



**NEW ENGLAND
COMMON ASSESSMENT PROGRAM**

**Released Items
Support Materials
2012**

Grade 7

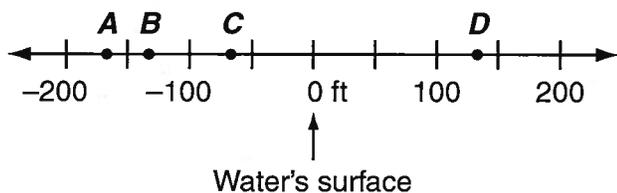
Mathematics

NECAP 2012 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.

120421.001 120422 B Common, CMN

- ① A ship's anchor is 135 feet below the water's surface. The position of the anchor is modeled on this number line.



Which point **best** represents 135 feet below the water's surface?

- A. point A
- B. point B
- C. point C
- D. point D

NECAP 2012 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.



120446.003 D Common, CMN

- 2 What must be true about a number y so that $5 \cdot y < 5$?
- A. $y > 5$
 - B. $y = 5$
 - C. $y = 1$
 - D. $y < 1$

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).

120496.000 B Common, CMN

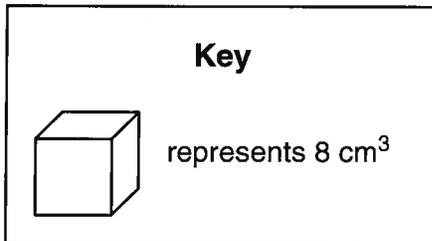
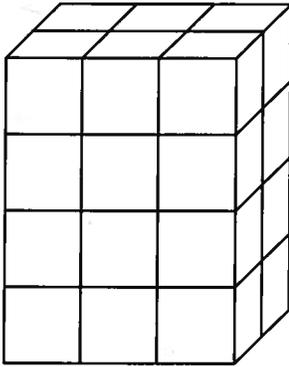
- 3 Which statement about a triangular prism is true?
- A. It has exactly 4 faces.
 - B. It has exactly 5 faces.
 - C. It has exactly 6 edges.
 - D. It has exactly 8 edges.

NECAP 2012 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.

125349.001 125350 A Common, CMN

4 Look at this rectangular prism.



What is the volume, in cubic centimeters, of the rectangular prism?

- A. 192 cm³
- B. 128 cm³
- C. 96 cm³
- D. 48 cm³

NECAP 2012 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.

146126.003 A Common, CMN

- 5 For a party, Nina will serve 12 ounces of cheese for every 5 people. How many **pounds** of cheese will she need for a party of 20 people? (1 pound = 16 ounces)
- A. 3.00 pounds
 - B. 3.75 pounds
 - C. 4.00 pounds
 - D. 6.70 pounds

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 $2n + 1$).

120334.001 C Common, CMN

- 6 A chorus is singing songs.
- 1 person sings the first song.
 - 3 people sing the second song.
 - 6 people sing the third song.
 - 10 people sing the fourth song.

If the pattern continues, how many people will sing the seventh song?

- A. 22
- B. 25
- C. 28
- D. 31

NECAP 2012 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 $y = 3x - 2$).

119242.004 D Common, CMN

7 The students in seventh grade are selling flowers to earn money for a class trip. A single carnation sells for \$2 and a single tulip sells for \$4. Which expression shows the amount of money the students will earn if they sell c carnations and t tulips?

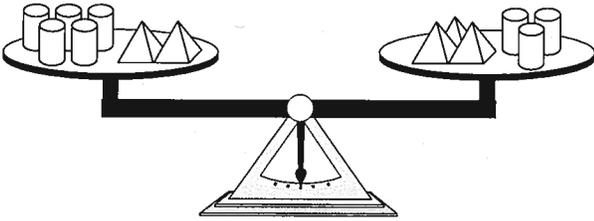
- A. $2 \cdot c \cdot 4 \cdot t$
- B. $6 \cdot (c + t)$
- C. $2 + c + 4 + t$
- D. $2 \cdot c + 4 \cdot t$

NECAP 2012 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 $a \neq 0$.

120514.000 120515 D Common, CMN

8 This scale is balanced.



Each  weighs c pounds. Each  weighs p pounds. Which statement shows the relationship between the objects on the scale?

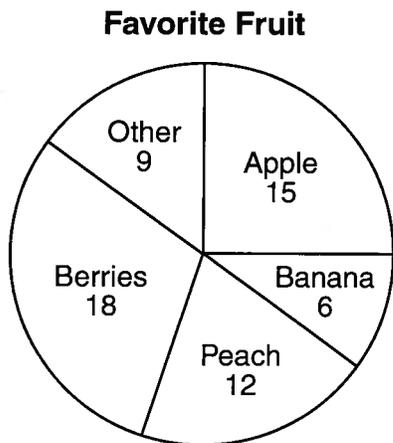
- A. $8c = 5p$
- B. $7cp = 6cp$
- C. $5c + 2p = 3c + p$
- D. $5c + 2p = 3c + 3p$

NECAP 2012 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 DSP 6.2.)

205054.000 205056 A Common, CMN

- 9 Kerry surveyed a group of people about their favorite fruit. She made this circle graph to display her data.



What fraction of the people Kerry surveyed said their favorite fruit was a banana?

- A. $\frac{1}{10}$
- B. $\frac{1}{8}$
- C. $\frac{1}{6}$
- D. $\frac{1}{5}$

NECAP 2012 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.

120440.001 A Common, CMN

- 10 This list shows the number of books Alexis borrowed from the school library each of the last 5 weeks.

7, 2, 3, 1, 3

Alexis borrows 6 books this week. Which of the following will change if Alexis includes 6 in her list?

- A. mean
- B. median
- C. mode
- D. range

NECAP 2012 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 $a \neq 0$.

169224.003 Common, CMN

11 Look at these two equations.

$$F + F = G$$

$$G + H = F + F + F + F + F + F$$

The value of F is 3. What is the value of H ?

Scoring Guide:

Score	Description
1	for correct answer, 12
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

NECAP 2012 RELEASED ITEMS
Grade 7 MATH

SCORE POINT 1
(EXAMPLE A)

169224.003 Common, CMN

11

12

The student's response is correct.

SCORE POINT 1
(EXAMPLE B)

169224.003 Common, CMN

11

$$\begin{aligned} 3+3 &= G \\ F+F &= G \\ G+12 &= 3+3+3+3+3+3 = 18 \\ G+H &= F+F+F+F+F+F \end{aligned}$$

$$\begin{aligned} 18 \\ -6 \\ \hline 12 \end{aligned}$$

The value of H
is 12.

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

SCORE POINT 0

169224.003 Common, CMN

11

$$G+H = \underbrace{3+3}_{G} + \underbrace{3+3}_{G} + \underbrace{3+3}_{G}$$

The student's response is incorrect.

The value of H is 2

NECAP 2012 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.



140280.004 Common, CMN

12 Thomas collected grocery coupons with the values listed below.

\$1.50	\$1.00	\$0.90
\$0.50	\$0.25	\$1.25
\$1.00	\$0.40	\$0.75

What is the median value of these grocery coupons?

Scoring Guide:

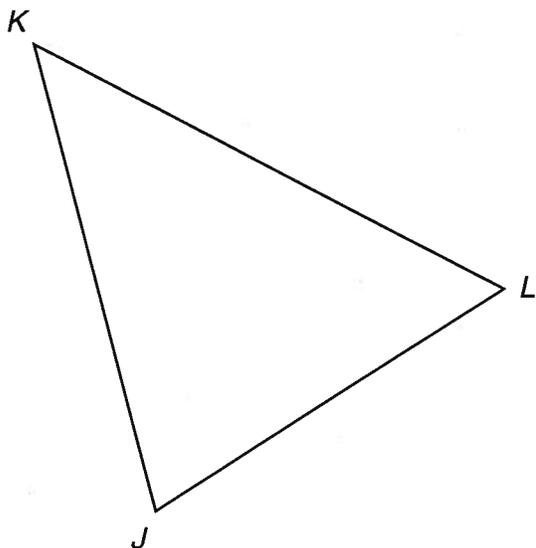
Score	Description
1	for correct answer, (\$) 0.90
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

NECAP 2012 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.

204567.004 204568 Common, CMN

- 13** Use your protractor to answer this question. What are the measures, in degrees, of each angle of this triangle? Be sure to list each measure with its correct angle label.



Scoring Guide:

Score	Description
2	for three correct angle measures with correct angle labels
1	for two correct angle measures with correct angle labels OR for three correct angle measures with at least two angle labels missing and/or incorrect
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

Training Notes:

$m\angle J = 72(^{\circ})$, $m\angle L = 60(^{\circ})$, and $m\angle K = 48(^{\circ})$

Note: Accept measures accurate to within $\pm 2^{\circ}$; accept, for full credit, measure for third angle that is outside acceptable limit but correctly determined using 180° as sum of angle measures.

NECAP 2012 RELEASED ITEMS
Grade 7 MATH

SCORE POINT 2
(EXAMPLE A)

204567.004 204568 Common, CMN

13

$$\angle KJL = 72^\circ$$

$$\angle JLK = 60^\circ$$

$$\angle LKJ = 48^\circ$$

The student's response is correct.

SCORE POINT 2
(EXAMPLE B)

204567.004 204568 Common, CMN

13

$$J.) 72^\circ, L.) 61^\circ, K.) 48^\circ$$

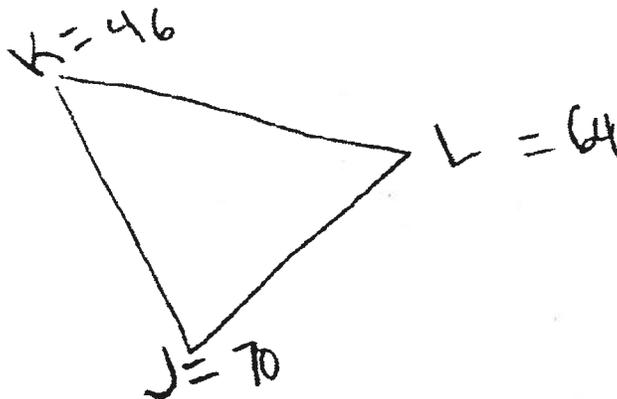
The student's response is correct.

SCORE POINT 2
(EXAMPLE C)

204567.004 204568 Common, CMN

13

The student's response is correct. Measure for $\angle L$ is outside the acceptable limit but correctly determined using 180° as sum of angle measures.



NECAP 2012 RELEASED ITEMS
Grade 7 MATH

SCORE POINT 1

204567.004 204568 Common, CMN

13

$$K = 132^\circ$$

$$J = 72^\circ$$

$$L = 60^\circ$$

The student's response has two correct angle measures with correct angle labels.

SCORE POINT 0
(EXAMPLE A)

204567.004 204568 Common, CMN

13

$$J - L = 73^\circ$$

$$L - K = 60^\circ$$

$$K - J = 62^\circ$$

The student's response is incorrect.

SCORE POINT 0
(EXAMPLE B)

204567.004 204568 Common, CMN

13

$$J = 72^\circ$$

$$L = 30^\circ$$

$$K = 42$$

The student's response is incorrect.

NECAP 2012 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 $2n + 1$).

145144.005 147160 Common, CMN

- 14** A copy store charges a one-time fee of \$25 to design a brochure. There is an additional cost to print copies of the brochure. This table shows the total cost of designing and printing different numbers of copies of the brochure.

Number of Copies Printed	Total Cost
10	\$ 40
20	\$ 55
30	\$ 70
40	\$ 85
50	\$100

The pattern in the table continues.

- a. What is the total cost to print exactly 15 copies of the brochure?

- b. How many copies of the brochure can be printed for a total cost of \$160?

Scoring Guide:

Score	Description
2	for correct answer in part a, (\$) 47.50 , and in part b, 90
1	for correct answer in part a only OR for correct answer in 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

NECAP 2012 RELEASED ITEMS
Grade 7 MATH

SCORE POINT 2

145144.005 147160 Common, CMN

14

a. \$47.50

Part a: The student's response is correct.

b. 90 copies

Part b: The student's response is correct.

SCORE POINT 1

145144.005 147160 Common, CMN

14

a. 15 copies = \$7.50

10 - 20 = 15 difference

$$\begin{array}{r} 7.50 \\ 2 \overline{)15.0} \\ \underline{14} \\ 10 \\ \end{array}$$

Part a: The student's response is incorrect.

b. 60 = 90 copies

$$\begin{array}{r} 15 \\ \times 4 \\ \hline 60 \end{array}$$

$$50 + 10 + 10 + 10 + 10 = 90$$

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

SCORE POINT 0

145144.005 147160 Common, CMN

14

a.
$$\begin{array}{l} 10 \text{ copies} = \$40 \\ 15 \text{ copies} = \$45 \\ 20 \text{ copies} = \$55 \\ 25 \text{ copies} = \$60 \end{array}$$

Part a: The student's response is incorrect.

b.
$$\begin{array}{l} 50 = 100 \\ 60 = 140 \\ 70 = 155 \\ 75 = \$160 \end{array}$$

Part b: The student's response is incorrect.

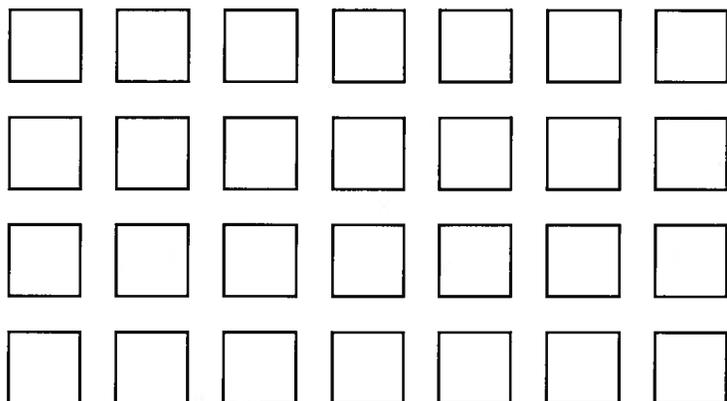
NECAP 2012 RELEASED ITEMS
Grade 7 MATH

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.



125344.001 125345 Common, CMN

- 15 The ratio of boys to girls in a school chorus is 3:4. These squares represent the students in the chorus. Each square represents one student.



- How many squares should be shaded to represent the boys in the chorus?
- What is the ratio of the number of boys to the total number of students in the chorus?
- Some more boys join the chorus. No more girls join. This changes the ratio of the number of boys to the total number of students to 1:2. What is the total number of boys in the chorus now? Show your work or explain how you know.

NECAP 2012 RELEASED ITEMS
Grade 7 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:

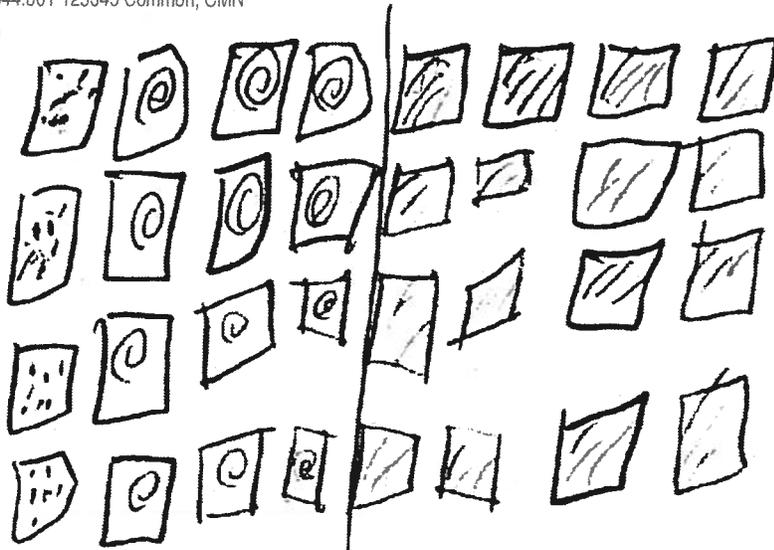
- Part a: 1 point for correct answer, **12**
- Part b: 1 point for correct answer, **3:7**, or equivalent
- Part c: 2 points for correct answer, **16**, with sufficient explanation or work shown to indicate correct strategy

OR

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

125344.001 125345 Common, CMN

15



@ = boys

/// = girls

⋮ = boys joined after

a. 12 squares

b. 3:7

c. 16

Part a: The student's response is correct.

Part b: The student's response is correct.

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

NECAP 2012 RELEASED ITEMS
Grade 7 MATH

SCORE POINT 3

125344.001 125345 Common, CMN

15

A- 12

Part a: The student's response is correct.

B- 3:7

Part b: The student's response is correct.

C- 16

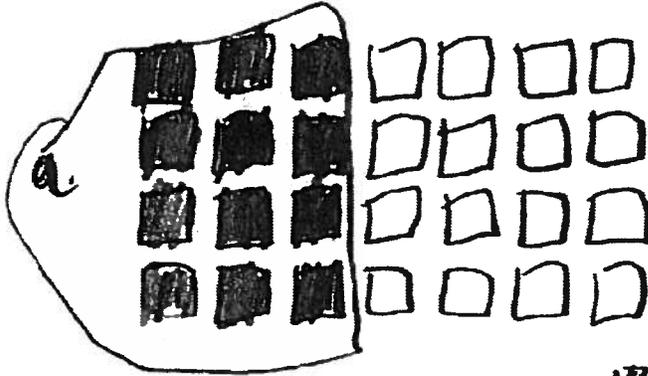
Part c: The student's response is correct,
with no work shown.

NECAP 2012 RELEASED ITEMS
Grade 7 MATH

SCORE POINT 2

125344.001 125345 Common, CMN

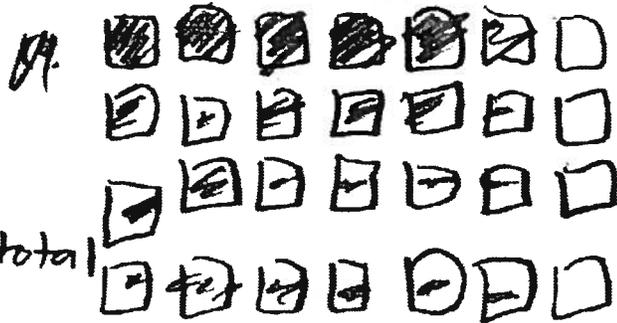
15



Part a: The student's response is correct.

b. 12 : 28

Part b: The student's response is correct.



28 = total

12 = boys

c. 24 boys

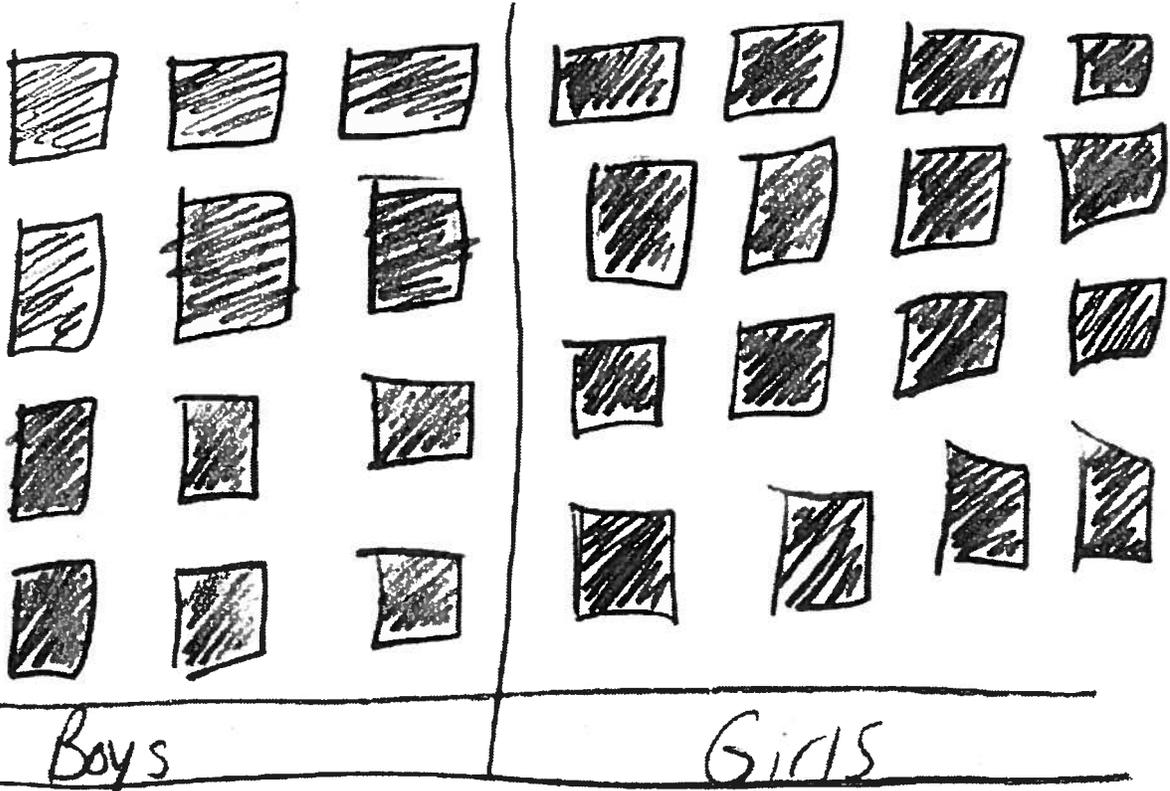
Part c: The student's response is incorrect.

NECAP 2012 RELEASED ITEMS
Grade 7 MATH

SCORE POINT 1

125344.001 125345 Common, CMN

15



- a. 12 should be shaded in.
- b. 11:28 is the ratio.
- c. 20 boys are in the chorus

Part a: The student's response is correct.

Part b: The student's response is incorrect.

Part c: The student's response is incorrect.

NECAP 2012 RELEASED ITEMS
Grade 7 MATH

SCORE POINT 0

125344.001 125345 Common, CMN

15

a Half is BOYS and
Half is girls.

Part a: The student's response is incorrect.

Part b: The student did not attempt.

Part c: The student did not attempt.

Grade 7 Mathematics Released Item Information – 2012

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