NAEP Released Items Aligned to the Iowa Core

3.OA.1 Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7.

Kim wants to give 7 stickers to each of her 5 friends. To find out how many stickers she needs, she writes the number sentence 7 + 7 + 7 + 7 + 7 = ☐.

Write a number sentence with multiplication that she could use to find the number of stickers she needs.

2003-4-10-5

Source: National Assessment of Educational Progress, 2003, Grade 4 Mathematics Assessment.

Each of 7 houses has 5 people in it. How many people are there in all?

A. 5
B. 7
C. 12
D. 35
E. 50

2008-9-21-14

Source: National Assessment of Educational Progress, 2008, Age 9 Mathematics Assessment.

3.OA.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.

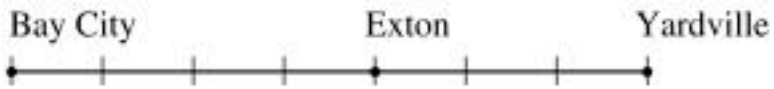
Martha planted 32 seeds. She put 8 seeds in each row. How many rows did she plant?

Which of the following could Martha use to solve the problem correctly?

A. 32 + 8
B. 32 - 8
C. 32 × 8
D. 32 ÷ 8

1996-4-12-3

Source: National Assessment of Educational Progress, 1996, Grade 4 Mathematics Assessment.



On the road shown above, the distance from Bay City to Exton is 60 miles. What is the distance from Bay City to Yardville?

A. 45 miles
B. 75 miles
C. 90 miles
D. 105 miles

2003-4-6-19
2003-8-6-19

Source: National Assessment of Educational Progress, 2003, Grade 4 and Grade 8 Mathematics Assessments.

3.OA.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

Sam placed cookies on a cookie sheet to form 2 rows with 6 cookies in each row. Which of the following number sentences best describes this situation?

A. $2 \times 6 = \square$
B. $2 + 6 = \square$
C. $6 \div 2 = \square$
D. $6 - 2 = \square$

2003-4-7-4

Source: National Assessment of Educational Progress, 2003, Grade 4 Mathematics Assessment.

Pat has 3 fish bowls. There are 4 plants and 5 fish in each bowl. Which gives the total number of fish?

A. $3 + 5$
B. 3×4
C. 3×5
D. $3 + 4 + 5$

2003-4-7-11

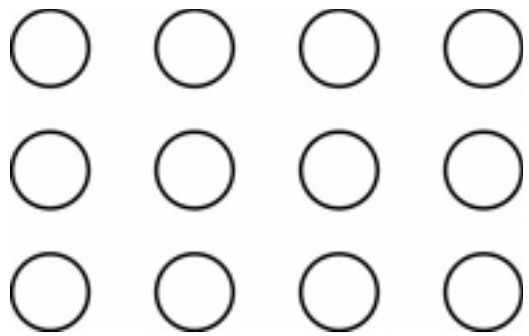
Source: National Assessment of Educational Progress, 2003, Grade 4 Mathematics Assessment.

Max bought 50 plants for his garden. He plans to put 8 plants in each row. How many complete rows of 8 can he plant?

A. 6 rows
B. 7 rows
C. 8 rows
D. 16 rows

1990-4-7-16

Source: National Assessment of Educational Progress, 1990, Grade 4 Mathematics Assessment.



Write a multiplication sentence to find the number of circles above.

ANSWER: _____ x _____= _____

2008-9-21-18

Source: National Assessment of Educational Progress, 2008, Age 9 Mathematics Assessment.

Each of the 18 students in Mr. Hall's class has p pencils. Which expression represents the total number of pencils that Mr. Hall's class has?

A. 18 + p
B. 18 - p
C. 18 x p
D. 18 ÷ p

2011-4-14-15

Source: National Assessment of Educational Progress, 2011, Grade 4 Mathematics Assessment.

N stands for the number of hours of sleep Ken gets each night. Which of the following represents the number of hours of sleep Ken gets in 1 week?

A. *N* + 7
B. *N* - 7
C. *N* x 7
D. *N* ÷ 7

2005-4-12-12

Source: National Assessment of Educational Progress, 2005, Grade 4 Mathematics Assessment.

If $\square$ represents the number of newspapers that Lee delivers each day, which of the following represents the total number of newspapers that Lee delivers in 5 days?

A. $5 + \square$
B. $5 \times \square$
C. $\square + 5$
D. $(\square + \square) \times 5$

1992-4-5-6
1992-8-5-6

Source: National Assessment of Educational Progress, 1992, Grade 4 and Grade 8 Mathematics Assessments.

3.OA.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = \square \div 3$, $6 \times 6 = ?$.

Six students bought exactly enough pens to share equally among themselves. Which of the following could be the number of pens they bought?

A. 46
B. 48
C. 50
D. 52

2003-4-6-11
2003-8-6-11

Source: National Assessment of Educational Progress, 2003, Grade 4 and Grade 8 Mathematics Assessments.

$4 \times \square = \square$ and $\square \times 3 = \square$

What number if placed in each box above would make both equations true?

A. 0
B. 1
C. 2
D. 3
E. 4

1996-12-10-6

Source: National Assessment of Educational Progress, 1996, Grade 12 Mathematics Assessment.

3.OA.5 Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)

4 × 0 × 5 × 9 =

A. 0
B. 36
C. 45
D. 180

2003-4-10-11

Source: National Assessment of Educational Progress, 2003, Grade 4 Mathematics Assessment.

What value of *b* makes the following sentence TRUE?

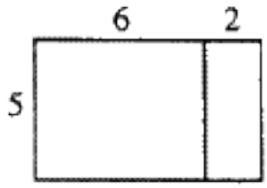
$26 \times b = 26$

2008-13-21-22

Source: National Assessment of Educational Progress, 2008, Age 13 Mathematics Assessment.

Which of the following figures best illustrates the statement

$5 \times (6 + 2) = (5 \times 6) + (5 \times 2)$?

A.


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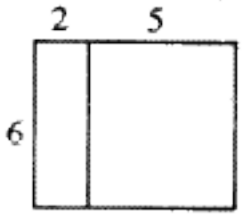

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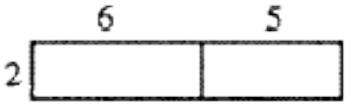
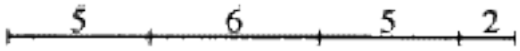


D.

E.


1990-8-7-6
1990-12-7-6

Source: National Assessment of Educational Progress, 1990, Grade 8 and Grade 12 Mathematics Assessments.

3.OA.6 Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.

3.OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

Find the products.

$$\begin{array}{r} 21 \\ \times\ 3 \\ \hline \end{array}$$

2004-9-23-16

Source: National Assessment of Educational Progress, 2004, Age 9 Mathematics Assessment.

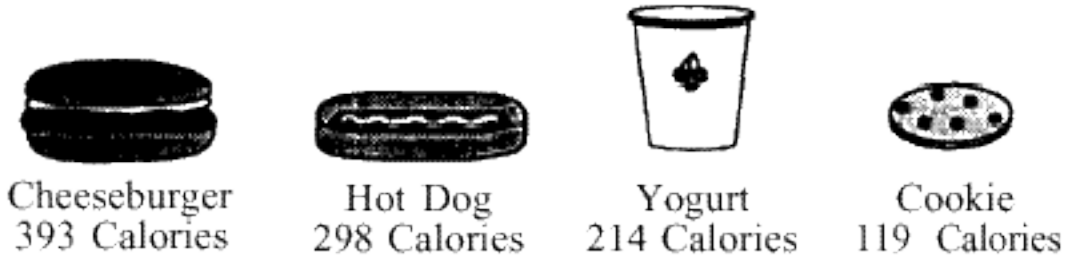
3.OA.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (3.OA.8.)

The Ben Franklin Bridge was 75 years old in 2001. In what year was the bridge 50 years old?

A. 1951
B. 1976
C. 1984
D. 1986

2007-4-11-11

Source: National Assessment of Educational Progress, 2007, Grade 4 Mathematics Assessment.



Which two of the items above would provide a total of about 600 calories?

1992-4-12-7

Source: National Assessment of Educational Progress, 1992, Grade 4 Mathematics Assessment.

A class is trying to collect 450 soup can labels to help get some new gym equipment. In the first week the students collected 60 labels, and in the second week they collected 82 labels. How many more labels do they need to reach their goal?

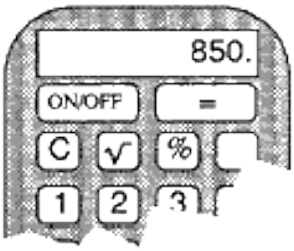
A. 208
B. 308
C. 390
D. 592

1990-4-7-13

Source: National Assessment of Educational Progress, 1990, Grade 4 Mathematics Assessment.

The third grade collected more than 850 bottle caps for an art project. The fourth grade collected more than 500 bottle caps. Using her calculator, Maria found the exact total of all the bottle caps collected by both grades. Which calculator could be hers?

A.

B. 

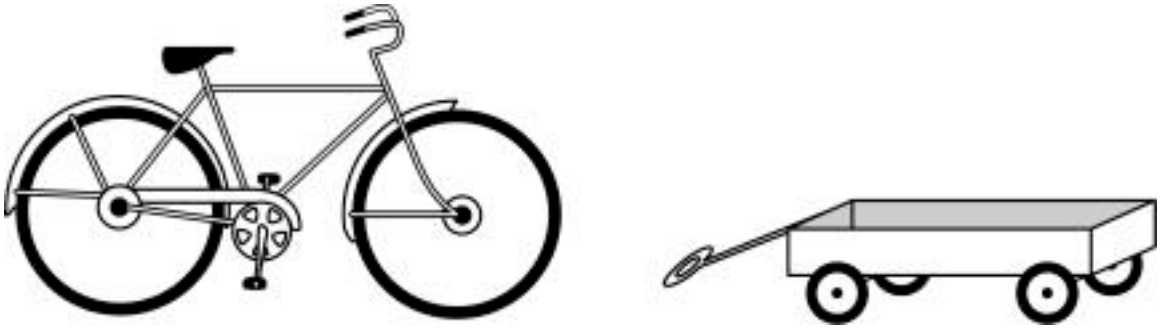
C.

D.

1990-4-9-6

Source: National Assessment of Educational Progress, 1990, Grade 4 Mathematics Assessment.

The following question refers to the situation described below.



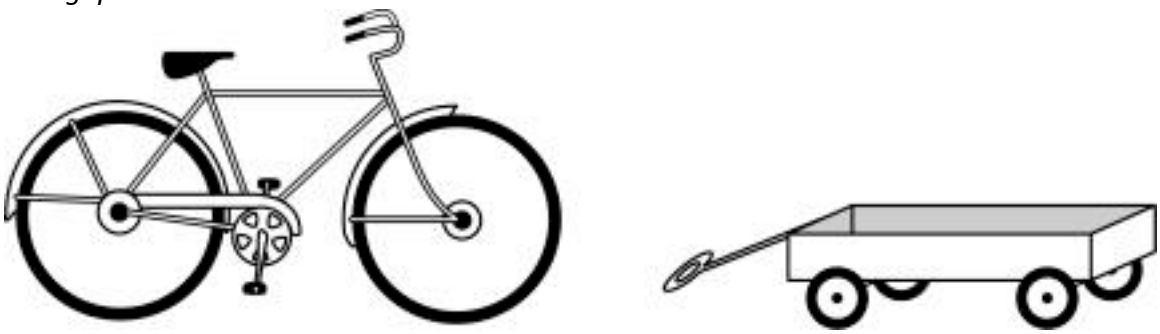
A school yard contains only bicycles and wagons like those in the figure above.

On Monday there were 3 bicycles and 2 wagons in the school yard. How many wheels were in the school yard?

2003-4-7-5

Source: National Assessment of Educational Progress, 2003, Grade 4 Mathematics Assessment.

The following question refers to the situation described below.



A school yard contains only bicycles and wagons like those in the figure above.

On Tuesday the total number of wheels in the school yard was 24. There are several ways this could happen.

a. How many bicycles and how many wagons could there be for this to happen?
   Number of bicycles _____
   Number of wagons _____
b. Find another way that this could happen.
   Number of bicycles _____
   Number of wagons _____

2003-4-7-6

Source: National Assessment of Educational Progress, 2003, Grade 4 Mathematics Assessment.

Bags of Healthy Snack Mix are packed into small and large cartons. The small cartons contain 12 bags each. The large cartons contain 18 bags each.

Meg claimed that she packed a total of 150 bags of Healthy Snack Mix into 2 small cartons and 7 large cartons.

Could Meg have packed the cartons the way she claimed?

◯ Yes ◯ No

Show the computations you used to arrive at your answer.

2011-8-8-9

Source: National Assessment of Educational Progress, 2011, Grade 8 Mathematics Assessment.

Carlos is planning to buy food for his 2 dogs. The food he buys must last for 4 weeks. Each dog eats 1 can of dog food and 3 dog biscuits every day. How many cans of dog food does Carlos need to buy?

Which piece of information is NOT needed to solve the problem below? **You do not have to solve the problem.**

A. Carlos has 2 dogs.
B. The food must last 4 weeks.
C. Each dog eats 1 can of dog food every day.
D. Each dog eats 3 biscuits every day.

2005-8-3-8

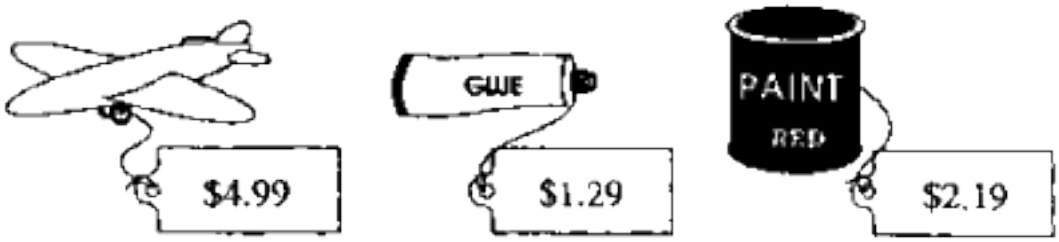
Source: National Assessment of Educational Progress, 2005, Grade 8 Mathematics Assessment.

Carl has 3 empty egg cartons and 34 eggs. If each carton holds 12 eggs, how many more eggs are needed to fill all 3 cartons?

A. 2
B. 3
C. 4
D. 6

2003-4-6-12
2003-8-6-12

Source: National Assessment of Educational Progress, 2005, Grade 4 and Grade 8 Mathematics Assessments.



Chen had $10 to buy a model plane, glue, and paint as shown above. At which of the following times could an estimate have been used instead of exact numbers?

A. When Chen tried to decide whether or not he had enough money to buy the plane, glue, and paint
B. When the clerk entered each amount into the cash register
C. When the clerk told Chen how much he owed
D. When Chen counted his change

1992-4-5-9
1992-8-5-9

Source: National Assessment of Educational Progress, 1992, Grade 4 and Grade 8 Mathematics Assessments.

Kathleen is packing baseballs into boxes. Each box holds 6 baseballs. She has 24 balls. Which number sentence will help her find out how many boxes she will need?

A. $24 - 6 = \square$
B. $24 \div 6 = \square$
C. $24 + 6 = \square$
D. $24 \times 6 = \square$

2004-13-23-10

Source: National Assessment of Educational Progress, 2004, Age 13 Mathematics Assessment.

3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.

A whole number is multiplied by 5. Which of these could be the result?

A. 652
B. 562
C. 526
D. 265

1996-4-12-2

Source: National Assessment of Educational Progress, 1996, Grade 4 Mathematics Assessment.

The difference between 85 and 53 is 32. Meredith added some number to 85 and then added the same number to 53. What would be the difference between the two new numbers?

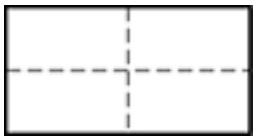
A. More than 32
B. Less than 32
C. 32
D. It depends on the number added to 85 and 53.

1990-4-9-11

Source: National Assessment of Educational Progress, 1990, Grade 4 Mathematics Assessment.

Sam folds a piece of paper in half once. There are 2 sections.

Sam folds the paper in half again. There are 4 sections.



Sam folds the paper in half again. There are 8 sections.

Sam folds the paper in half two more times.
Which list shows the number of sections there are each time Sam folds the paper?

A. 2, 4, 8, 10, 12
B. 2, 4, 8, 12, 24
C. 2, 4, 8, 16, 24
D. 2, 4, 8, 16, 32

2011-4-9-14

Source: National Assessment of Educational Progress, 2011, Grade 4 Mathematics Assessment.

Puppy's Age	Puppy's Weight
1 month	10 lbs.
2 months	15 lbs.
3 months	19 lbs.
4 months	22 lbs.
5 months	?

John records the weight of his puppy every month in a chart like the one shown above. If the pattern of the puppy's weight gain continues, how many pounds will the puppy weigh at 5 months?

A. 30
B. 27
C. 25
D. 24

1992-4-5-15
1992-8-5-15

Source: National Assessment of Educational Progress, 1992, Grade 4 and Grade 8 Mathematics Assessments.

Product
2 x 2 = 4
2 x 2 x 2 = 8
2 x 2 x 2 x 2 = 16
2 x 2 x 2 x 2 x 2 = 32

If the pattern shown continues, could 375 be one of the products in this pattern?

○ Yes ○ No

Explain why or why not.

1992-4-12-12

Source: National Assessment of Educational Progress, 1992, Grade 4 Mathematics Assessment.

If n is any integer, which of the following expressions must be an odd integer?

A. $n + 1$
B. $2n$
C. $2n + 1$
D. $3n$
E. $3n + 1$

2011-8-8-8

Source: National Assessment of Educational Progress, 2011, Grade 8 Mathematics Assessment.

Consider the statement "If *n* is an even number, then *n* is two times an odd number." For which of the following values of *n* is the statement FALSE?

A. 2
B. 6
C. 8
D. 10
E. 14

2003-8-7-11

Source: National Assessment of Educational Progress, 2003, Grade 8 Mathematics Assessment.