



**NEW ENGLAND
COMMON ASSESSMENT PROGRAM**

**Released Items
Support Materials
2011**

**Grade 5
Mathematics**

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

N&O 4.1 Demonstrates conceptual understanding of rational numbers with respect to: whole numbers from 0 to 999,999 through equivalency, composition, decomposition, or place value **using models, explanations, or other representations**; and positive fractional numbers (benchmark fractions: $a/2$, $a/3$, $a/4$, $a/5$, $a/6$, $a/8$, or $a/10$, where a is a whole number greater than 0 and less than or equal to the denominator) as a part to whole relationship in area, set, or linear models where the number of parts in the whole are equal to, and a multiple or factor of the denominator; and **decimals as hundredths** within the context of money, or tenths within the context of metric measurements (e.g., 2.3 cm) **using models, explanations, or other representations**.

- 1 What number is equivalent to 4 thousands + 6 hundreds + 23 tens + 5 ones?
- A. 46,235
 - B. 4,925
 - C. 4,835
 - D. 4,628

**NECAP 2011 RELEASED ITEMS
GRADE 5 MATH**

N&O 4.2 Demonstrates understanding of the relative magnitude of numbers from 0 to 999,999 by ordering or comparing whole numbers; and ordering, comparing, or identifying equivalent proper positive fractional numbers; or decimals using models, number lines, or explanations.

2 Look at this chart.

Name of State	Area (in square kilometers)
New Hampshire	24,043
Vermont	24,903

A forest has an area that is greater than the area of New Hampshire and less than the area of Vermont. Which measurement could be the area of the forest?

- A. 24,030 square kilometers
- B. 24,920 square kilometers
- C. 24,100 square kilometers
- D. 24,005 square kilometers

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

N&O 4.3 **Demonstrates conceptual understanding of mathematical operations** by describing or illustrating the relationship between repeated subtraction and division (no remainders); the inverse relationship between multiplication and division of whole numbers; or the addition or subtraction of positive fractional numbers with like denominators using models, number lines, or explanations.

- 3 Mr. Drake put 84 books into boxes. He put 12 books in each box. Mr. Drake determined the number of boxes needed by solving the problem below.

Divide 84 by 12.

What is another way to solve this problem?

- A. Divide 12 by 84.
- B. Multiply 12 by 84.
- C. Count the number of times 12 can be subtracted from 84 until 0 is reached.
- D. Find a number that can be added to 12 to reach 84.

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

N&O 4.3 **Demonstrates conceptual understanding of mathematical operations** by describing or illustrating the relationship between repeated subtraction and division (no remainders); the inverse relationship between multiplication and division of whole numbers; or the addition or subtraction of positive fractional numbers with like denominators using models, number lines, or explanations.

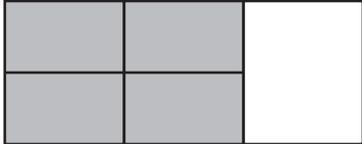


- 4 This rectangle is shaded gray to represent 1 whole.



Which rectangle is shaded gray to represent the sum of $\frac{3}{5}$ and $\frac{1}{5}$?

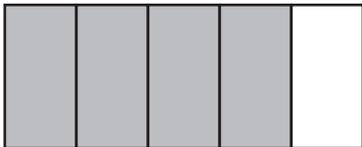
A.



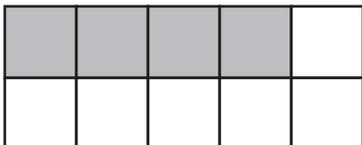
B.



C.



D.



NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

N&O 4.4 Accurately solves problems involving multiple operations on whole numbers or the use of the properties of factors and multiples; and addition or subtraction of decimals and positive proper fractions with like denominators. (Multiplication limited to 2 digits by 2 digits, and division limited to 1 digit divisors.)
(IMPORTANT: Applies the conventions of order of operations where the left to right computations are modified only by the use of parentheses.)



- 5 Cassandra and Jolene scooped candy

into bags at the movie theater.

Cassandra's bag weighed $\frac{2}{8}$ pound.

Jolene's bag weighed $\frac{3}{8}$ pound **more**

than Cassandra's bag. How many

pounds did Jolene's bag weigh?

A. $\frac{1}{8}$ pound

B. $\frac{3}{8}$ pound

C. $\frac{5}{8}$ pound

D. $\frac{5}{16}$ pound

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

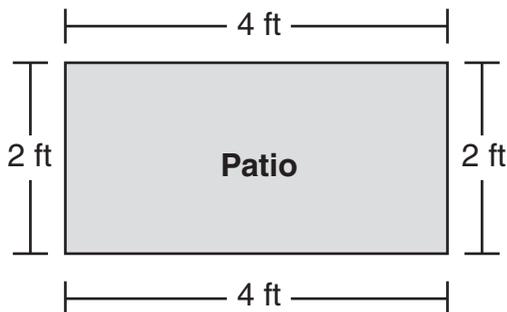
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- 6 Reggie is standing next to a pine tree that is 15 meters tall. Reggie is 1.6 meters tall. How many meters taller is the pine tree than Reggie?
- A. 13.4 meters
 - B. 14.4 meters
 - C. 14.6 meters
 - D. 16.6 meters

G&M 4.6 Demonstrates conceptual understanding of perimeter of polygons, and the area of rectangles, polygons or irregular shapes on grids using a variety of models, manipulatives, or formulas. Expresses all measures using appropriate units.

- 7 This picture shows the shape of a patio.



What is the area of the patio?

- A. 16 square feet
- B. 12 square feet
- C. 8 square feet
- D. 6 square feet

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

F&A 4.1 Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables or sequences; and writes a rule in words or^{sc} symbols to find the next case.

- 8 This table shows the amount of money fifth-grade students will collect for selling different numbers of raffle tickets.

Raffle Ticket Sales

Number of Tickets Sold	10	20	30	40
Money Collected	\$5	\$10	\$15	\$20

Based on this table, how many raffle tickets do the students need to sell to collect \$70?

- A. 35
- B. 90
- C. 140
- D. 350

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

F&A 4.3 Demonstrates conceptual understanding of algebraic expressions by using letters or symbols to represent unknown quantities to write simple linear algebraic expressions involving any one of the four operations; or by evaluating simple linear algebraic expressions using whole numbers.

- 9 This expression represents the number of cans needed to hold t tennis balls.

$$t \div 3$$

How many cans are needed to hold 54 tennis balls?

- A. 18
- B. 51
- C. 57
- D. 162

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

F&A 4.4 **Demonstrates conceptual understanding of equality** by showing equivalence between two expressions using models or different representations of the expressions, by simplifying numerical expressions where left to right computations may be modified only by the use of parentheses [e.g., $14 - (2 \times 5)$] (expressions consistent with the parameters of M(F&A)–4–3), and by solving one-step linear equations of the form $ax = c$, $x \pm b = c$, where a , b , and c are whole numbers with $a \neq 0$.

10 Look at these number sentences.

$$\square + 8 = 24$$

$$\square \div \triangle = 8$$

Each \square has the same value in both of these number sentences.

The \triangle has a different value than the \square .

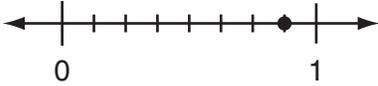
What is the value of the \triangle ?

- A. 2
- B. 3
- C. 8
- D. 16

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

N&O 4.2 Demonstrates understanding of the relative magnitude of numbers from 0 to 999,999 by ordering or comparing whole numbers; and ordering, comparing, or identifying equivalent proper positive fractional numbers; or decimals using models, number lines, or explanations.

11 Look at this number line.



What fraction represents the location of the dot?

Scoring Guide:

Score	Description
1	for correct answer, $\frac{7}{8}$ or equivalent fraction
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 5 MATH

SCORE POINT 1
(EXAMPLE A)

11

$$\frac{7}{8}$$

The student's answer is correct.

SCORE POINT 1
(EXAMPLE B)

11



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

SCORE POINT 0

11

$$.875$$

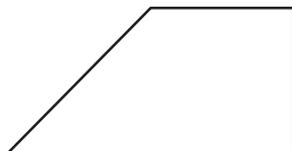
$$.125 \times \text{dot on line 7} = .875$$

The student's answer is not written as a fraction.

NECAP 2011 RELEASED ITEMS
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G&M 4.1 Uses **properties or attributes of angles** (number of angles) **or sides** (number of sides, length of sides, parallelism, or perpendicularity) **to identify, describe, or distinguish among** triangles, squares, rectangles, rhombi, trapezoids, hexagons, or octagons; or classify angles relative to 90° as more than, less than, or equal to.

12 Copy this figure into your Student Answer Booklet.



- Put an *M* next to each angle with a measure of **more** than 90° .
- Put an *L* next to each angle with a measure of **less** than 90° .
- Put an *E* next to each angle with a measure **equal** to 90° .

Scoring Guide:

Score	Description
1	for correctly labeling all 4 angles of the figure
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 5 MATH

SCORE POINT 1
(EXAMPLE A)

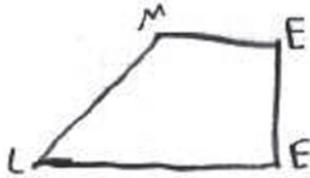
12



The student's answer is correct.

SCORE POINT 1
(EXAMPLE B)

12



The student's answer is correct.

SCORE POINT 0
(EXAMPLE A)

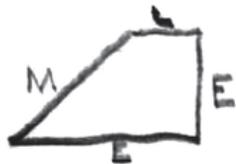
12



The student's answer is incorrect.

SCORE POINT 0
(EXAMPLE B)

12

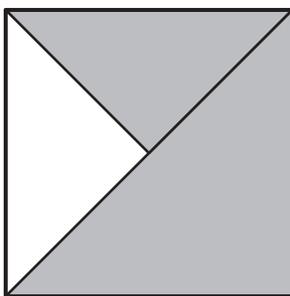


The student's answer is incorrect.

**NECAP 2011 RELEASED ITEMS
GRADE 5 MATH**

N&O 4.1 Demonstrates conceptual understanding of rational numbers with respect to: whole numbers from 0 to 999,999 through equivalency, composition, decomposition, or place value using models, explanations, or other representations; and positive fractional numbers (benchmark fractions: $\frac{a}{2}$, $\frac{a}{3}$, $\frac{a}{4}$, $\frac{a}{5}$, $\frac{a}{6}$, $\frac{a}{8}$, or $\frac{a}{10}$, where a is a whole number greater than 0 and less than or equal to the denominator) as a part to whole relationship in area, set, or linear models where the number of parts in the whole are equal to, and a multiple or factor of the denominator; and **decimals** as hundredths within the context of money, or tenths within the context of metric measurements (e.g., 2.3 cm) **using models, explanations, or other representations.**

- 13 Dylan shaded part of this square gray to represent a fraction.



Dylan's Square

Dylan explained that he shaded the square to represent the fraction $\frac{2}{3}$, because he shaded 2 parts gray out of a total of 3 parts.

- a. What is the mistake in Dylan's explanation?
- b. What fraction of the square is shaded gray?

Scoring Guide:

Score	Description
2	for correct explanation in part a and correct answer in part b, $\frac{3}{4}$
1	for correct explanation in part a or for correct answer in part b
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: Dylan did not divide the square into equal parts.

OR

Student shows how the square can be divided into equal parts.

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

SCORE POINT 2
(EXAMPLE A)

13

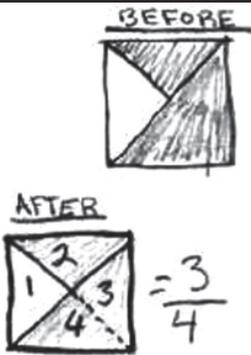
All of the parts must be equal in size.

$$\frac{3}{4}$$

- a) The student's explanation is correct.
b) The student's answer is correct.

SCORE POINT 2
(EXAMPLE B)

13



Dylan forgot that the parts are not equal so instead of coloring in $\frac{2}{3}$ he colored in $\frac{3}{4}$.

- a) The student's explanation is correct.
b) The student's answer is correct.

SCORE POINT 1
(EXAMPLE A)

13

He did not color $\frac{2}{3}$ gray.

$$\frac{3}{4}$$

- a) The student's explanation is incorrect.
b) The student's answer is correct.

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

SCORE POINT 1
(EXAMPLE B)

13

a. Dylan didn't make the parts equal.

b. $\frac{1}{4}$

- a) The student's explanation is correct.
b) The student's answer is incorrect.

SCORE POINT 0
(EXAMPLE A)

13

A There is no mistake in Dylan's explanation

B. $\frac{2}{3}$

- a) The student's explanation is incorrect.
b) The student's answer is incorrect.

SCORE POINT 0
(EXAMPLE B)

13

A: He shaded it wrong because he shaded $\frac{1}{2}$

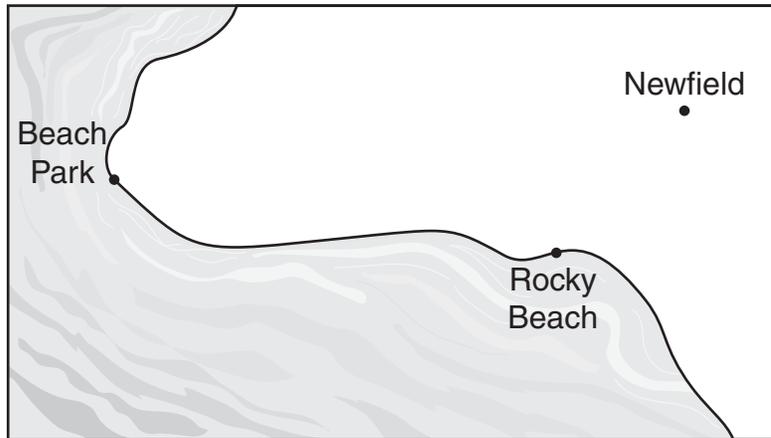
B: $\frac{1}{5}$

- a) The student's explanation is incorrect.
b) The student's answer is incorrect.

**NECAP 2011 RELEASED ITEMS
GRADE 5 MATH**

G&M 4.5 Demonstrates conceptual understanding of similarity by applying scales on maps, or applying characteristics of similar figures (same shape but not necessarily the same size) to identify similar figures, or to solve problems involving similar figures. Describes relationships using models or^{sc} explanations.

14 Look at this map.



Scale
1 inch represents 20 miles

Use a ruler to help you answer this question.

How many **more** miles are between Newfield and Beach Park than between Newfield and Rocky Beach? Show your work or explain how you know.

Scoring Guide:

Score	Description
2	for correct answer, 40 (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 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

Sample Responses:

The distance between Newfield and Beach Park is 3 inches, which represents $20 + 20 + 20 = 60$ miles. The distance between Newfield and Rocky Beach is 1 inch, which represents 20 miles. So the difference is $60 - 20 = 40$ miles.

OR

The distance between Newfield and Beach Park is 3 inches. The distance between Newfield and Rocky Beach is 1 inch.

The difference is $3 - 1 = 2$ inches, which represents $20 + 20 = 40$ miles.

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

SCORE POINT 2

14 40 because Rocky beach and Newfield's are 1 inch apart which is 20 miles and Newfield and Beach Park are 3 inches apart which is 60 miles, but you minus the twenty miles and you get 40.

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

SCORE POINT 1

14
20 miles from Newfield to Rocky Beach
60 miles from Beach Park to Newfield.
$$\begin{array}{r} 60 \\ -20 \\ \hline 30 \text{ miles} \end{array}$$
 ← answer

The student's strategy is appropriate, but contains a computation error.

SCORE POINT 0

14
$$2\frac{1}{8}$$

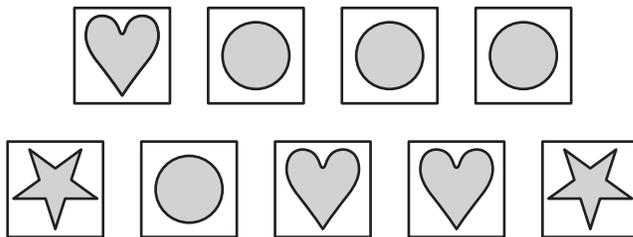
The student's answer is incorrect, with no explanation or work shown.

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

DSP 4.5 For a probability event in which the sample space may or may not contain equally likely outcomes, determines the theoretical probability of an event and expresses the result as part to whole (e.g., two out of five).

- 15 Malana has these nine cards.

Malana's Cards

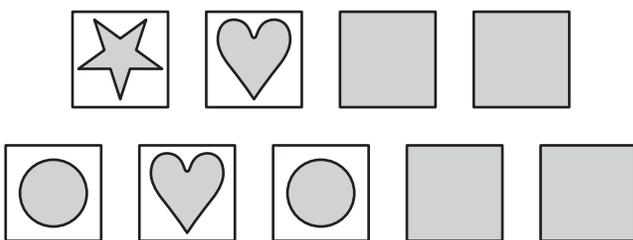


Malana turns her cards facedown and mixes them. Then she picks one of her cards.

- What is the probability that Malana picks a card with a star on it?
- What is the probability that Malana does **not** pick a card with a heart on it?

Kelly has these nine cards. Each card has a star, a heart, or a circle on it. Four of Kelly's cards are facedown, as shown below.

Kelly's Cards



Kelly turns the rest of her cards facedown and mixes them. Then she picks one of her cards.

- The probability that Kelly picks a card with a star on it is 3 out of 9.
 - The probability that Kelly picks a card with a circle on it is less than the probability that she picks a card with a star on it.
- What is the probability that Kelly picks a card with a heart on it? Show your work or explain how you know.

**NECAP 2011 RELEASED ITEMS
GRADE 5 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, **2 out of 9** or **equivalent**

Part b: 1 point for correct answer, **6 out of 9** or **equivalent**

Part c: 2 points for correct answer, **4 out of 9** or **equivalent**, 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 sufficient strategy with incorrect or no answer

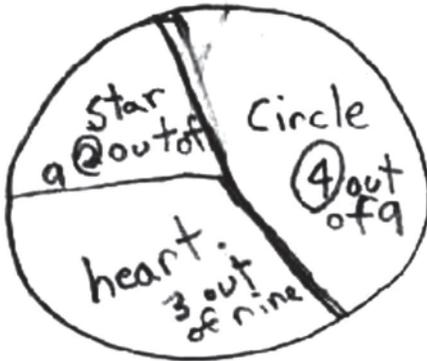
Sample Responses:

Part c: Kelly has 3 stars total. 1 star is showing, so 2 stars are not showing. Kelly has fewer circles than stars so she must have less than 3 circles. 2 circles are showing, so 0 circles are not showing. If there are 2 stars and 0 circles not showing, that leaves 2 cards, which must be hearts. That means there are 4 hearts total. So the probability Kelly picks a heart is $\frac{4}{9}$.

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

SCORE POINT 4
(EXAMPLE A)

15



Malana

- A. 2 out of 9 (not likely)
B. 6 out of 9 (quite likely)

Kelly



c 4 out of 9 (quite likely)

$$\begin{array}{r}
 3 \text{ (star)} \\
 + 2 \text{ (circle)} \\
 \hline
 5
 \end{array}
 \qquad
 \begin{array}{r}
 9 \text{ (cards)} \\
 - 5 \\
 \hline
 4 \text{ heart}
 \end{array}$$

- a) The student's answer is correct. (Showing work is not required.)
b) The student's answer is correct. (Showing work is not required.)
c) The student's answer is correct, with sufficient work shown.

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

SCORE POINT 4
(EXAMPLE B)

15

a. $\frac{2}{9}$

b. $\frac{6}{9}$



- a) The student's answer is correct.
- b) The student's answer is correct.
- c) The student's answer is correct, with sufficient explanation given.

because it said star was $\frac{3}{9}$ and there was only 1 star so I added to more star making it $\frac{3}{9}$ and it said circle was less than $\frac{3}{9}$ and we had $\frac{2}{9}$ so the last were hearts making it $\frac{4}{9}$.

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

SCORE POINT 3
(EXAMPLE A)

15

$$a. \frac{2}{9} \quad b. \frac{7}{9}$$

$$c. \frac{4}{9}$$



- a) The student's answer is correct.
- b) The student's answer is incorrect.
- c) The student's answer is correct, with sufficient work shown.

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

SCORE POINT 3
(EXAMPLE B)

15

A. 2 out of 9

B. 7 out of 9

C. 4 out of 9 because it

says the probability of Malana to pick a star is 3 out of 9 and the cards show 1 star so 2 of the facedown cards must be a star. Then it says that the probability for a circle is less than a star so none of the facedown cards are a circle. The other two facedown cards must be hearts so 2 hearts + 2 hearts equals 4.

- a) The student's answer is correct.
- b) The student's answer is incorrect.
- c) The student's answer is correct, with sufficient explanation given.

SCORE POINT 2

15

A = $\frac{2}{9}$ ^{Malana} of a chance

B = $\frac{6}{9}$ of a chance

Melly
C = $\frac{3}{9}$ of a chance

- a) The student's answer is correct.
- b) The student's answer is correct.
- c) The student's answer is incorrect, with incorrect work shown.

9 cards
- 6 not hearts

3 hearts

3/9 chance

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

SCORE POINT 1
(EXAMPLE A)

15

a. The probability is low because she only has 2 stars and 4 circles

b. It is high because there is 1 heart and 4 circles.



- a) The student's answer is incorrect.
- b) The student's answer is incorrect.
- c) The student's strategy is appropriate with no answer given.

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

SCORE POINT 1
(EXAMPLE B)

15

a. 2 out of 9 $\frac{2}{9}$

b. 3 out of 6 = $\frac{1}{2}$

c. 3 out of 9 $\frac{3}{9}$

Because one heart was face down and I saw the other heart face up in the cards above it and there were 3 hearts and 9 cards altogether so the probability is 3 out of nine.

- a) The student's answer is correct.
- b) The student's answer is incorrect.
- c) The student's answer is incorrect, with incorrect explanation given.

NECAP 2011 RELEASED ITEMS
GRADE 5 MATH

SCORE POINT 0
(EXAMPLE A)

15

- (A) 20 out of 100 for a star picked.
- (B) 60 out of 100 not to pick a heart.
- (C) The probability that Kelly star on it is not 3 out of 9.
Picking a circle is not less than picking a star.

- a) The student's answer is incorrect.
b) The student's answer is incorrect.
c) The student's answer is incorrect, with incorrect explanation given.

SCORE POINT 0
(EXAMPLE B)

15

- a. 2
- b. 6
- c. 3
- because there are 3 cards of hearts.

- a) The student's answer is incorrect.
b) The student's answer is incorrect.
c) The student's answer is incorrect, with incorrect explanation given.

Grade 5 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	NO	NO	NO	NO	NO	GM	FA	FA	FA	NO	GM	NO	GM	DP
GLE Code	4-1	4-2	4-3	4-3	4-4	4-4	4-6	4-1	4-3	4-4	4-2	4-1	4-1	4-5	4-5
Depth of Knowledge Code	2	2	1	2	1	1	2	2	1	2	2	1	2	2	3
Item Type ²	MC	SA	SA	SA	SA	CR									
Answer Key	C	C	C	C	C	A	C	C	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