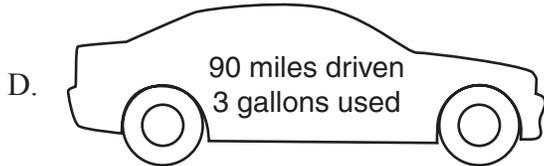
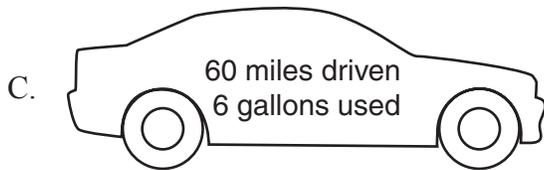
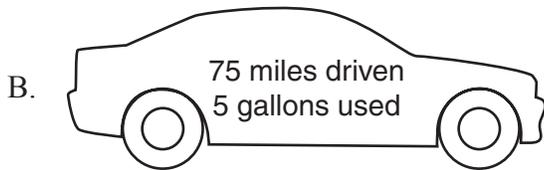
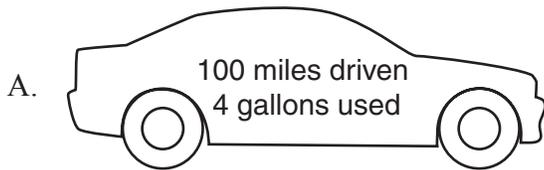
**Mathematics**

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

**N&O 6.1** Demonstrates conceptual understanding of rational numbers with respect to ratios (comparison of two whole numbers by division  $a/b$ ,  $a:b$ , and  $a \div b$ , where  $b \neq 0$ ); and rates (e.g.,  $a$  out of  $b$ , 25%) using models, explanations, or other representations.



- 1 Which car had the greatest number of miles driven per gallon used?



NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

**N&O 6.3** Demonstrates conceptual understanding of mathematical operations by describing or illustrating the meaning of a power by representing the relationship between the base (whole number) and the exponent (whole number) (e.g.,  $3^3$ ,  $4^3$ ); and the effect on the magnitude of a whole number when multiplying or dividing it by a whole number, decimal, or fraction.

- 2 The value of  $\square$  is greater than 1. The value of  $\triangle$  is greater than 0 and less than 1.

Which expression has the **greatest** value?

- A.  $\triangle - \square$   
B.  $\triangle \div \square$   
C.  $\square \times \triangle$   
D.  $\square \div \triangle$

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

**N&O 6.4** Accurately solves problems involving single or multiple operations on fractions (proper, improper, and mixed), or decimals; and addition or subtraction of integers; percent of a whole; or problems involving greatest common factor or least common multiple. (IMPORTANT: *Applies the conventions of order of operations with and without parentheses.*)



- 3 Renee uses vinegar and water to make a cleaning mixture. The amount of vinegar in the mixture is  $\frac{1}{8}$  the amount of water. Renee put 10 cups of water in a bucket. How much vinegar should she add to the water?

- A.  $1\frac{1}{4}$  cups
- B.  $1\frac{2}{5}$  cups
- C.  $1\frac{1}{2}$  cups
- D.  $1\frac{4}{5}$  cups

**NECAP 2013 RELEASED ITEMS**  
**Grade 7 MATH**

**N&O 6.4** Accurately solves problems involving single or multiple operations on fractions (proper, improper, and mixed), or decimals; and addition or subtraction of integers; percent of a whole; or problems involving greatest common factor or least common multiple. (IMPORTANT: *Applies the conventions of order of operations with and without parentheses.*)



- 4 A car dealer has 75 cars, 23 trucks, and 42 minivans in stock. What percent of the vehicles in stock are minivans?
- A. 3%
  - B. 30%
  - C. 33%
  - D. 42%

**G&M 6.7** Measures and uses units of measures appropriately and consistently, and makes conversions within systems when solving problems across the content strands.

- 5 A supermarket charges \$4 per pound for grapes and \$4 per pound for cherries. Gretchen buys some grapes and some cherries.

- She buys 24 ounces of grapes.
- She buys 20 ounces of cherries.

What is the total cost of the grapes and the cherries Gretchen buys?

[1 pound = 16 ounces]

- A. \$ 5
- B. \$ 6
- C. \$10
- D. \$11

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

**F&A 6.1** Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; or writes a rule in words or symbols for finding specific cases of a linear relationship; or writes a rule in words or symbols for finding specific cases of a nonlinear relationship; and writes an expression or equation using words or symbols to express the generalization of a linear relationship (e.g., twice the term number plus 1 or  $2n + 1$ ).



- 6 This table shows the relationship between the fee to park in a garage and the amount of time parked in the garage.

**Parking Fees**

Time	Fee (in dollars)
Up to 1 hour	2.00
Up to $1\frac{1}{2}$ hours	2.75
Up to 2 hours	3.50
Up to $2\frac{1}{2}$ hours	4.25

The pattern continues. What is the fee to park in the garage for up to 5 hours?

- A. \$ 5.00
- B. \$ 8.00
- C. \$ 8.50
- D. \$10.00

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

**F&A 6.3** Demonstrates conceptual understanding of algebraic expressions by using letters to represent unknown quantities to write linear algebraic expressions involving two or more of the four operations; or by evaluating linear algebraic expressions (including those with more than one variable); or by evaluating an expression within an equation (e.g., determine the value of  $y$  when  $x = 4$  given  $y = 3x - 2$ ).

7 Jessica had  $x$  dollars. She bought 3 movie tickets for \$8 each. Which expression represents the amount, in dollars, that Jessica has left?

- A.  $3(8 - x)$
- B.  $3(x - 8)$
- C.  $x - 3(8)$
- D.  $3x - 8$

**F&A 6.3** Demonstrates conceptual understanding of algebraic expressions by using letters to represent unknown quantities to write linear algebraic expressions involving two or more of the four operations; or by evaluating linear algebraic expressions (including those with more than one variable); or by evaluating an expression within an equation (e.g., determine the value of  $y$  when  $x = 4$  given  $y = 3x - 2$ ).

8 Gabriel is hiking up a mountain with friends. Their distance,  $d$ , in miles from the summit, is represented by the equation  $d = 3.6 - 1.2t$ , where  $t$  is time in hours. Gabriel and his friends have been hiking for 2.5 hours. How many miles are they from the summit?

- A. 1.1
- B. 0.8
- C. 0.6
- D. 0.5

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

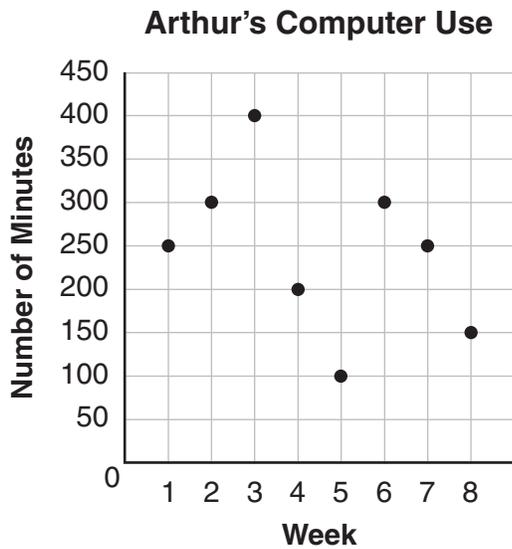
**F&A 6.4** **Demonstrates conceptual understanding of equality** by showing equivalence between two expressions using models or different representations of the expressions (expressions consistent with the parameters of F&A 6.3), solving multi-step linear equations of the form  $ax \pm b = c$ , where  $a$ ,  $b$ , and  $c$  are whole numbers with  $a \neq 0$ .

- 9 Chet exercised for 45 minutes. Sal exercised for 10 minutes less than Chet exercised. Which equation **cannot** be used to find  $t$ , the time in minutes Sal exercised?
- A.  $10 = 45 + t$
  - B.  $t + 10 = 45$
  - C.  $45 - 10 = t$
  - D.  $45 - t = 10$

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

**DSP 6.1** Interprets a given representation (circle graphs, line graphs, or stem-and-leaf plots) 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)-6-2.*)

- 10 This graph shows the number of minutes Arthur used a computer each week over the past 8 weeks.



What is the range of the number of minutes Arthur used the computer?

- A. 400 minutes
- B. 300 minutes
- C. 150 minutes
- D. 100 minutes

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

**N&O 6.2** Demonstrates understanding of the relative magnitude of numbers by ordering or comparing numbers with whole number bases and whole number exponents (e.g.,  $3^3$ ,  $4^3$ ), integers, or rational numbers within and across number formats (fractions, decimals, or whole number percents from 1- 100) using number lines or equality and inequality symbols.



- 11 Write a number that could go in the box to make this statement true.

$$\frac{8}{11} < \square < 75\%$$

**Scoring Guide:**

Score	Description
1	for correct answer, a number between $\frac{8}{11}$ ( $0.\overline{72}$ ) and 0.75
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

SCORE POINT 1  
(EXAMPLE A)



11

$$\frac{8}{11} < \underline{\underline{74\%}} < 75\%$$

The student's response is correct.

SCORE POINT 1  
(EXAMPLE B)



11

$$\frac{820}{1100}$$

The student's response is correct.

SCORE POINT 0



11

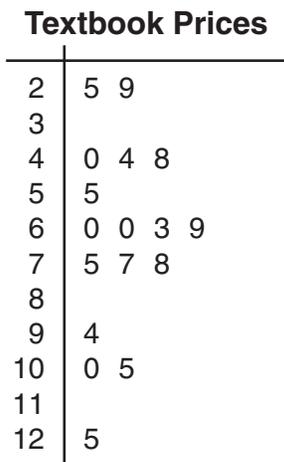
$$\frac{8}{11} < \frac{7}{10} < 75\%$$

The student's response is incorrect.

**NECAP 2013 RELEASED ITEMS**  
**Grade 7 MATH**

**DSP 6.1** **Interprets a given representation** (circle graphs, line graphs, or stem-and-leaf plots) 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)-6-2.*)

- 12 This stem-and-leaf plot shows the price of each of the textbooks used at Jefferson Middle School.



**Key**  
2 | 5 represents \$25

What is the median price, in dollars, of the textbooks?

**Scoring Guide:**

Score	Description
<b>1</b>	for correct answer, (\$)63
<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 2013 RELEASED ITEMS  
Grade 7 MATH

SCORE POINT 1  
(EXAMPLE A)

12

20, 29, 40, 44, 48, 50, 60, 60, 63, 67, 75, 77, 78, 94, 100, 100, 125

63 is the Median

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

SCORE POINT 1  
(EXAMPLE B)

12

#63

The student's response is correct.

SCORE POINT 0

12

~~25~~, ~~3~~, ~~4~~, ~~4~~, ~~5~~, ~~5~~, ~~6~~, ~~3~~, ~~7~~, ~~8~~, ~~8~~, ~~9~~, ~~10~~, ~~10~~, ~~12~~, ~~15~~

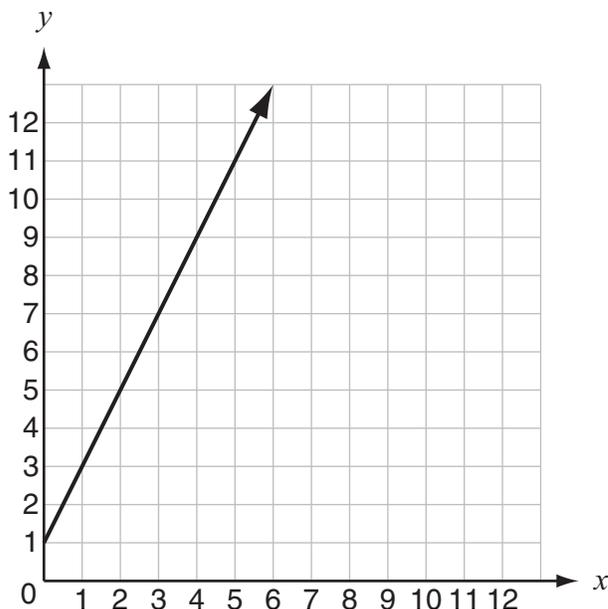
3

The student's response is incorrect.

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

**F&A 6.1** Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations; or writes a rule in words or symbols for finding specific cases of a linear relationship; or writes a rule in words or symbols for finding specific cases of a nonlinear relationship; and writes an expression or equation using words or symbols to express the **generalization** of a linear relationship (e.g., twice the term number plus 1 or  $2n + 1$ ).

13 Look at this graph.



- What is the value of  $y$  when  $x = 5$ ?
- Use words or symbols to write a rule for the pattern shown by the graph.

**Scoring Guide:**

Score	Description
2	for correct answers to part a, <b>11</b> , and part b, $(y = )2x + 1$ or <b>equivalent</b> (accept verbal descriptions)
1	for correct answer to part a OR for correct answer to part b
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

SCORE POINT 2

13

A:  $y = 11$

B:  $y = x + (x + 1)$

Part a: The student's response is correct.

Part b: The student's response is correct.

SCORE POINT 1  
(EXAMPLE A)

13

a.)  $y = 11$

b.) Every time  $x$  increases by one,  $y$  changes to the next odd number.

Part a: The student's response is correct.

Part b: The student's response is incorrect.

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

SCORE POINT 1  
(EXAMPLE B)

13

a. 10

b.  $(x \cdot 2) + 1$

Part a: The student's response is incorrect.

Part b: The student's response is correct.

SCORE POINT 0

13

A = 13

B = it increases  
while going up

Part a: The student's response is incorrect.

Part b: The student's response is incorrect.

**NECAP 2013 RELEASED ITEMS**  
**Grade 7 MATH**

**DSP 6.2** 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 dispersion (range) to analyze situations, or to solve problems.

- 14 Nelly recorded the distance she ran for each of the 31 days in July. She used the data from all 31 days to calculate the information shown in this table.

Minimum distance	0.5 mile
Maximum distance	4.0 miles
Mean distance	2.1 miles
Median distance	1.8 miles
Mode of distances	1.5 miles

What is the total number of miles that Nelly ran during the month of July? Show your work or explain how you know.

**Scoring Guide:**

Score	Description
2	for correct answer, <b>65.1</b> (miles), with sufficient explanation or work shown to indicate correct strategy
1	for correct answer with insufficient or no explanation or work shown OR for appropriate 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

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

SCORE POINT 2  
(EXAMPLE A)

14

65.1 miles, if the mean is the sum of all values divided by the number of values, then if you multiply the mean by the number of values you get the sum of all values.

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

SCORE POINT 2  
(EXAMPLE B)

14

$$\begin{array}{r} \times 2.1 \\ 31 \\ \hline 21 \\ 630 \\ \hline 65.1 \text{ miles} \end{array}$$

The total number of miles that nelly ran is 65.1 miles.

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

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

SCORE POINT 1  
(EXAMPLE A)

14

65.1 is how many miles she ran. I no  
this from the mean.

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

SCORE POINT 1  
(EXAMPLE B)

14

nelly ran a total of 55.8 miles in the month of  
July I got the mean (1.8) and then  
multiplied it by 31 days and that is how  
I found my answer of

55.8 miles

The student's response is incorrect,  
with sufficient explanation to indicate  
correct strategy.

14

$$\begin{array}{r} 0.5 \\ 4.0 \\ 2.1 \\ + 1.8 \\ \hline 1.5 \\ \hline 9.9 \end{array}$$

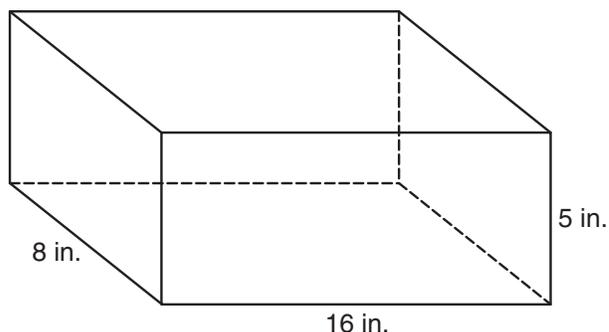
The total amount of miles that Nelly ran is 9.9 miles. I know that because you add all the distanses together to get your answer.

The student's response is incorrect, with incorrect strategy.

**NECAP 2013 RELEASED ITEMS**  
**Grade 7 MATH**

**G&M 6.6** Demonstrates conceptual understanding of perimeter of polygons, the area of quadrilaterals or triangles, and the volume of rectangular prisms by using models, formulas, or by solving problems; and demonstrates understanding of the relationships of circle measures (radius to diameter and diameter to circumference) by solving related problems. Expresses all measures using appropriate units.

- 15 Seth uses rectangular shoe boxes like the one shown below for storing his baseball cards.



- a. What is the area, in square inches, of the bottom of this shoe box?
- b. What is the volume, in cubic inches, of this shoe box?
- c. A second box has the same volume, but it has a height of only 4 inches. What could be the length and width, in inches, of the second box? Show your work or explain how you know.

**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.
<b>Blank</b>	No response

**Training Notes:**

Part a: 1 point for correct answer, **128** (sq. in.) (note: accept responses that interpret any single face as “bottom”.)

Part b: 1 point for correct answer, **640** (cu. in.)

Part c: 2 points for correct answer, any length and width whose product is 160, with sufficient explanation or work shown to indicate correct strategy

OR

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

**Note:** For incorrect units in any part(s), do not award a 4-score. Otherwise do not penalize.

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

SCORE POINT 4  
(EXAMPLE A)

15

a.)  $128 \text{ inches}^2$

---

Part a: The student's response is correct.

b)  $640 \text{ inches}^3$

---

Part b: The student's response is correct.

c. The length of the second shoe box is 16 in. and the width is 10 in.

$$10 \times 16 = 160 \text{ in.}$$

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

$$160 \cdot 4 \text{ in.} = 640 \text{ in.}^3$$

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

SCORE POINT 4  
(EXAMPLE B)

15

a.  $16 \times 8 = 128$  square inches

b. 640 cubic inches

c. height = 4  
length = 160  
width = 1

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

Part b: The student's response is correct.

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

a

$$\begin{array}{r} 160 \\ \underline{\quad 4} \\ 640 \\ \underline{\quad 1} \\ 640 \end{array}$$

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

SCORE POINT 3  
(EXAMPLE A)

15

a.) 128

Part a: The student's response is correct.

b.) 640

Part b: The student's response is correct.

c.)  $L=40$   $W=4$

Part c: The student's response is correct,  
with no work shown.

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

SCORE POINT 3  
(EXAMPLE B)

15

a) 128 sq. in.

b) 640 cubic sq. in.

c)

W	L	H	T
8	16	5	640
9	16	4	576
8	17	4	544
8	18	4	576
9	18	4	648
10	16	4	640

Part a: The student's response is correct.

Part b: The student's response is correct.  
(Student was not given a 4-score because  
of incorrect units.)

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

15

(A) 128 square inches

Part a: The student's response is correct.

(B)  $16 \times 5 = 80$  cubic inches

Part b: The student's response is incorrect.

(C)  $h = 4$  in.  $b = 10$  in  $W = 2$   
 $= 80$  cubic inches

Part c: The student's response is correct based on answer to part b, with no work shown.

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

SCORE POINT 2  
(EXAMPLE B)

15

a.  $16 \times 8 = 128$   
 $128$  square inches

Part a: The student's response is correct.

b.  $640$  cubic inches  
 $128 \times 5 = 640$   
base  $\times$  height = volume

Part b: The student's response is correct.

c. The width and length would have to be 24.

$$640 \div 4 = 160$$
$$160 \div 2 = 80 \quad 80 \div 24 = 3.33$$

Part c: The student's response is incorrect, with incorrect strategy.

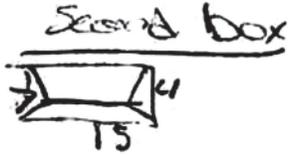
NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

SCORE POINT 1  
(EXAMPLE A)

15

A)  $128$

$$\begin{array}{r} 16 \\ \times 8 \\ \hline 128 \end{array}$$



Part a: The student's response is correct.

B)  $29$

$$8 + 16 + 5 = 29$$

Part b: The student's response is incorrect.

Part c: The student's response is incorrect, with incorrect strategy.

<p>C) <math>\frac{\text{width}}{7}</math></p> $\frac{16}{7}$	<p><math>\frac{\text{length}}{15}</math></p> $\frac{16}{15}$	<p><math>\frac{\text{inches}}{4}</math></p> $\frac{5}{4}$
--	--	---

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

SCORE POINT 1  
(EXAMPLE B)

15

a. 18 in.

Part a: The student's response is incorrect.

b. 640 cubic inches.

Part b: The student's response is correct.

c. 4 in. width, 7 in. length.

Part c: The student's response is incorrect,  
with no explanation or work shown.

NECAP 2013 RELEASED ITEMS  
Grade 7 MATH

SCORE POINT 0

15

A

$$\begin{array}{r} .8 \\ +16 \\ +5 \\ \hline 29 \end{array}$$

B

$$\begin{array}{r} 2 \\ 16 \\ \times 5 \\ \hline 75 \end{array}$$

75 cubic inches

C

17 in = length  
8 in = width

Part a: The student's response is incorrect.

Part b: The student's response is incorrect.

Part c: The student's response is incorrect, with no explanation or work shown.

## Grade 7 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 <sup>1</sup>	NO	NO	NO	NO	GM	FA	FA	FA	FA	DP	NO	DP	FA	DP	GM
GLE Code	6-1	6-3	6-4	6-4	6-7	6-1	6-3	6-3	6-4	6-1	6-2	6-1	6-1	6-2	6-6
Depth of Knowledge Code	2	3	1	1	2	2	1	2	2	1	2	1	3	3	2
Item Type <sup>2</sup>	MC	SA	SA	SA	SA	CR									
Answer Key	D	D	A	B	D	B	C	C	A	B					
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