



**NEW ENGLAND
COMMON ASSESSMENT PROGRAM**

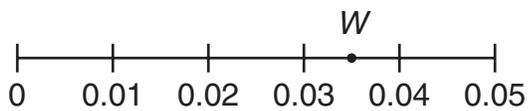
**Released Items
Support Materials
2006**

**Grade 6
Mathematics**

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

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 Look at this number line.



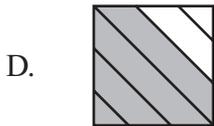
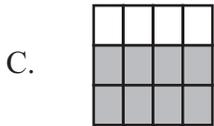
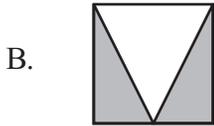
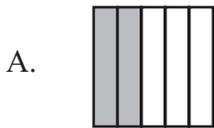
What decimal best represents the location of point W ?

- A. 0.035
- B. 0.045
- C. 0.350
- D. 0.450

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

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2 Which model is shaded gray to represent $\frac{2}{3}$?



**NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS**

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.

- 3 Tasha is drawing a map of her town. The chart below shows the distance between Tasha's house and different places in town.

| Place | Distance from Tasha's House |
|-------------|-----------------------------|
| Park | $1\frac{3}{8}$ miles |
| Post Office | $2\frac{1}{4}$ miles |
| Library | $\frac{3}{4}$ mile |
| School | $1\frac{2}{3}$ miles |

Which place is located more than $1\frac{1}{2}$ miles and less than 2 miles from Tasha's house?

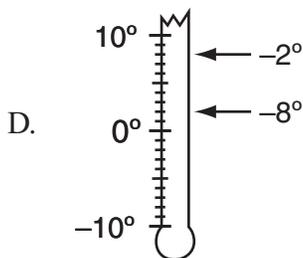
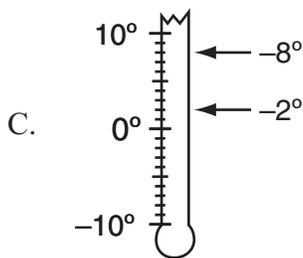
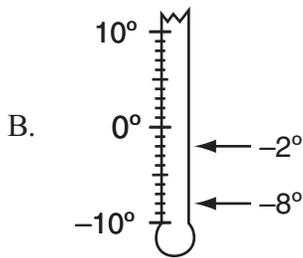
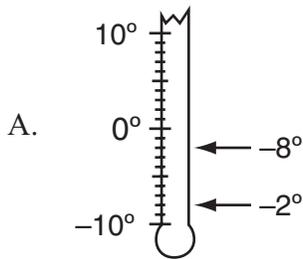
- A. Park
- B. Post Office
- C. Library
- D. School

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

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.



- 4 Which picture shows the correct position of -2° and the correct position of -8° on the thermometer?



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GRADE 6 MATHEMATICS

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.

- 5 Reggie received a free movie ticket for every 15 movies he rented at Sky Videos. Reggie rented 88 movies at Sky Videos. What is the total number of free movie tickets Reggie received?
- A. 4
 - B. 5
 - C. 6
 - D. 7

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.*)



- 6 Mr. Mason owes \$21.28 for his groceries. He pays with a twenty-dollar bill and a five-dollar bill. What is the correct amount of change Mr. Mason will receive?
- A. \$3.72
 - B. \$3.82
 - C. \$4.28
 - D. \$4.72

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GRADE 6 MATHEMATICS

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.*)



- 7 Here are the clues to Gina's number.
- Her number is a factor of 27.
 - Her number is a prime number.

What is Gina's number?

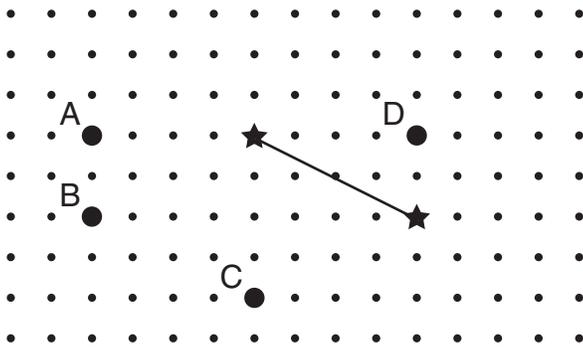
- A. 3
- B. 5
- C. 7
- D. 9

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GRADE 6 MATHEMATICS

G&M 5.1 Uses **properties or attributes of angles** (right, acute, or obtuse) or **sides** (number of congruent sides, parallelism, or perpendicularity) to **identify, describe, classify, or distinguish among different types of triangles** (right, acute, obtuse, equiangular, or equilateral) or **quadrilaterals** (rectangles, squares, rhombi, trapezoids, or parallelograms).



- 8 Marcy is drawing a **right triangle** by placing stars on the grid below and connecting them with line segments.



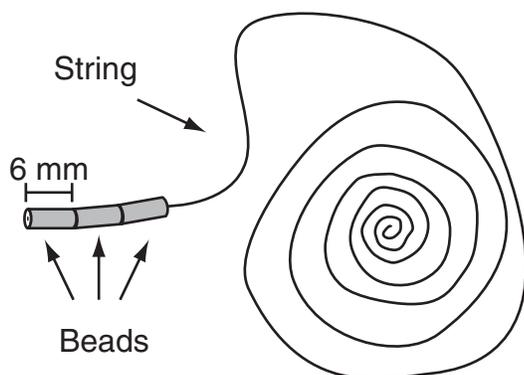
Which point could be the location of the third star of Marcy's right triangle?

- A. Point A
- B. Point B
- C. Point C
- D. Point D

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GRADE 6 MATHEMATICS

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.

- 9 Nadia is putting beads on a piece of string, as shown below.



Each bead is 6 mm long. What is the greatest number of beads Nadia can put on a 60 cm string? [1 cm = 10 mm]

- A. 10
- B. 36
- C. 100
- D. 3600

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GRADE 6 MATHEMATICS

DSP 5.3 Identifies or describes representations or elements of representations that best display a given set of data or situation, consistent with the representations required in M(DSP)-5-1.

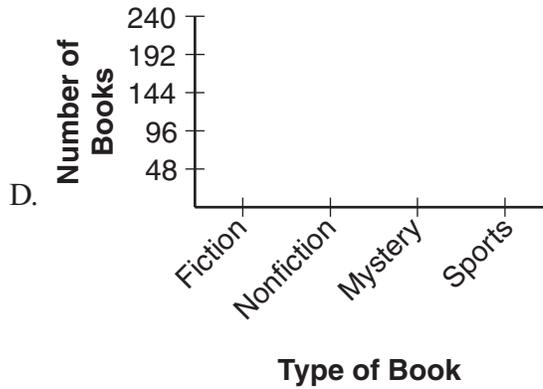
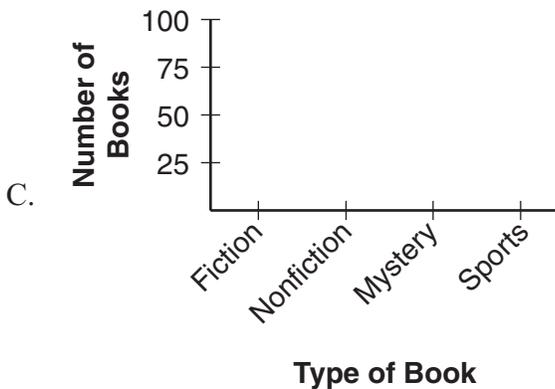
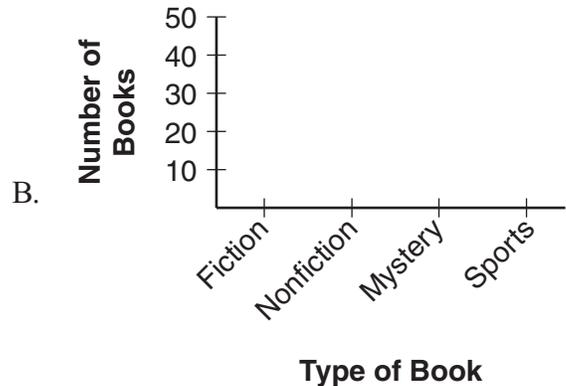
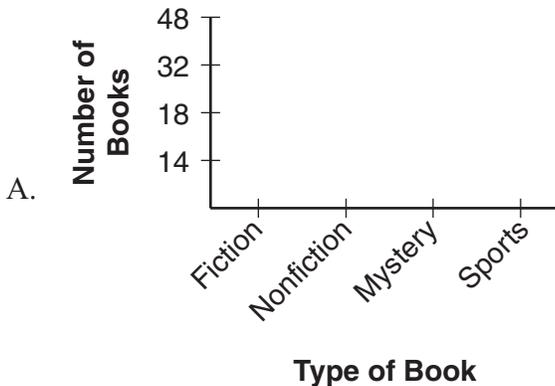


10 Look at this chart.

Books Checked Out from the Library

| Type of Book | Number of Books |
|--------------|-----------------|
| Fiction | 48 |
| Nonfiction | 18 |
| Mystery | 32 |
| Sports | 14 |

The librarian is creating a bar graph of the data in the table. Which scale is **best** for the librarian to use?



NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

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 The length of Moose Trail is 3.75 kilometers. The length of Boulder Trail is 5.5 kilometers. What is the difference in length between Moose Trail and Boulder Trail?

Scoring Guide

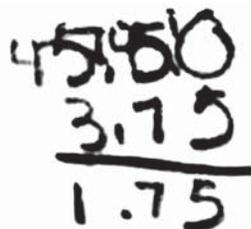
| Score | Description |
|-------|----------------------------------------------------------------------------------------------------------------|
| 1 | Student gives the correct difference in length, 1.75 (kilometers) . |
| 0 | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | No response |

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

SCORE POINT 1
(EXAMPLE A)



1.75 kilo.


$$\begin{array}{r} 45.50 \\ 3.75 \overline{)45.50} \\ \underline{375} \\ 800 \\ \underline{750} \\ 500 \\ \underline{375} \\ 1250 \\ \underline{1125} \\ 1250 \\ \underline{1125} \\ 250 \\ \underline{225} \\ 250 \\ \underline{225} \\ 250 \end{array}$$

Student's answer is correct
(work is not required).

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GRADE 6 MATHEMATICS

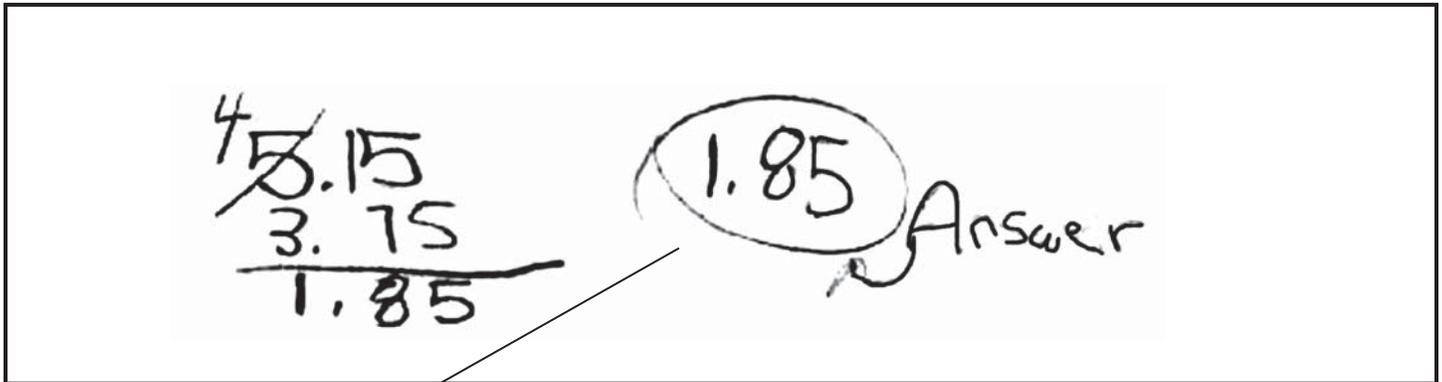
SCORE POINT 0
(EXAMPLE A)



The image shows a student's handwritten work on a math problem. On the left, there is a vertical subtraction problem: 3.75 minus 5.50 . A horizontal line is drawn under 5.50 , and the result 2.25 is written below it. On the right side of the work area, the number 2.25 is written again.

Student's answer is incorrect.

SCORE POINT 0
(EXAMPLE B)



The image shows a student's handwritten work. On the left, there is a vertical subtraction problem: $4\cancel{5}.15$ minus 3.75 . A horizontal line is drawn under 3.75 , and the result 1.85 is written below it. To the right of this, the number 1.85 is circled, and the word "Answer" is written next to it with an arrow pointing to the circled number.

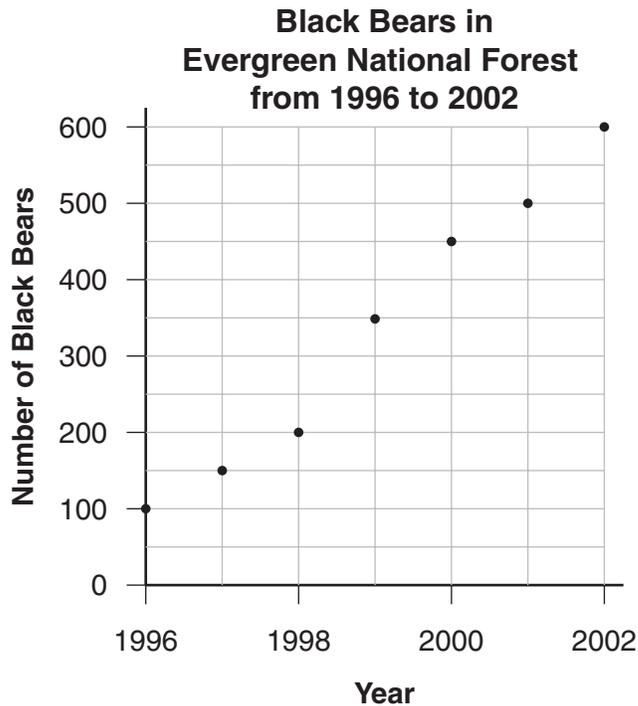
Student's answer is incorrect.

**NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS**

DSP 5.1 Interprets a given representation (tables, bar graphs, circle graphs, or line graphs) 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 $M(DSP)-5-2$.)

12 Look at this graph.



What was the increase in the number of black bears from 1998 to 1999?

Scoring Guide

| Score | Description |
|--------------|----------------------------------------------------------------------------------------------------------------|
| 1 | Student gives the correct increase, 150 (black bears) . |
| 0 | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | No response |

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

SCORE POINT 1
(EXAMPLE A)

150

Student's answer is correct.

SCORE POINT 0
(EXAMPLE A)

It went from 200 to 330. It went up 130.

Student's answer is incorrect.

**NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS**

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.

13 Jasmine drew a rectangle with the following properties.

- The area is 32 square centimeters.
- The length is twice the width.

What is the perimeter of Jasmine's rectangle? Show your work or explain how you know.

Scoring Guide

| Score | Description |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Student gives correct answer, 24 (cm) , with work shown or explanation given. |
| 1 | Student gives correct answer but no work or explanation. OR Work or explanation shows correct strategy in solving the problem, but there is a computation error. |
| 0 | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | No response |

Sample Response:

Jasmine's rectangle has a length of 8 cm and a width of 4 cm, since 8 is twice 4 and the area is $4 \times 8 = 32$. So the perimeter of Jasmine's rectangle is $4 + 8 + 4 + 8 = 24$ centimeters.

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GRADE 6 MATHEMATICS

SCORE POINT 2
(EXAMPLE A)

$8 \times 4 = 32$
 $8 + 8 + 4 + 4 = 24$

24

Student's answer is correct, with work shown (units not required). (2 points)

SCORE POINT 1
(EXAMPLE A)

length
6

width
16

area
32

answer: 24

Student's answer is correct. (1 point)

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

SCORE POINT 0
(EXAMPLE A)

$$\begin{array}{r} 30 \\ \times 2 \\ \hline 64 \end{array}$$

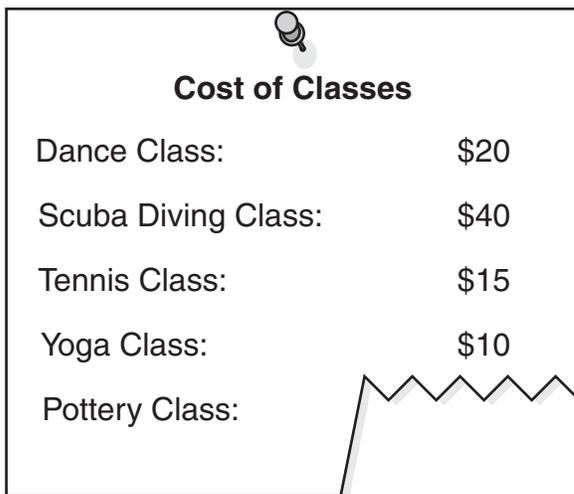
The perimeter is 64 square
Cenemeters

Student's answer is incorrect and
does not show a correct strategy.
(0 points)

**NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS**

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.

- 14 The sign below shows a community center’s five classes and the costs of four of the classes. The bottom of the sign is torn.



The average (mean) cost of a class is \$22. How much does a pottery class cost at this community center? Show your work or explain how you know.

Scoring Guide

| Score | Description |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Student gives correct answer, \$25 , with work shown or explanation given. |
| 1 | Student gives correct answer with incomplete or no work or explanation. OR Work or explanation shows correct strategy in solving the problem, but there is a computation error. |
| 0 | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |
| Blank | No response |

Sample Response:

Sum of all costs equals $5 \times 22 = 110$. Sum of the first 4 costs equals 85. So the cost of the pottery class is $110 - 85 = \$25$.

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

SCORE POINT 2
(EXAMPLE A)

$\$25$

$$\begin{array}{r} \$22 \\ \times 5 \\ \hline \$110 \end{array}$$

20
40
15
+10

\$85

$$\begin{array}{r} \$110 \\ - 85 \\ \hline \$25 \end{array}$$

Student's answer is correct, with work shown. (2 points)

SCORE POINT 1
(EXAMPLE A)

25

Student's answer is correct, with no work shown or explanation given. (1 point)

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

SCORE POINT 1
(EXAMPLE B)

$$\begin{array}{r} 20 \\ 40 \\ 15 \\ 10 \\ 15 \\ \hline 110 \end{array}$$

$$\begin{array}{r} 22 \\ 5 \overline{)110} \\ \underline{100} \\ 10 \\ \underline{10} \\ 0 \end{array}$$

Pottery class costs \$15.00.

Student has a correct strategy, but there is a computation error. (1 point)

SCORE POINT 0
(EXAMPLE A)

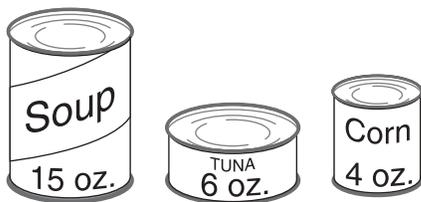
The cost of Pottery Class is \$25.
I found a pattern of \$10 \$15 \$20 so I thought it would be \$25.

Student's answer is correct based on an incorrect strategy. (0 points)

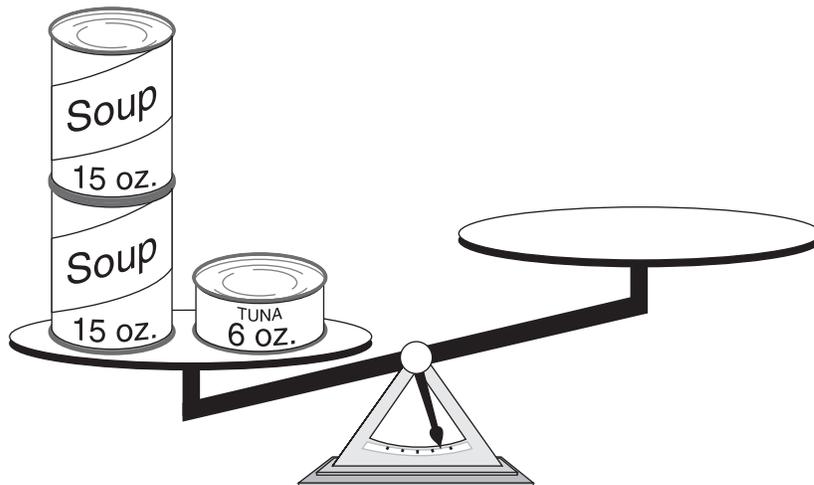
NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

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

- 15 Look at this soup can, tuna can, and corn can.



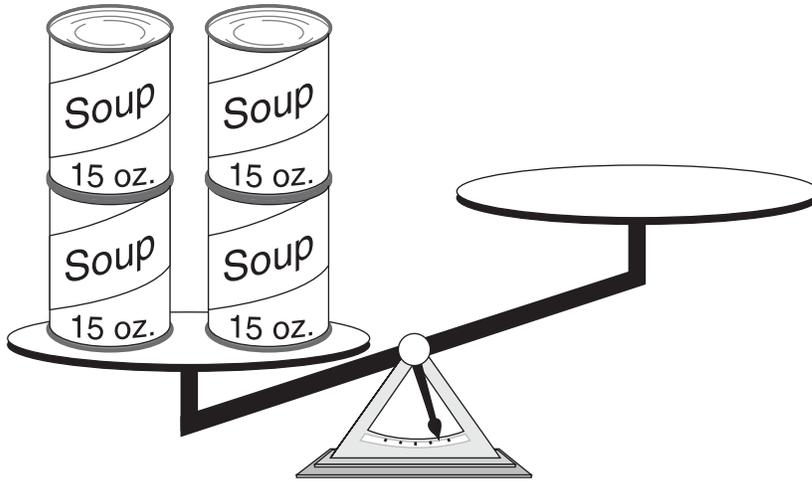
- a. Suzi put exactly 2 soup cans and 1 tuna can on the left side of this balance scale.



How many corn cans does Suzi need to put on the **right side** to balance the scale? Show your work or explain how you know.

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

b. Nathan put exactly 4 soup cans on the left side of this balance scale.



- Nathan will put **only** tuna and corn cans on the right side.
- He will put at least one corn can and one tuna can on the right side.

How many tuna cans and how many corn cans could Nathan put on the **right side** to balance the scale?
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. |
| Blank | No response |

**NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS**

Training Notes:

- Part a: 2 points for the correct answer, **9 (corn cans)**, with work shown or explanation given
OR
1 point for the correct answer with incomplete or no work shown or explanation given
or
for correct strategy shown in solving the problem, but there is a computation error
- Part b: 2 points for the correct combination of tuna cans and corn cans that have a total weight of 60 oz (with at least one corn can and one tuna can), with work shown or explanation given
OR
1 point for the correct answer with incomplete or no work shown or explanation given
or
for correct strategy shown in solving the problem, but there is a computation error

Sample Responses:

Part a: $2 \times 15 + 6 = 36$ oz; $36 \div 4 = 9$

Part b: $4 \times 15 = 60$ oz, with one of the following variations adding tuna and corn:
 $6 + 4 = 10$ oz; $60 \div 10 = 6$, so 6 tuna cans and 6 corn cans
OR
 $2 \times 6 + 12 \times 4 = 12 + 48 = 60$, so 2 tuna cans and 12 corn cans
OR
 $4 \times 6 + 9 \times 4 = 24 + 36 = 60$, so 4 tuna cans and 9 corn cans
OR
 $6 \times 6 + 6 \times 4 = 36 + 24 = 60$, so 6 tuna cans and 6 corn cans
OR
 $8 \times 6 + 3 \times 4 = 48 + 12 = 60$, so 8 tuna cans and 3 corn cans

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

SCORE POINT 4
(EXAMPLE A)

A.

$$\begin{array}{r} 15 \text{ oz.} \\ + 15 \text{ oz.} \\ \hline 30 \text{ oz.} \end{array}$$

$$\begin{array}{r} 4 \text{ oz.} \\ \times 9 \text{ cans} \\ \hline 36 \text{ oz.} \end{array}$$

9 cans of corn will balance the scale.

B.

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

$$\begin{array}{r} 6 \text{ oz.} \\ \times 8 \\ \hline 48 \end{array}$$

$$\begin{array}{r} 4 \text{ oz.} \\ \times 3 \\ \hline 12 \end{array}$$

He should put 8 tuna cans and 3 corn cans to balance the scale.

$$\begin{array}{r} 48 \\ + 12 \\ \hline 60 \text{ oz.} \end{array}$$

b) Student has a correct answer, with work shown. (2 points)

a) Student's answer is correct, with work shown. (2 points)

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

SCORE POINT 3
(EXAMPLE A)

She needs 9 corn can to make it
A. balance because if you add all the soup and
tuna you get 36oz. So 4×9 is 36 so you need 9
cans

B. He needs 6 cans of tuna and 6 cans of corn

a) Student's answer is correct, with explanation given. (2 points)

b) Student has a correct answer, with no work shown or explanation given. (1 point)

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

SCORE POINT 3
(EXAMPLE B)

Handwritten student work for a math problem. The work is divided into two columns by a vertical line. The left column shows two addition problems: $15 + 15 = 30$ and $15 + 15 + 15 = 45$. The right column shows a division problem $4 \overline{)36}$ with a quotient of 9, and a list of items: 6 corn cans and 6 tuna cans. There are also some scattered numbers and a crossed-out '6'.

a) Student's answer is correct, with work shown. (2 points)

b) Student has a correct answer, with incomplete work shown. (1 point)

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

SCORE POINT 2
(EXAMPLE A)

a. 9 corn cans

a) Student's answer is correct,
with no work shown or
explanation given. (1 point)

b- 6 tuna cans
6 corn cans

b) Student has a correct
answer, with no work shown
or explanation given. (1 point)

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

SCORE POINT 2
(EXAMPLE B)

A

$$\begin{array}{r} 15 \\ 15 \\ + 6 \\ \hline 36 \text{ ounces} \end{array}$$

$4 \overline{)36}$ Suzi needs 9 corn cans,

a) Student's answer is correct,
with work shown. (2 points)

B

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

Nathan can put 10 tuna cans
and 5 corn cans,

b) Student's answer is
incorrect and does not show a
correct strategy. (0 points)

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

SCORE POINT 1
(EXAMPLE A)

A. $15 + 15 + 6 = 36$

$4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 = 36^{oz}$

So you would need 36 corn cans

B. $15 + 15 + 15 + 15 = 60^{oz}$

Nathan would need to put 5 tuna cans
and 5 corn cans

b) Student's answer is incorrect, with incomplete work shown. (0 points)

a) Student's strategy is appropriate, with an incorrect answer. (1 point)

NECAP 2006 RELEASED ITEMS
GRADE 6 MATHEMATICS

SCORE POINT 0
(EXAMPLE A)

- Ⓐ 36 ounces on the left side so in order to make it the same with corn cans you need 4 Corn cans to make it the same.
- Ⓑ you would 8 corn cans and 8 tuna cans.

a) Student's answer is incorrect, with incomplete work shown. (0 points)

b) Student's answer is incorrect, with no work shown or explanation given. (0 points)