NAEP Released Items Aligned to the Iowa Core

3.MD.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.

MOVIE TIMES	
Early Show	3:15
Late Show	7:30

The early show and the late show for a movie last the same amount of time. The early show begins at 3:15 P.M. and ends at 4:27 P.M. The late show begins at 7:30 P.M. At what time does the late show end?

Show your work.

2011-4-8-15

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

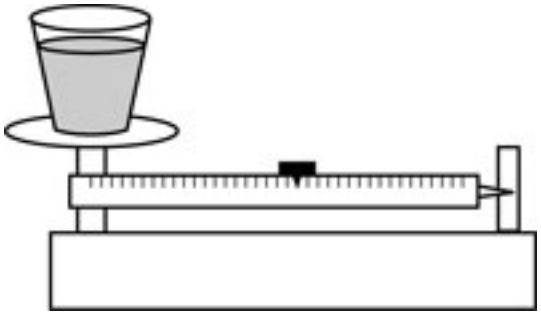
The time is now 10:18 P.M. In how many minutes will it be 11:00 P.M.?

A. 12
B. 18
C. 22
D. 42
E. 82

2008-9-21-5

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

3.MD.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.



What is being measured?

A. The amount of water in the cup
B. The height of the water in the cup
C. The weight of the cup of water
D. The temperature of the water

2007-4-11-1

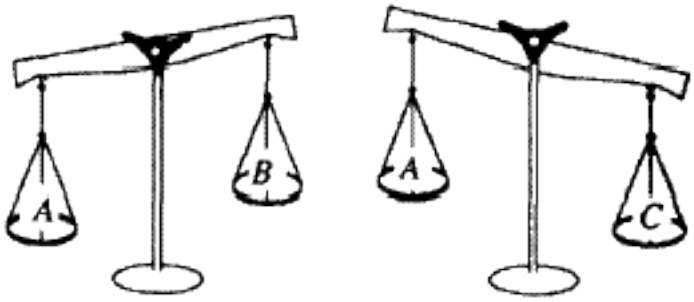
Source: National Assessment of Educational Progress, 2007, Grade 4 Mathematics Assessment.

Which of the following would be used to find the weight of an apple?

A. A measuring cup
B. A ruler
C. A scale
D. A thermometer

2003-4-10-4

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



The weights of three objects were compared using a pan balance. Two comparisons were made as shown in the figure above. Which object is the heaviest?

A. *A*
B. *B*
C. *C*
D. Not enough information is given

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

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

What is the weight shown on the scale?

A. 6 pounds
B. 7 pounds
C. 51 pounds
D. 60 pounds

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

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

Which unit would you use to tell the temperature outside?

A. Degree
B. Gram
C. Liter
D. Meter

2008-9-21-12

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

About how many kilograms does a bicycle weigh?

A. 1.5 kilograms
B. 15 kilograms
C. 150 kilograms
D. 1500 kilograms

2004-9-23-21

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

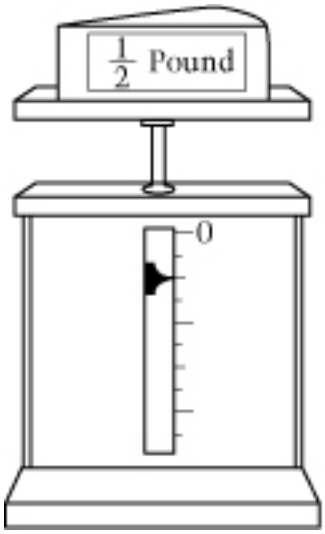
Which of the following is a unit of volume?

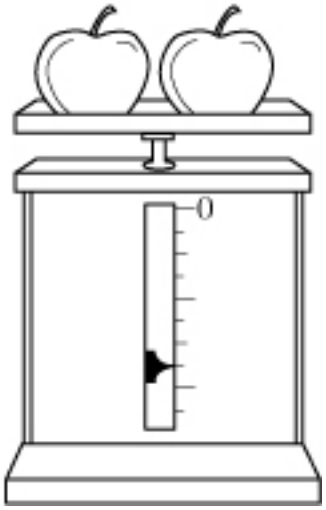
A. Acre
B. Gram
C. Liter
D. Meter
E. Ton

2011-8-12-2

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

Both figures below show the same scale. The marks on the scale have no labels except the zero point.



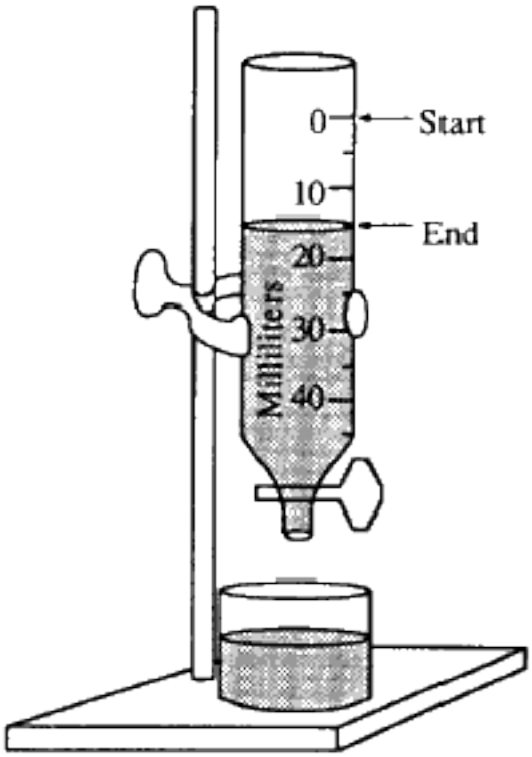


The weight of the cheese is $\frac{1}{2}$ pound. What is the total weight of the two apples?

Total weight of the two apples = _____ pounds.

2007-8-11-7

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



In the figure above, the tube was filled to the 0 mark at the start. How much liquid has been let out?

A. 10 milliliters
B. 15 milliliters
C. 25 milliliters
D. 40 milliliters
E. 50 milliliters

1990-8-7-4
1990-12-7-4

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

Which unit would you use to measure the weight of a car?

A. milligram
B. gram
C. kilogram
D. liter

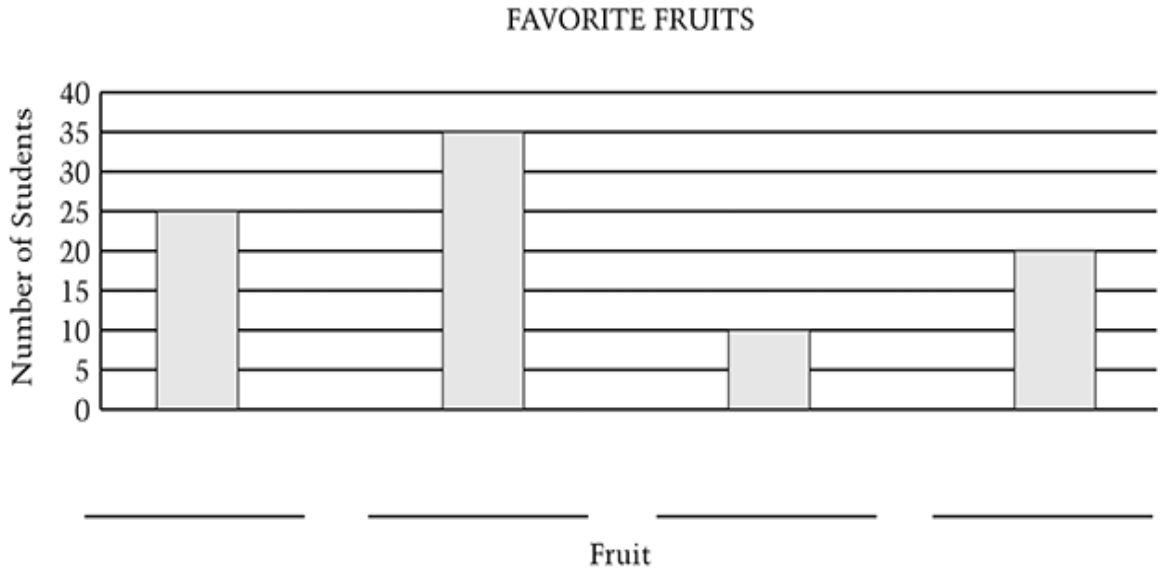
2004-13-23-16

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

3.MD.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

The graph below shows students' favorite fruits.
Use these clues to label the bars with the correct fruit.

- Twice as many students chose apples as grapes.
- Five more students chose peaches than apples.
- Ten more students chose bananas than peaches.



Write the correct fruit on the lines above.

2011-4-12-4

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

Fred planted 8 trees.
Yolanda planted 12 trees.

Make a pictograph of the information above. Use to represent 2 trees

TREES PLANTED

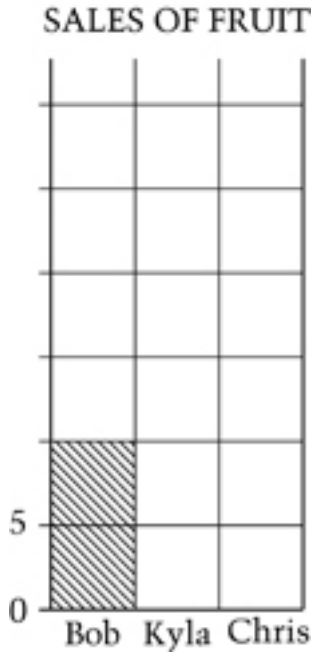
Fred	
Yolanda	

= 2 trees

2009-4-10-4

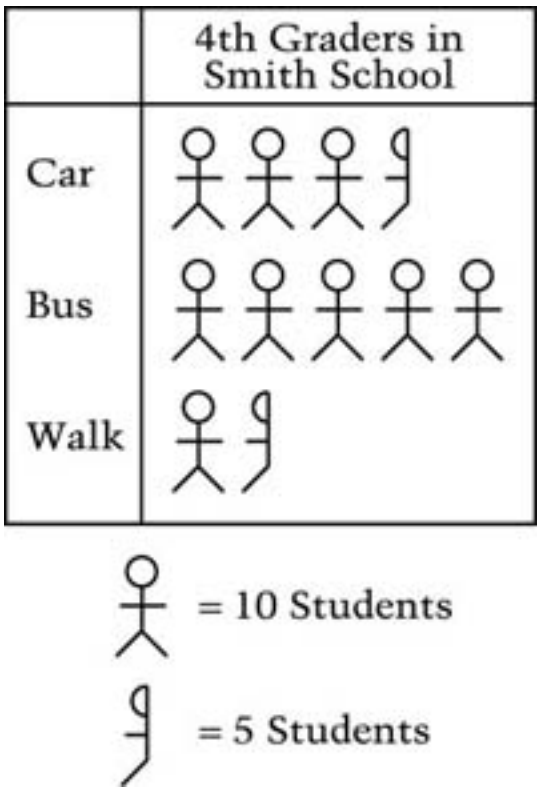
Source: National Assessment of Educational Progress, 2009, Grade 4 Mathematics Assessment.

In the school sale Bob sold 10 boxes of fruit, Kyla sold 20 boxes, and Chris sold 15 boxes. Complete the bar graph below to show how many boxes each student sold.



2007-4-9-3

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



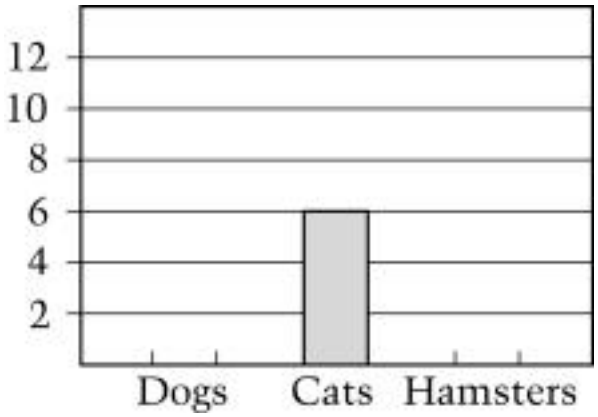
The pictograph shows how all the 4th graders at Smith School get to school. According to the pictograph, how many 4th graders attend Smith School?

A. 95
B. 100
C. 105
D. 110

2007-4-11-6

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

Draw bars on the graph below so that the number of dogs is twice the number of cats and the number of hamsters is one-half the number of cats.



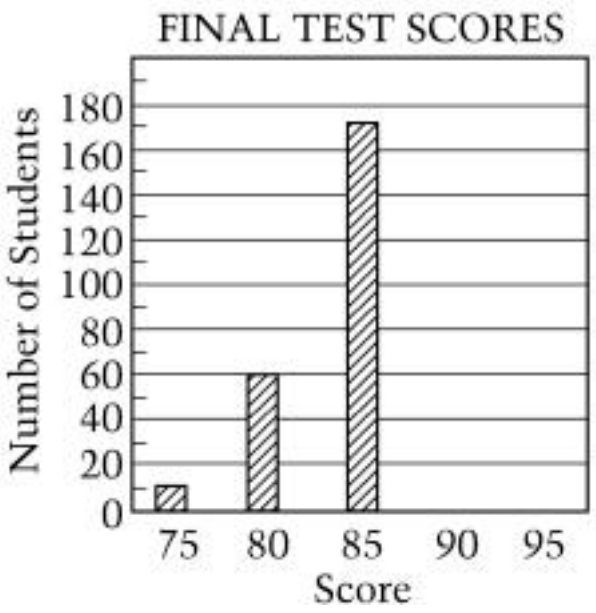
2005-4-4-7
2005-8-4-7

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

FINAL TEST SCORES

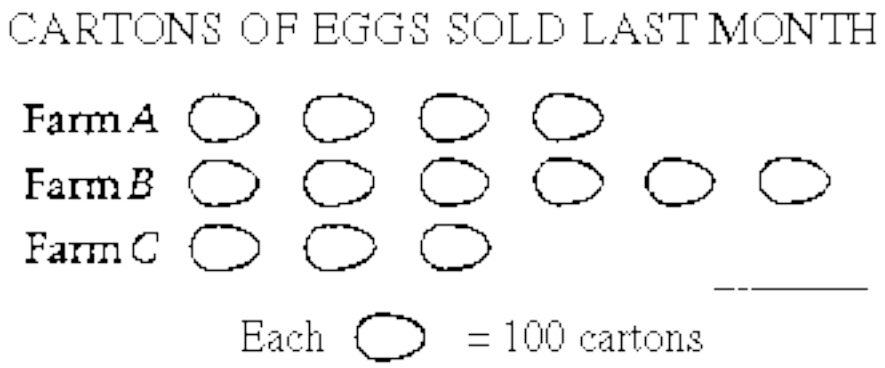
Score	Number of Students
95	50
90	120
85	170
80	60
75	10

Use the information in the table above to complete the bar graph below.



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

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

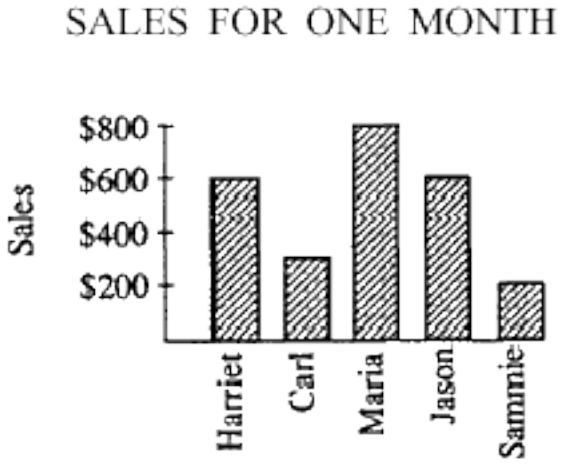


According to the graph, how many cartons of eggs were sold altogether by farms *A, B,* and *C* last month?

A. 13
B. 130
C. 1,300
D. 13,000

1996-4-9-4

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

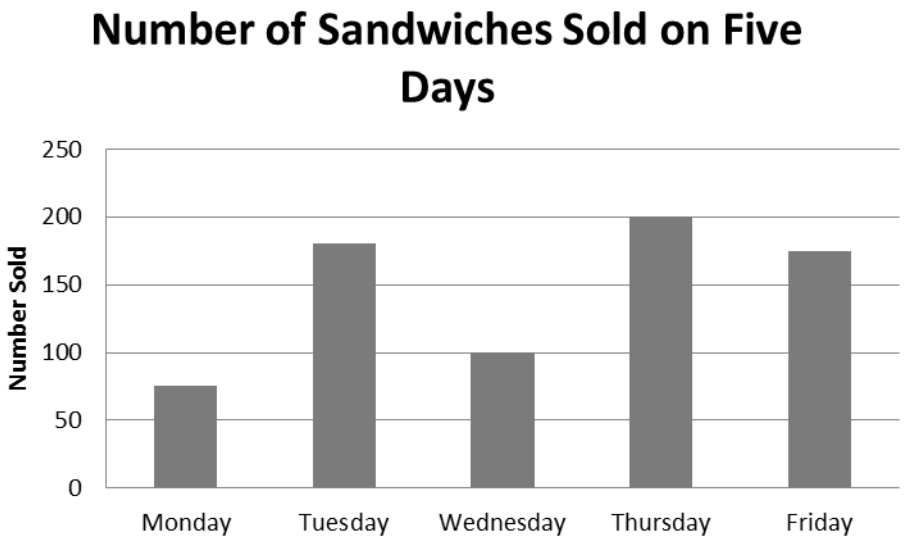


According to the graph above, which person's sales were closest to $400 for the month?

A. Harriet
B. Carl
C. Jason
D. Sammie

1990-4-7-2

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



According to the graph above, about how many sandwiches were sold on Tuesday?

A. 100
B. 150
C. 180
D. 200

1990-4-7-14 Adapted

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

	POPULATION
Clear Lake	8,000
Rancho Santa Fe	4,000
Bull Shoals	1,500
Beaver City	750
Jeffersonville	500

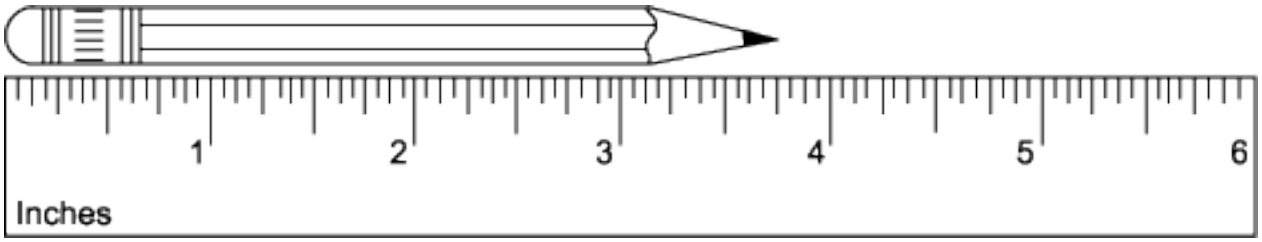
A pictogram of the data above is to be drawn using as the symbol that represents 500 people. How many would it take to represent the population of Rancho Santa Fe?

A. 1
B. 4
C. 8
D. 80
E. 4,000

2003-8-10-4

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

3.MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.



What is the length of this pencil to the nearest quarter inch?

A. $3\frac{1}{4}$ inches

B. $3\frac{3}{4}$ inches

C. $4\frac{1}{4}$ inches

D. 4 inches

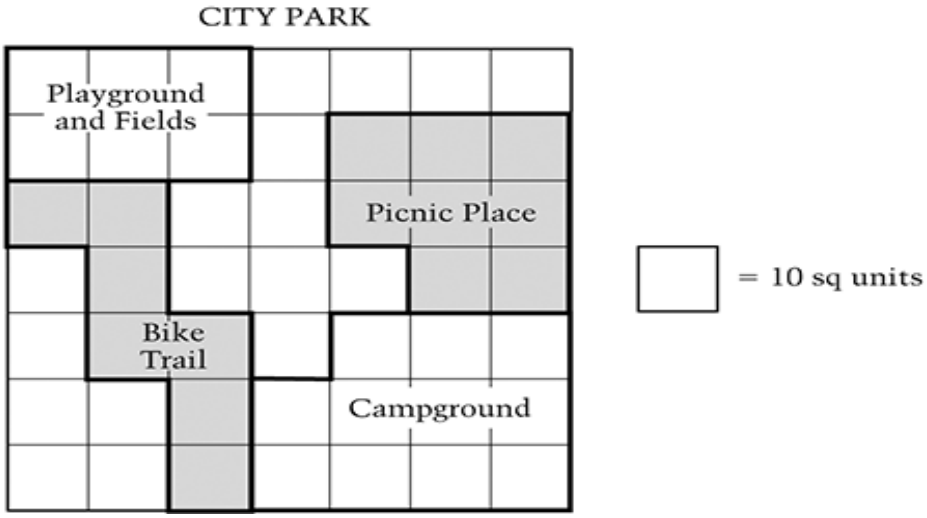
2004-13-23-9

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

3.MD.5 Recognize area as an attribute of plane figures and understand concepts of area measurement.

a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.
b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.

3.MD.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

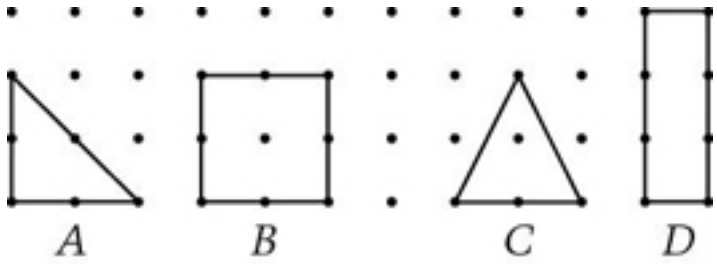


A map of City Park is shown above. The area of the whole park is 490 square units. The Bike Trail and the Picnic Place together occupy how many square units of the park's area?

A. 70
B. 80
C. 150
D. 220

2011-4-12-8

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

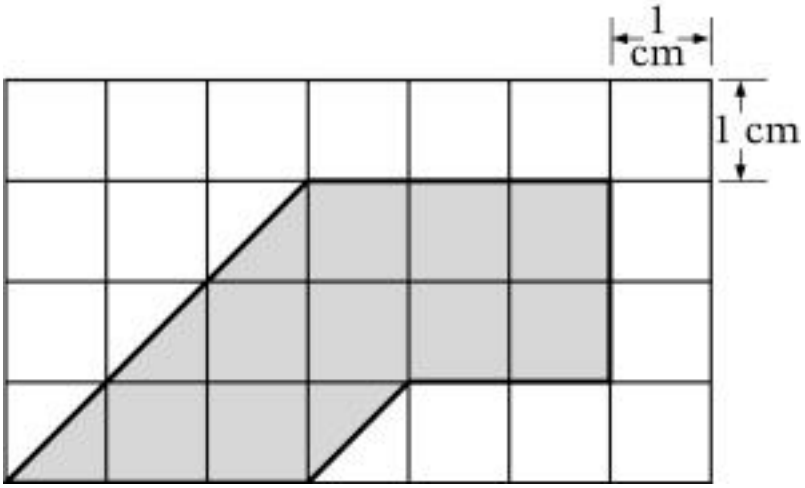


Which figure has the greatest area?

A. *A*
B. *B*
C. *C*
D. *D*

2009-4-10-9

Source: National Assessment of Educational Progress, 2009, Grade 4 Mathematics Assessment.



What is the area of the shaded figure?

A. 9 square centimeters
B. 11 square centimeters
C. 13 square centimeters
D. 14 square centimeters

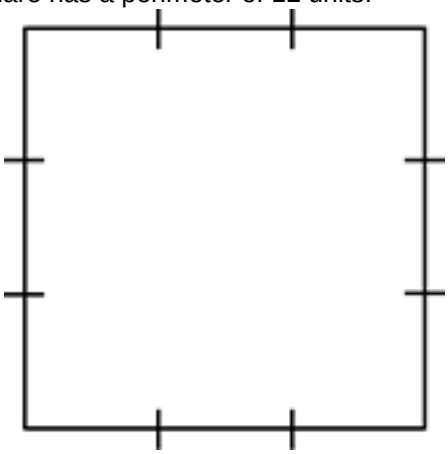
2005-4-4-6

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

3.MD.7 Relate area to the operations of multiplication and addition.

a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.
c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.
d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

The square has a perimeter of 12 units.

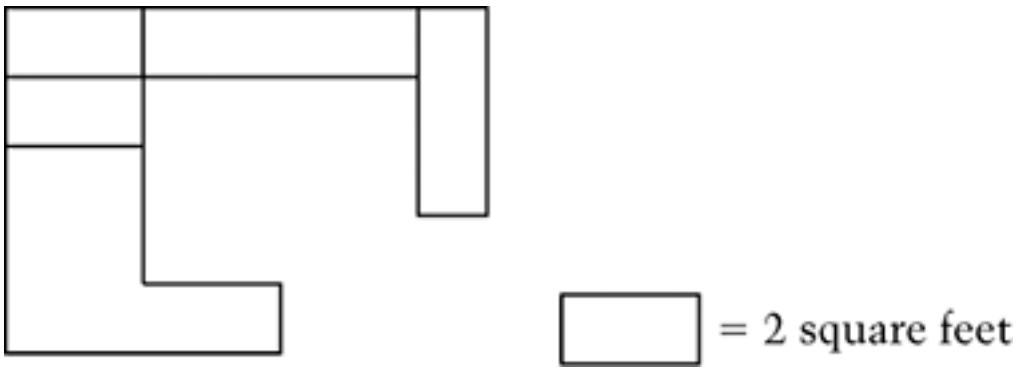


What is the area of the square?

E. 6 square units
F. 8 square units
G. 9 square units
H. 12 square units

2011-4-9-7

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

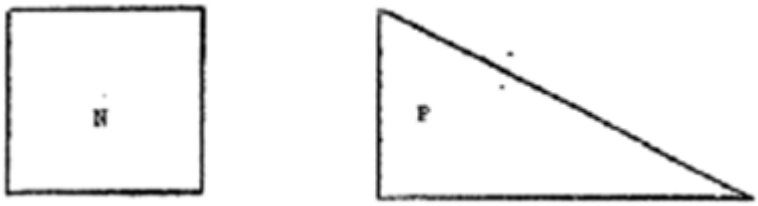


Which is the best estimate for the area of the figure?

A. Less than 10 square feet
B. More than 10 square feet but less than 15 square feet
C. More than 15 square feet but less than 25 square feet
D. More than 25 square feet

2011-4-9-11

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



Bob, Carmen, and Tyler were comparing the areas of *N* and *P*.

Bob:
"N and P have the same area."

Cameo:
"The area of N is larger."

Tyler:
"The area of P is larger."

Who was correct?_____

Use pictures and words to explain why.

1996-4-10-6

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

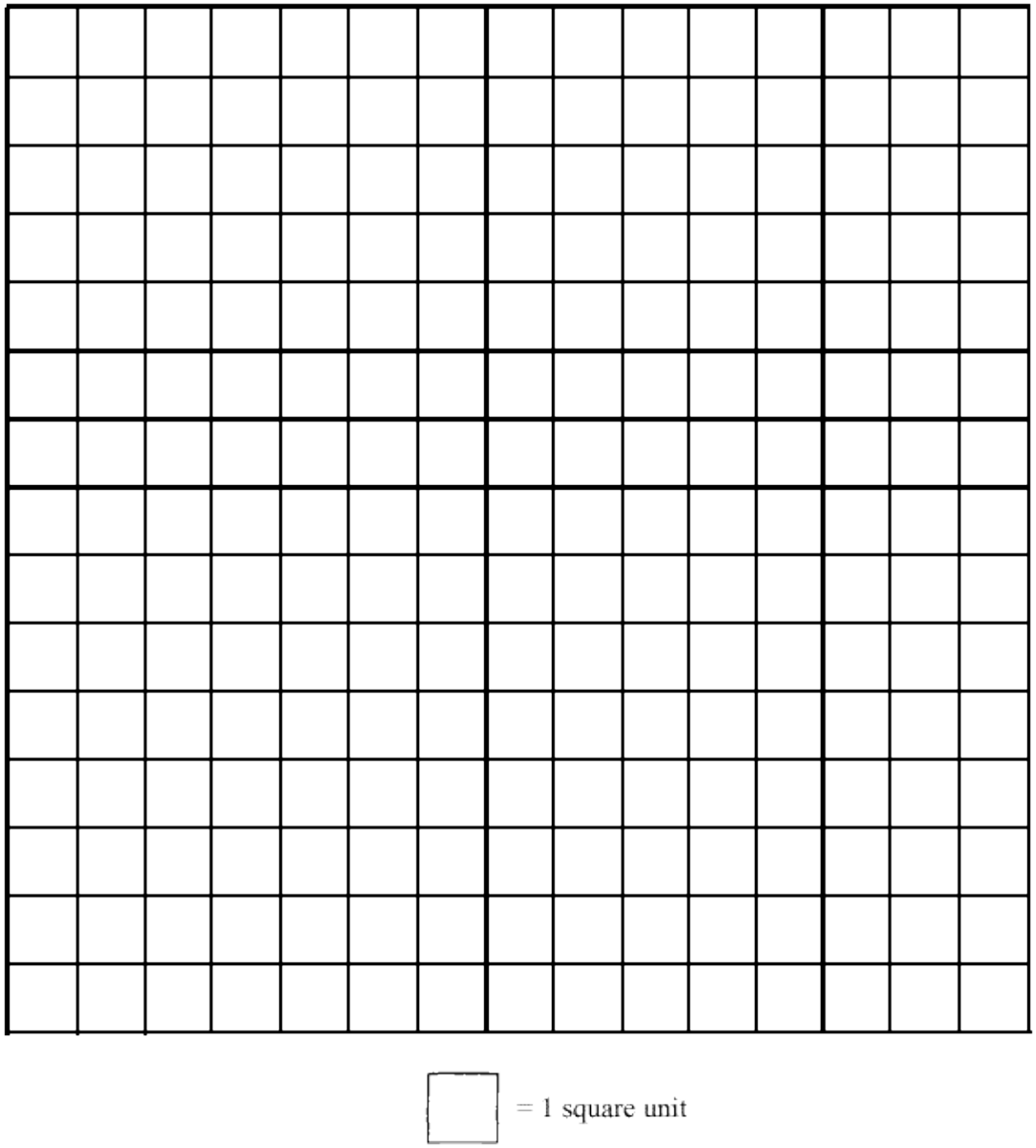
A rectangular carpet is 9 feet long and 6 feet wide. What is the area of the carpet in square feet?

A. 15
B. 27
C. 30
D. 54

1992-4-5-17
1992-8-5-17

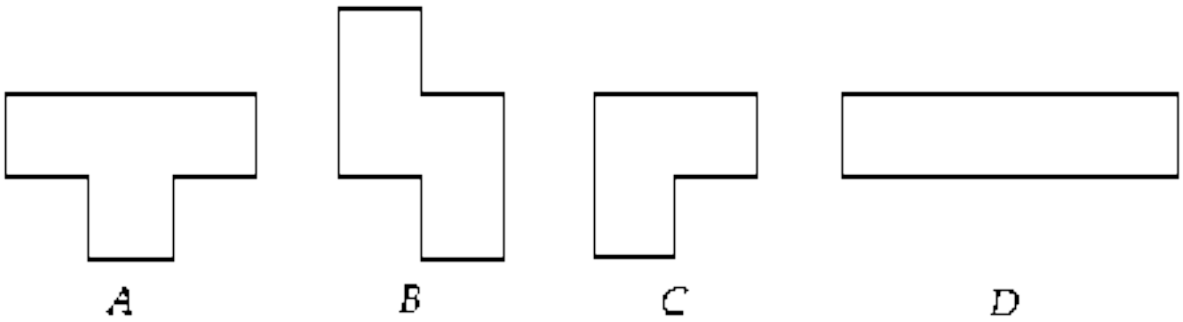
Source: National Assessment of Educational Progress, 1992, Grade 4 and 8 Mathematics Assessment.

On the grid below, draw a rectangle with an area of 12 square units.



1992-4-7-2
1992-8-7-2

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

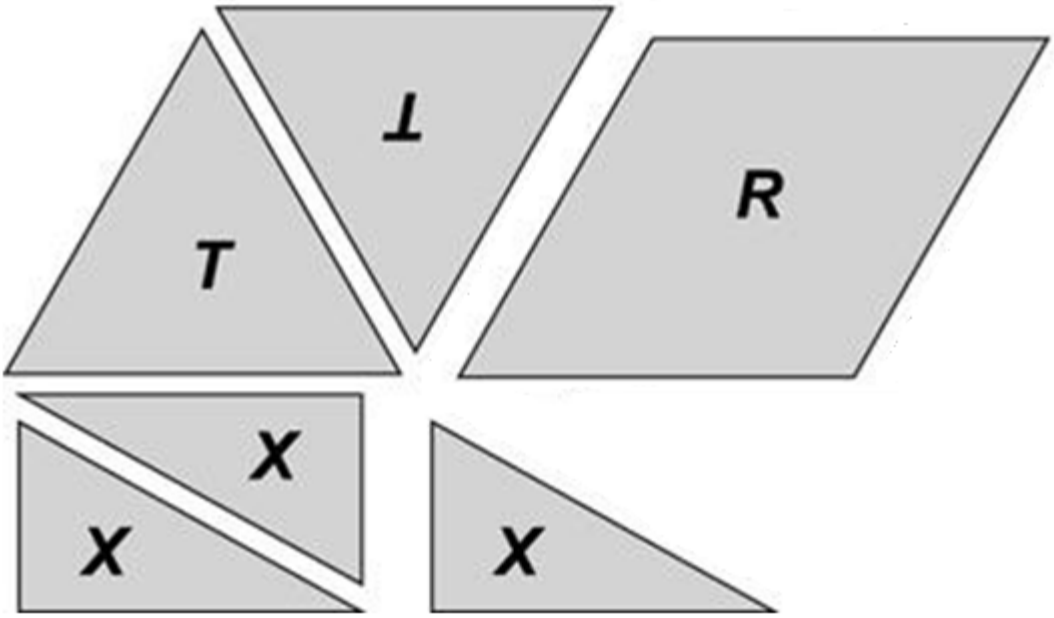


Which figure has the <u>least</u> area?

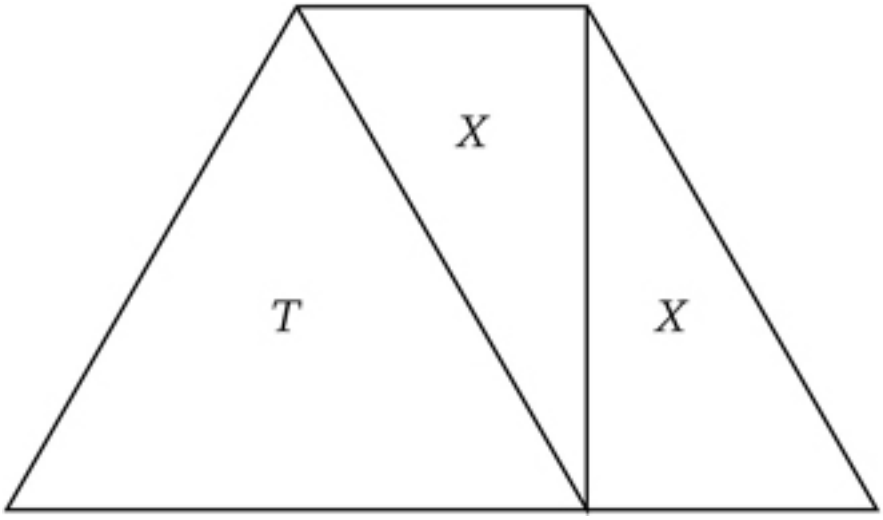
A. *A*
B. *B*
C. *C*
D. *D*

1992-4-15-2
1992-8-15-2

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



You will need pieces labeled *R*, *T*, and *X* to answer this question.



The figure above is made of one piece labeled *T* and two pieces labeled *X*. This figure has the same total area as

A. one piece labeled *R*
B. two pieces labeled *X*
C. three pieces labeled *X*
D. one piece labeled *R* and one piece labeled *T*

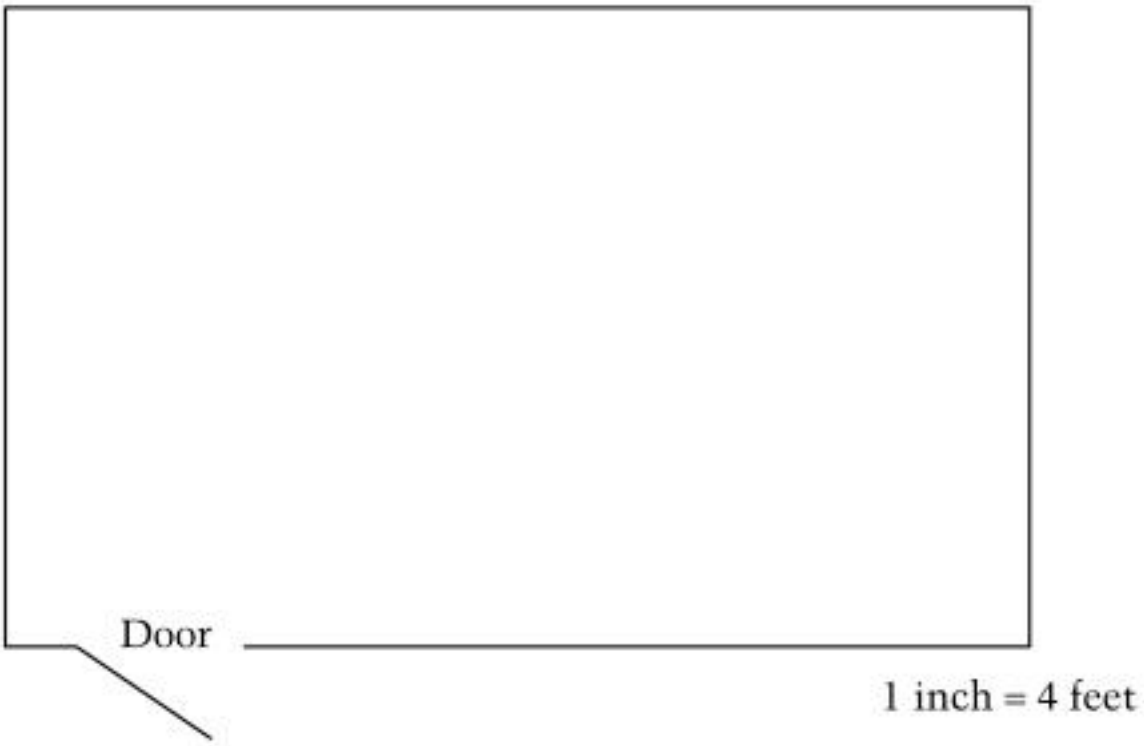
2009-8-5-4

Source: National Assessment of Educational Progress, 2009, Grade 8 Mathematics Assessment.

How many square tiles, 5 inches on a side, does it take to cover a rectangular area that is 50 inches wide and 100 inches long?

2009-8-5-17

Source: National Assessment of Educational Progress, 2009, Grade 8 Mathematics Assessment.



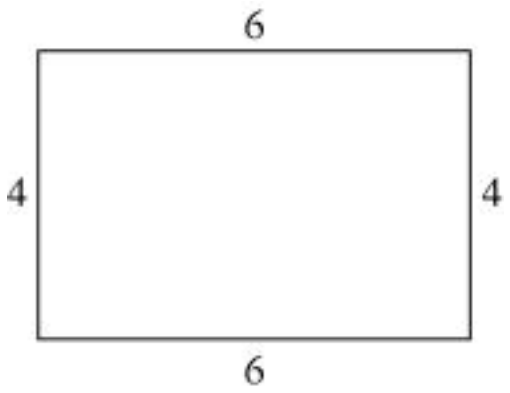
The floor of a room shown in the figure above is to be covered with tiles. One box of floor tiles will cover 25 square feet. Use your ruler to determine how many whole boxes of these tiles must be bought to cover the entire floor.

_____ boxes of tiles.

Explain your reasoning in the space below.

2005-8-3-18

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



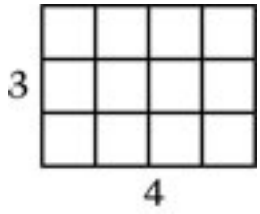
Which of the following numerical expressions gives the area of the rectangle above?

A. 4×6
B. $4 + 6$
C. $2(4 \times 6)$
D. $2(4 + 6)$
E. $4 + 6 + 4 + 6$

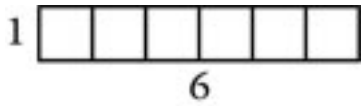
2003-8-7-5

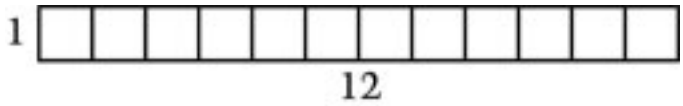
Source: National Assessment of Educational Progress, 2003, Grade 8 Mathematics Assessment.

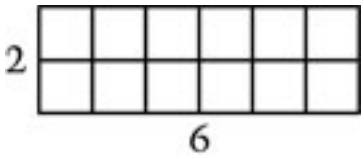
3.MD.8 Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

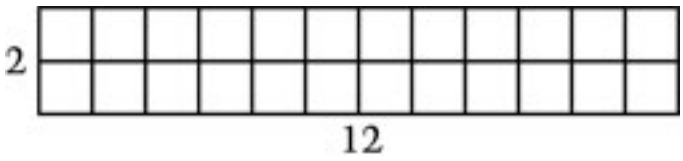


Which rectangle below has the same perimeter (distance around) as the rectangle above?

A. 

B. 

C. 

D. 

2007-4-11-10

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

A stop sign has 8 sides of equal length. Ryan knows that the length of each side is 10 inches. Explain how Ryan can find the perimeter (distance around) of the sign.

What is the perimeter of the sign? Answer: _____ inches

2007-4-11-14

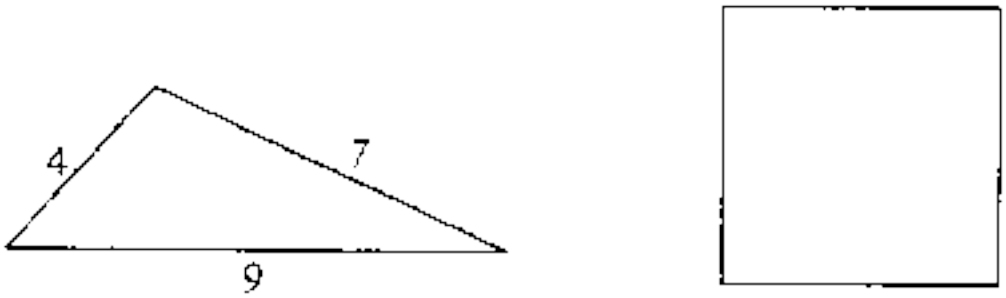
Source: National Assessment of Educational Progress, 2007, Grade 4 Mathematics Assessment.

The perimeter of a square is 36 inches. What is the length of one side of the square?

A. 4 inches
B. 6 inches
C. 9 inches
D. 18 inches

2003-4-6-10

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

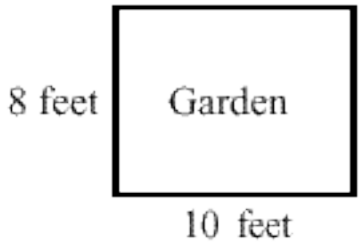


If both the square and the triangle above have the same perimeter, what is the length of each side of the square?

A. 4
B. 5
C. 6
D. 7

1996-4-9-8

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

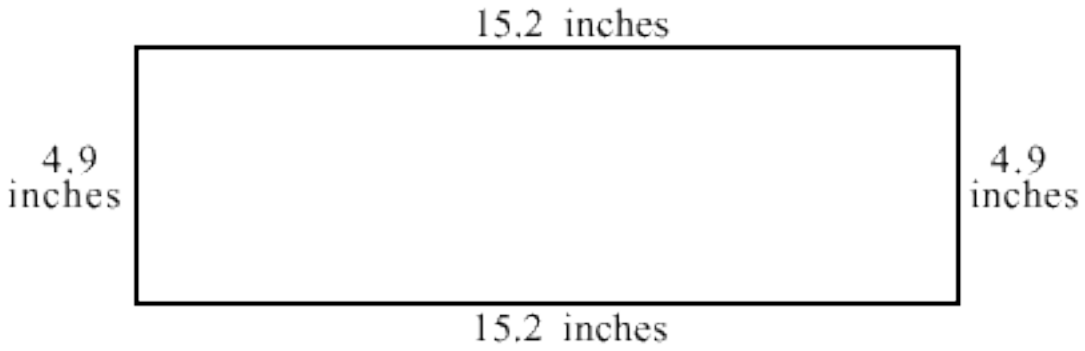


How many feet of fencing would it take to go around the garden?

A. 18
B. 28
C. 36
D. 80

1992-4-14-2

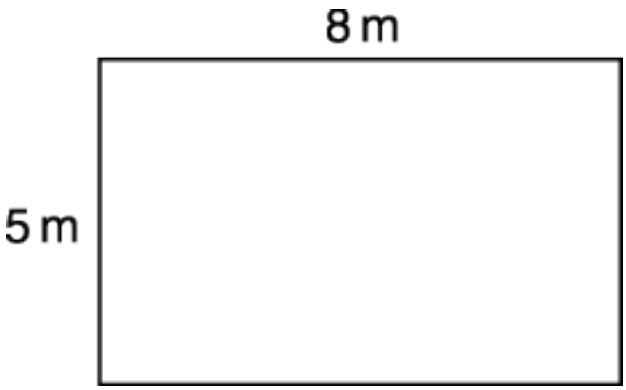
Source: National Assessment of Educational Progress, 1992, Grade 4 Mathematics Assessment.



What is the distance around the rectangle shown above?

1990-4-9-14

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

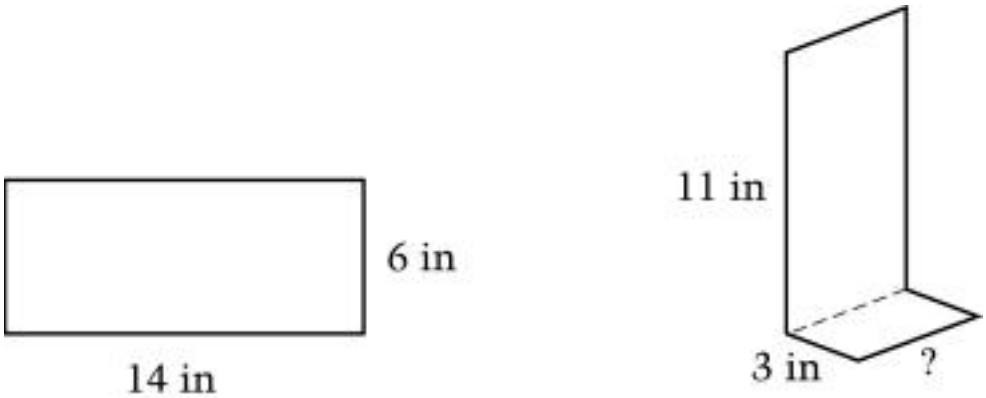


What is the PERIMETER of this rectangle?

A. 13 meters
B. 26 meters
C. 40 meters
D. 80 meters

2004-9-23-25
2004-13-23-27

Source: National Assessment of Educational Progress, 2004, Age 9 and Age 13 Mathematics Assessment.



A piece of metal in the shape of a rectangle was folded as shown above. In the figure on the right, the ? symbol represents what length?

A. 3 inches
B. 6 inches
C. 8 inches
D. 11 inches

2005-4-12-13

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

You will need a ruler for this problem.

In the space below, draw a rectangle 2 inches wide and 3½ inches long.

1992-4-5-7
1992-8-5-7

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

Of the following, which is the best estimate for the area of a typical classroom floor?

A. 700 feet
B. 700 square feet
C. 700 cubic feet
D. 700 yards
E. 700 square yards

2007-8-9-5

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

A rectangular playground has a perimeter of 390 feet. The width of the playground is 75 feet. What is its length?

A. 5.2 feet
B. 97.5 feet
C. 120 feet
D. 130 feet
E. 240 feet

2005-8-12-2

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

What is the distance all the way around a square that has a side length of 10 inches?

A. 10 inches
B. 20 inches
C. 40 inches
D. 100 inches

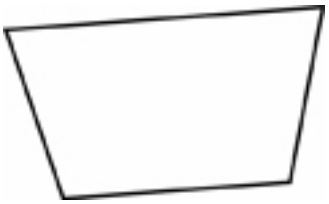
2008-9-21-11
2008-13-21-11

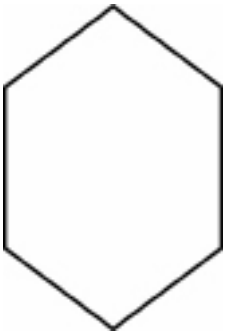
Source: National Assessment of Educational Progress, 2008, Age 9 and Age 13 Mathematics Assessments.

Which figure is NOT a POLYGON?

A.

B.

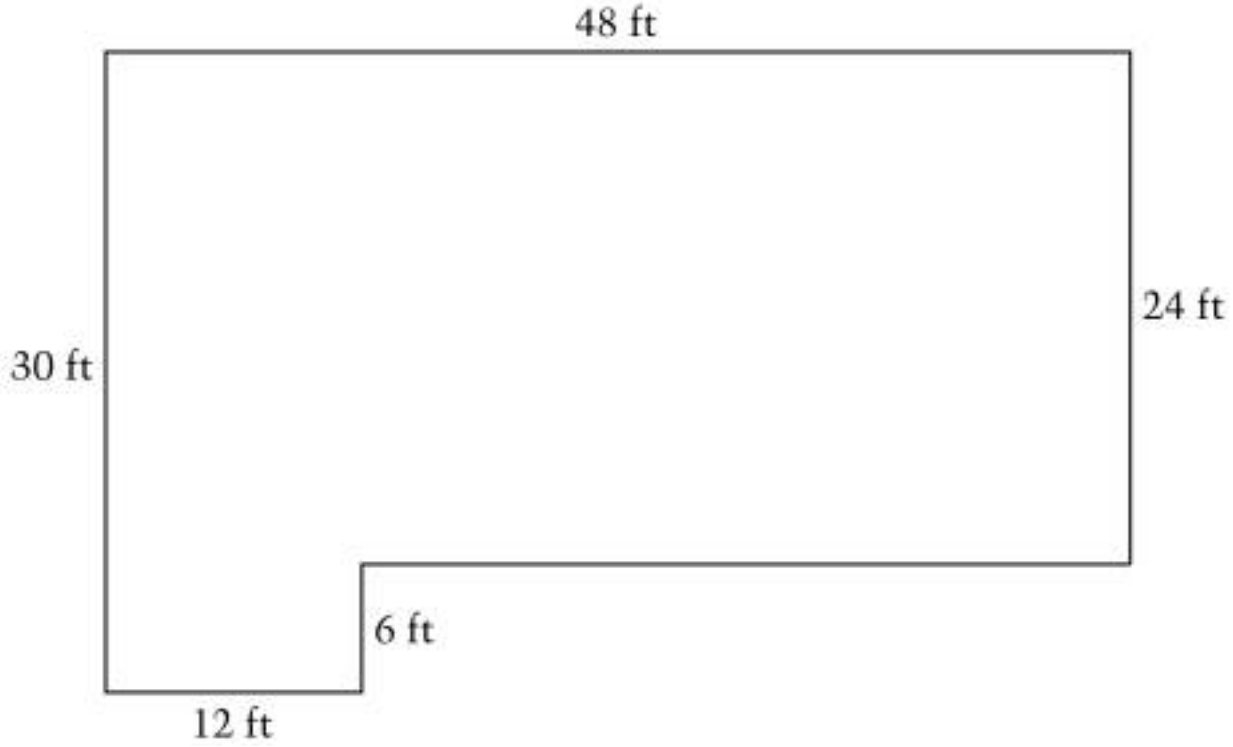
C. 

D. 

2008-13-21-13

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

The following question refers to the following diagram.



The diagram is part of a scale drawing of a house.

What is the length, in feet, of the side whose dimension is not given in the diagram?

A. 12
B. 24
C. 30
D. 36
E. 40

2005-12-4-1

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