NAEP Released Items Aligned to the Iowa Core

7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

2x + 3y + 4x =

A. 9xy
B. 9x y
C. 5xy + 4x
D. 6x + 3y

2004-13-23-36

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

2x + 3y + 4x =

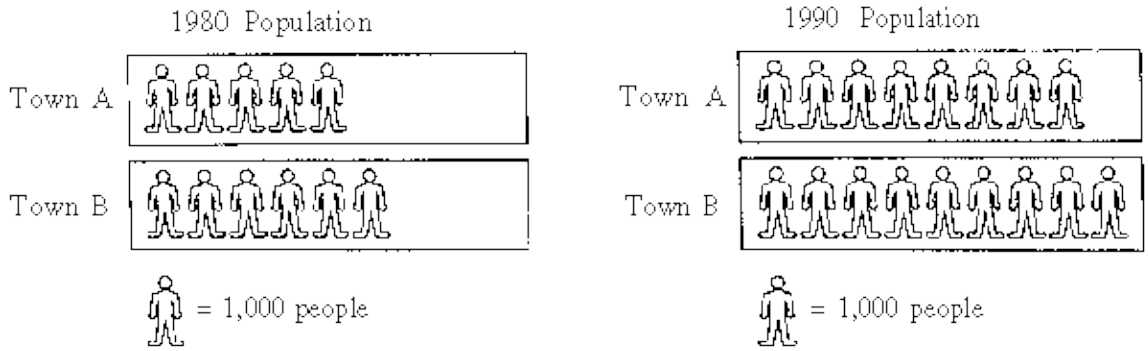
A. 9xy
B. 9x y
C. 5xy + 4x
D. 6x + 3y

2004-17-23-18

Source: National Assessment of Educational Progress, 2004, Age 17 Mathematics Assessment.

7.EE.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."

7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.



In 1980, the populations of Town A and Town B were 5,000 and 6,000, respectively. The 1990 populations of Town A and Town B were 8,000 and 9,000, respectively.

Brian claims that from 1980 to 1990 the populations of the two towns grew by the same amount.

Use mathematics to explain how Brian might have justified his claim.

Darlene claims that from 1980 to 1990 the population of Town A had grown more. Use mathematics to explain how Darlene might have justified her claim.

1996-8-12-5
1996-12-12-5

Source: National Assessment of Educational Progress, 1996, Grade 8 and Grade 12 Mathematics Assessments.

Video Store A	Video Store B
$2.65 per tape for one night	$3.00 per tape for 2 nights
$1.50 charge for each additional night	1 credit if tape returned after one night
Every 10th tape **free** for one night	Every 10 credits = one **free** rental

The Peterson family rents 30 videotapes yearly, of which 23 are rented for one night only and 7 are rented over a period of two nights. Given the rental fee structures shown above, fill in the chart below with the total yearly cost for the Petersons at each store. (Note: The 30 tapes include the free tapes earned.)

Store	Total Cost
A	
B	

1992-12-7-13

Source: National Assessment of Educational Progress, 1992, Grade 12 Mathematics Assessment.

In a school fund-raiser, 10 students in class A sold an average (arithmetic mean) of 4 boxes of cookies. In class B, 15 students sold an average of 9 boxes. What was the average number of boxes of cookies sold by the 25 students?

A. $\frac{13}{25}$

B. 1

C. $6\frac{1}{2}$

D. 7

E. $13\frac{6}{13}$

2005-12-3-13

Source: National Assessment of Educational Progress, 2005, Grade 12 Mathematics Assessment.

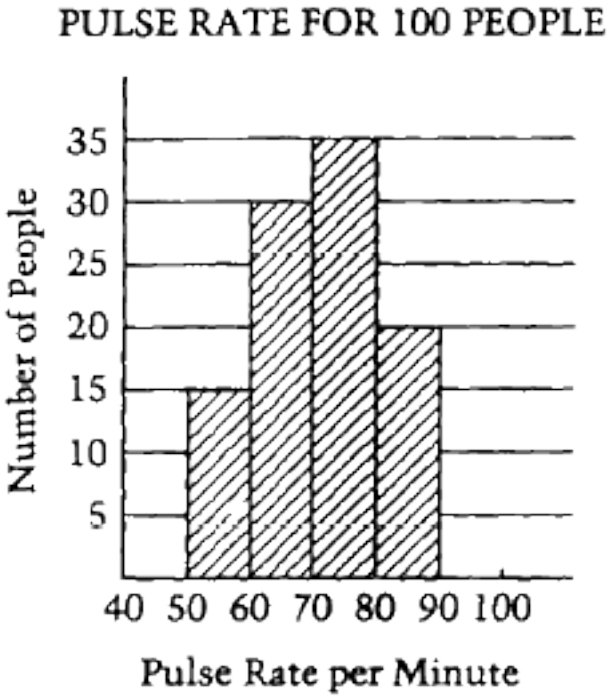
TIME CARD Name: J. Jasmine	Number of hours	Average Hourly Wage	Total Daily Earnings
Mon. 10:00 a.m. - 3:00 p.m.	5	5.50	27.50
Tues. 9:00 a.m. - 4:00 p.m.	7	5.50	38.50
Wed. 3:00 p.m. - 7:00 p.m.	4	5.75	23.00
Thurs. 2:00 p.m. - 8:00 p.m.	6		
Fri. 5:00 p.m. - 10:00 p.m.	5	6.00	30.00

According to the information above, what is the average hourly wage for Thursday's earnings if the total earnings for the five days was $153.50?

The hourly wage rate changes at some hour during the day. At what time does the hourly wage rate change?

1996-12-12-2

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



The pulse rate for a group of 100 people is shown in the graph above. What is the average pulse rate per minute for these 100 people?

(Note: Use the midpoint of each interval to represent the pulse rate for the entire interval. For example, 55 would be used for the pulse rate of the 15 people in the 50-60 group.)

1992-12-7-12

Source: National Assessment of Educational Progress, 1992, Grade 12 Mathematics Assessment.

Yvonne has studied the cost of tickets over time for her favorite sports team. She has created a model to predict the cost of a ticket in the future. Let *C* represent the cost of a ticket in dollars and *y* represent the number of years in the future. Her model is as follows.

$$C = 2.50\,y + 13$$

Based on this model, how much will the cost of a ticket increase in two years?

A. $5
B. $8
C. $13
D. $18
E. $26

2005-12-3-5

Source: National Assessment of Educational Progress, 2005, Grade 12 Mathematics Assessment.

7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?
b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.

The admission price to a movie theater is $7.50 for each adult and $4.75 for each child. Which of the following equations can be used to determine T, the total admission price, in dollars, for x adults and y children?

A. $T = (7.50 + 4.75)(x + y)$
B. $T = 7.50x + 4.75y$
C. $T = 7.50y + 4.75x$
D. $T = (7.50x)(4.75y)$
E. $T = (7.50 + 4.75) + (x + y)$

2011-8-8-3

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

A rectangle has a width of m inches and a length of k inches. If the perimeter of the rectangle is 1,523 inches, which of the following equations is true?

A. $2(m + k) = 1{,}523$
B. $2m + k = 1{,}523$
C. $m + k = 1{,}523$
D. $mk = 1{,}523$
E. $m^2k^2 = 1{,}523$

2011-8-9-10

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

If $15 + 3x = 42$, then $x =$

A. 9
B. 11
C. 12
D. 14
E. 19

2007-8-9-4

Source: National Assessment of Educational Progress, 2007, Grade 8 Mathematics Assessment.

The temperature in degrees Celsius can be found by subtracting 32 from the temperature in degrees Fahrenheit and multiplying the result by $\frac{5}{9}$. If the temperature of a furnace is 393 degrees Fahrenheit, what is it in degrees Celsius, to the nearest degree?

A. 649
B. 375
C. 219
D. 201
E. 187

2007-8-9-14

Source: National Assessment of Educational Progress, 2007, Grade 8 Mathematics Assessment.

At the school carnival, Carmen sold 3 times as many hot dogs as Shawn. The two of them sold 152 hot dogs altogether. How many hot dogs did Carmen sell?

A. 21
B. 38
C. 51
D. 114
E. 148

2007-8-11-15

Source: National Assessment of Educational Progress, 2007, Grade 8 Mathematics Assessment.

The cost to rent a motorbike is given by the following formula:

Cost = ($3 × number of hours) + $2

Fill in the table below.

Time in Hours	Cost in Dollars
1	5
4	
	17

1990-8-9-10

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

Angie has a bag containing n apples. She gives 4 to her brother and keeps 5 for herself. She then divides the remaining apples equally among 3 friends. Which of the following expressions represents the number of apples each friend receives?

A. $\frac{n}{3}-4-5$

B. $\frac{n-4-5}{3}$

C. $\frac{4+5-n}{3}$

D. $\frac{n-4}{3}-5$

E. $\frac{n-5}{3}-4$

2009-12-7-6

Source: National Assessment of Educational Progress, 2009, Grade 12 Mathematics Assessment.

Henry is older than Bill, and Bill is older than Peter. Then

A. Henry is older than Peter.
B. Henry is younger than Peter.
C. Henry is the same age as Peter.
D. there is not enough information given to tell which is true.

2004-13-23-14
2004-17-23-3

Source: National Assessment of Educational Progress, 2004, Age 13 and Age 17 Mathematics Assessments.