



**NEW ENGLAND
COMMON ASSESSMENT PROGRAM**

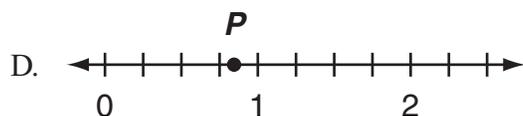
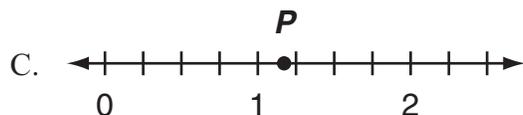
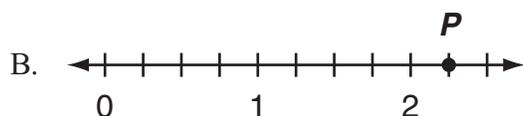
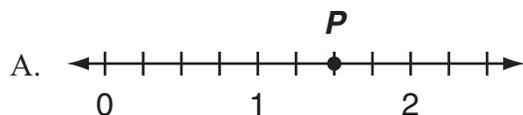
**Released Items
Support Materials
2011**

**Grade 7
Mathematics**

NECAP 2011 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.

- 1 On which number line is point P closest to 1.2?



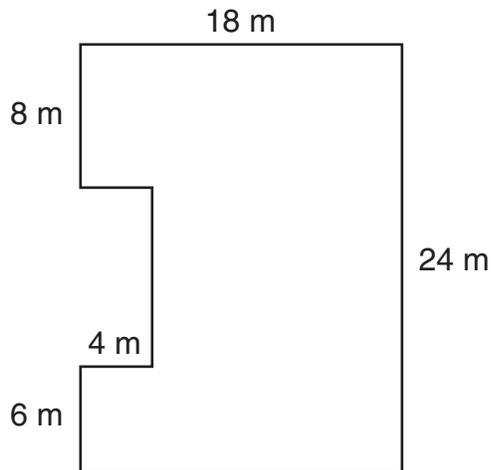
G&M 6.3 Uses properties or attributes (shape of bases, number of lateral faces, number of bases, number of edges, or number of vertices) to identify, compare, or describe three-dimensional shapes (rectangular prisms, triangular prisms, cylinders, spheres, pyramids, or cones).

- 2 Which statement is true about **all** prisms?
- A. The number of edges is an odd number.
 - B. The number of edges is an even number.
 - C. The number of vertices is an odd number.
 - D. The number of vertices is an even number.

NECAP 2011 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.

3 Look at this figure.



What is the perimeter of this figure?

- A. 96 meters
- B. 92 meters
- C. 78 meters
- D. 60 meters

NECAP 2011 RELEASED ITEMS
GRADE 7 MATH

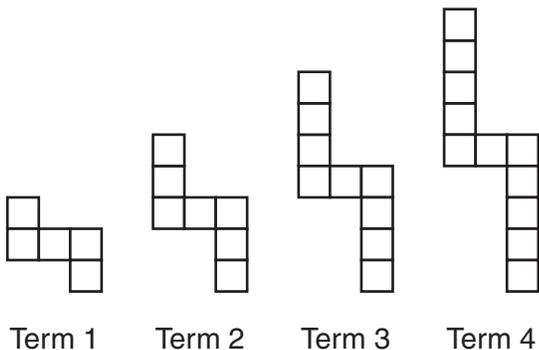
G&M 6.7 Measures and uses units of measures appropriately and consistently, and makes conversions within systems when solving problems across the content strands.

- 4 The Old Faithful geyser in Yellowstone National Park erupts approximately every 74 minutes. Based on this information, about how many times does Old Faithful erupt in one 24-hour day?
[1 hr = 60 min]

- A. 3
- B. 14
- C. 20
- D. 30

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^{sc} symbols for finding specific cases of a nonlinear relationship; and writes an expression or^{sc} equation using words or^{sc} symbols to express the **generalization of a linear relationship (e.g., twice the term number plus 1 or^{sc} $2n + 1$).**

- 5 This pattern was made with square tiles.



Which expression represents the number of square tiles in the n th term?

- A. $3n$
- B. $5n$
- C. $2n + 3$
- D. $3n + 2$

**NECAP 2011 RELEASED ITEMS
GRADE 7 MATH**

F&A 6.2 Demonstrates conceptual understanding of linear relationships ($y = kx$; $y = mx + b$) as a constant rate of change by constructing or interpreting graphs of real occurrences and describing the slope of linear relationships (faster, slower, greater, or smaller) in a variety of problem situations; **and** describes how change in the value of one variable relates to change in the value of a second variable in problem situations with constant rates of change.

- 6 This table shows the total shipping costs for objects of different weights.

Shipping Costs

Weight of Object (in pounds)	Total Shipping Cost (in dollars)
4	5
8	11
12	17
16	23

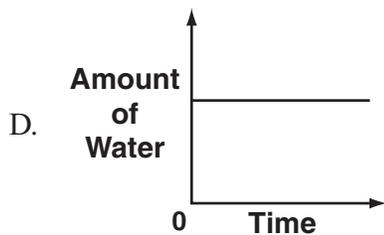
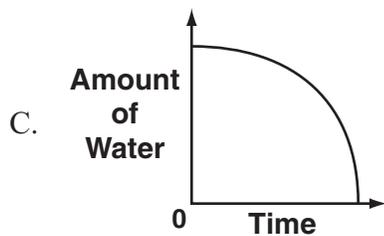
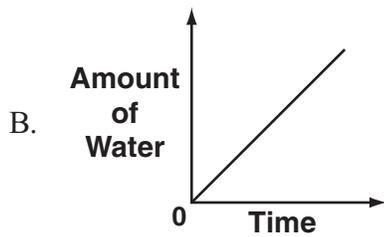
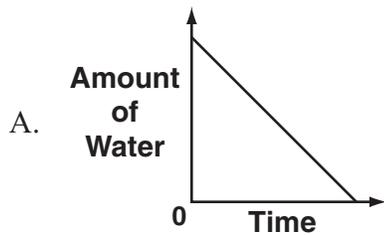
Based on the information in the table, by how many dollars does the total shipping cost increase if the weight of an object increases by 1 pound?

- A. \$1.25
- B. \$1.50
- C. \$3.00
- D. \$6.00

NECAP 2011 RELEASED ITEMS
GRADE 7 MATH

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- 7 Water from a faucet is filling a bucket at a constant rate. Which graph could show the amount of water in the bucket as it fills?



NECAP 2011 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 $y = 3x - 2$).



- 8 What is the value of this expression when $x = 5$?

$$2 + 3x - 4$$

- A. 4
- B. 6
- C. 13
- D. 21

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 M(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 Luis wrote this expression.

$$3 + 4 \cdot (5 + 6)$$

Which of the following expressions is equivalent to Luis's expression?

- A. $7 \cdot 5 + 6$
- B. $3 + 20 + 6$
- C. $7 \cdot 11$
- D. $3 + 4 \cdot 11$

NECAP 2011 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.

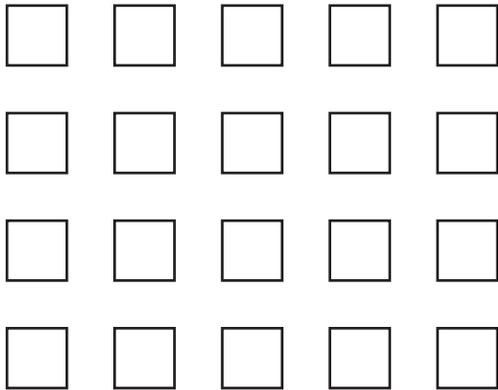
10 In five basketball games Terry scored 24, 26, 10, 25, and 30 points. In how many of the games did Terry score more than his mean number of points?

- A. 2
- B. 3
- C. 4
- D. 5

NECAP 2011 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.

- 11 This picture shows the number of desks in Mr. Moore's classroom. In one of Mr. Moore's classes, students were seated at 3 out of every 4 desks.



How many students were seated at desks in Mr. Moore's class?

Scoring Guide:

Score	Description
1	for correct answer, 15 (students)
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

NECAP 2011 RELEASED ITEMS
GRADE 7 MATH

SCORE POINT 1
(EXAMPLE A)

11 There were 15 students that were seated.

The student's answer is correct.

SCORE POINT 1
(EXAMPLE B)

11
answer: 15
 $\frac{3}{4}$ of 20 = 15

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

SCORE POINT 0

11 5 student were seated in
Mr. Moore's class.

The student's answer is incorrect.

**NECAP 2011 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 $y = 3x - 2$).

- 12 A mechanic charges \$80 for a new muffler and \$35 per hour to install the muffler. Write an algebraic expression to represent the total number of dollars that the mechanic charges for a new muffler and h hours to install it.

Scoring Guide:

Score	Description
1	for correct answer, $80 + 35h$ or equivalent
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

NECAP 2011 RELEASED ITEMS
GRADE 7 MATH

SCORE POINT 1

12

$$80 + 35h$$

The student's answer is correct.

SCORE POINT 0

12

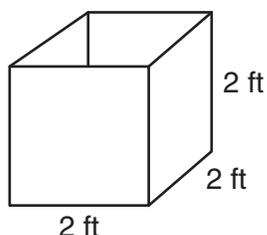
$$35 \times h + 80d =$$

The student's answer is incorrect.

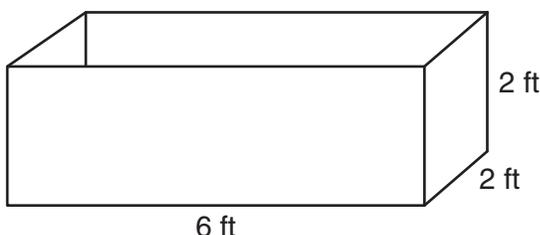
NECAP 2011 RELEASED ITEMS
GRADE 7 MATH

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.

- 13 Look at Box P and Box Q.



Box P



Box Q

Andy fills each box with 1-foot cubes.

How many **more** 1-foot cubes will fit into Box Q than into Box P? Show your work or explain how you know.

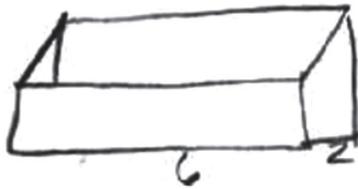
Scoring Guide:

Score	Description
2	for correct answer, 16 , 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.
Blank	No response

NECAP 2011 RELEASED ITEMS
GRADE 7 MATH

SCORE POINT 2
(EXAMPLE A)

13 For box P  $2 = 2 \times 2 \times 2 = 8$

Box Q  $6 \times 2 \times 2 = 24$

$$\begin{array}{r} 114 \\ -24 \\ \hline 8 \\ \hline 16 \end{array}$$

16 more cubes

The student's answer is correct, with sufficient work shown to indicate correct strategy.

SCORE POINT 2
(EXAMPLE B)

13 8 in Box P - $2 \times 2 \times 2$
24 in Box Q - $2 \times 2 \times 6$
16 more in Box Q

The student's answer is correct, with sufficient work shown to indicate correct strategy.

SCORE POINT 1

13 $2 \times 2 \times 2 = 8^3 \text{ ft.}$
 $2 \times 2 \times 6 = 24^3 \text{ ft.}$ $3P = Q$

$$\begin{array}{r} 24 \\ -8 \\ \hline 16^3 \text{ ft.} \end{array}$$

16^3 ft.

The student's strategy is appropriate, with incorrect answer due to the position of the exponent.

NECAP 2011 RELEASED ITEMS
GRADE 7 MATH

SCORE POINT 0
(EXAMPLE A)

13 Rectangular Prism area = Bh
Box P Box Q $\frac{12c.}{-4c.}$
 $2 \times 2 = 4$ cubes $6 \times 2 = 12$ cubes
Box Q holds 8 more cubes than
Box P.

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

SCORE POINT 0
(EXAMPLE B)

13 $2+2+2=6$
 $6+2+2=10$
 $10-6=4$ 4 cubes

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

**NECAP 2011 RELEASED ITEMS
GRADE 7 MATH**

DSP 6.5 For a probability event in which the sample space may or may not contain equally likely outcomes, determines the experimental or theoretical probability of an event in a problem-solving situation.

- 14 A hat contains 24 pieces of paper. Each piece of paper has the name of a student on it. When one piece of paper is chosen at random, the probability that it has a girl's name is $\frac{3}{8}$.

How many girls' names are in the hat? Show your work or explain how you know.

Scoring Guide:

Score	Description
2	for correct answer, 9 , 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.
Blank	No response

NECAP 2011 RELEASED ITEMS
GRADE 7 MATH

SCORE POINT 2
(EXAMPLE A)

14 24 pieces of paper in the hat
 $\frac{3}{8}$ are girls' names $\frac{3}{8} \times \frac{3}{3} = \frac{9}{24}$ girls' names

There are 9 girls' names in the hat.

The student's answer is correct, with sufficient work shown to indicate correct strategy.

SCORE POINT 2
(EXAMPLE B)

14 $\frac{3}{8} = 0.375$
 $0.375 \cdot 24 = 9$
9 girls' names are in the hat.

The student's answer is correct, with sufficient work shown to indicate correct strategy.

SCORE POINT 2
(EXAMPLE C)

14  9 pieces of paper will have girls names on it.

The student's answer is correct, with sufficient work shown to indicate correct strategy.

NECAP 2011 RELEASED ITEMS
GRADE 7 MATH

SCORE POINT 1
(EXAMPLE A)

14 The hat has $\frac{9}{24}$ Girls names.

This is how I figured it out:

$\frac{3 \times 3}{8 \times 3} \frac{9}{24}$ I did this because the hat has 24 pieces of of paper, and the problem said that $\frac{3}{8}$ of the papers had Girls names, so I changed the fraction to $\frac{9}{24}$.

The student's answer is incorrect, with sufficient work shown to indicate correct strategy.

SCORE POINT 1
(EXAMPLE B)

14 $24 \div .375 =$

9 girls

The student's answer is correct, with incorrect work shown.

SCORE POINT 0

14 There are 3 Girl names in the hat. Because there are 5 Boys and 3 Girls

The student's answer is incorrect, with incorrect explanation given.

NECAP 2011 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.*)



- 15 Kevin will give one energy bar and one map to each runner in a race.
- He buys energy bars in boxes. There are 6 energy bars in each box.
 - He buys maps in packages. There are 50 maps in each package.

- a. How many boxes of energy bars would Kevin need if 125 runners enter the race?
- b. How many packages of maps would Kevin need if 125 runners enter the race?

On the day of the race, more than 125 runners enter.

- c. What is the fewest number of runners that Kevin could give one energy bar and one map to without having any open boxes of energy bars or open packages of maps left over? Show your work or explain how you know.

**NECAP 2011 RELEASED ITEMS
GRADE 7 MATH**

Scoring Guide:

Score	Description
4	4 points
3	3 points
2	2 points
1	1 point OR Student shows minimal understanding of solving problems involving least common multiples.
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, **21**

Part b: 1 point for correct answer, **3**

Part c: 2 points for correct answer, **150**, 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

appropriate strategy with incorrect or no answer

Note: If student does not provide answers to Parts a and/or b as whole packages, do not award a 4 score. Otherwise, do not penalize.

NECAP 2011 RELEASED ITEMS
GRADE 7 MATH

SCORE POINT 4



15

39a. He would need 21 boxes

39b. He would need 3 packages

39c. 150 runners because that is the Least Common
Multiply between 6 and 50.

a) The student's answer is correct.

b) The student's answer is correct.

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

$$50 \times 3 = 150$$

$$150 \div 6 = 25$$

$$150 \div 50 = 3$$

SCORE POINT 3



15

a. $125 \div 6 \approx 20.8$ so he needs about 21 boxes

b. He would need $2 \frac{1}{2}$ boxes, but you can't
get half a box so he needs 3 boxes

c. $6 \times 21 = 126$ which is over 125
but 50 doesn't go into it.
50's lowest (150) 6 doesn't go
into and the next 50 up (200)
6 doesn't go into. The closest
is 300.

300 people is the lowest

a) The student's answer is correct.

b) The student's answer is correct.

c) The student's answer is incorrect, with sufficient
work shown to indicate correct strategy.

NECAP 2011 RELEASED ITEMS
GRADE 7 MATH

SCORE POINT 2



15

21 boxes of bats
3 boxes of maps

$$\begin{array}{r} 21 \\ 6 \overline{) 125} \\ \underline{12} \\ 5 \end{array}$$
$$\begin{array}{r} 3 \\ 50 \overline{) 150} \\ \underline{150} \\ 0 \end{array}$$

a) The student's answer is correct.

b) The student's answer is correct.

c) Student did not attempt.

SCORE POINT 1
(EXAMPLE A)



15

A. $21 \times 6 = 126$ 6 bats

B. $50 \times 3 = 150$ 3 bats

C.

a) The student's answer is incorrect.

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

c) Student did not attempt.

NECAP 2011 RELEASED ITEMS
GRADE 7 MATH

SCORE POINT 1
(EXAMPLE B)



15

a. he would need
20 boxes

$$6 - \square$$

$$125 \div 6$$

$$50 \text{ maps} - \square$$

$$125 \div 50$$

a) The student's answer is incorrect.

b. He would need
2 boxes

b) The student's answer is incorrect.

c. It would be 150 runners,
you don't have any
remainders

$$150 \div 6$$

c) The student's answer is correct, with insufficient work shown to indicate correct strategy.

SCORE POINT 0



15

A = 750 energy bars

a) The student's answer is incorrect.

B = 6,250 maps

b) The student's answer is incorrect.

c = Maybe you could go to the
store and buy one energy bar
and one map.

c) The student's response is incorrect.

Grade 7 Mathematics Released Item Information – 2011

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	GM	GM	GM	FA	FA	FA	FA	FA	DP	NO	FA	GM	DP	NO
GLE Code	6-2	6-3	6-6	6-7	6-1	6-2	6-2	6-3	6-4	6-2	6-1	6-3	6-6	6-5	6-4
Depth of Knowledge Code	1	3	2	2	2	2	2	1	1	2	1	1	2	2	3
Item Type ²	MC	SA	SA	SA	SA	CR									
Answer Key	C	D	B	C	C	B	B	C	D	C					
Total Possible Points	1	1	1	1	1	1	1	1	1	1	1	1	2	2	4

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

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