SCALE DRAWINGS

Architects regularly use scale drawings when they design houses and buildings. A scale is a ratio that compares the measurements used in the drawing to the actual measurements. Scale drawings or models are similar to the actual drawing or figure, and therefore the sides are proportional.

The ratio you should use when working with scale drawings or models is

$$\frac{Scale \ measurement}{Actual \ measurement}$$

This is called scale ratio. For example, if a model car measures 2 cm for every 1 ft of the actual car, the scale ratio is 2cm/1 ft. Knowing this ratio allows you to set up a proportion to figure out how long the actual car would be if the scale model was 36 cm: $\frac{2cm}{1ft} = \frac{36cm}{xft}$. By solving the proportion, you can determine that the actual car length is 18ft.

EXAMPLE: The height of the symbol in the accompanying drawing is 1.5 inches. The actual symbol will be 12 inches tall once it is placed on a sign. If the width of this symbol is 1 inch, how wide will the actual symbol be?
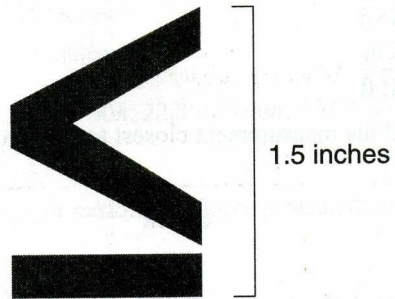
1.5 inches

Set up a proportion.

$$\frac{Scale}{Actual} = \frac{scale}{actual}$$

$$\frac{1.5}{12} = \frac{1}{x}$$
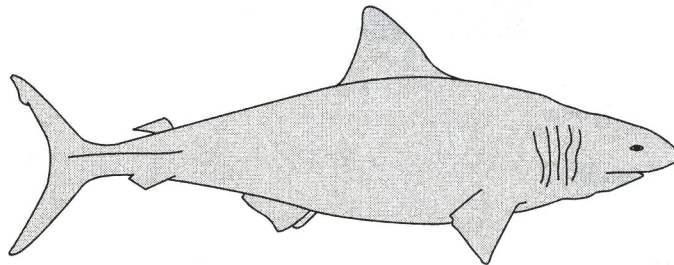
$$1 \bullet 12 = 1.5\,x$$

$$12 \div 1.5 = x$$

The actual symbol will be 8 inches wide.

Sample Questions

1. A photograph measures 4 inches wide and 5 inches long. If you have the photograph enlarged to fit a frame 36 inches long, what is the widest the photograph can be?

   A. 36 inches   **B.** 32 inches
   C. 30 inches   **D.** 28 inches

2. A Florida map has a scale of 1 inch = approximately 22.8 miles. If the distance on the map between Vero Beach and Boynton Beach is 3.5 inches, what is the actual distance?

3. The smallest mammal, Kitti's hog-nosed bat, has a head-body length of $1\frac{7}{50}$ inches and a wingspan of about $5\frac{1}{10}$ inches. A scale drawing of this little bat is made showing it in full flight. The wingspan on the drawing is 15 inches. What should the length of the bat be in the drawing?

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

   B. $5\frac{1}{2}$ inches   **D.** 67 inches

4. The Sears Tower is 1450 feet tall. Jeff wanted to make a scale model for his class project, but his mother's car can hold only a 36-in.-tall model. Which of the following scales is closest to the scale Jeff needs?

   A. $\dfrac{1\,\text{in}}{25\,\text{ft}}$ **C.** $\dfrac{1\,\text{in}}{45\,\text{ft}}$

   B. $\dfrac{1\,\text{in}}{40\,\text{ft}}$ **D.** $\dfrac{2\,\text{in}}{45\,\text{ft}}$

5. Use the scale 2 in = 15 ft to find the measurement closest to the actual length of the white shark shown here.

   Shark

   A. 24 feet   **C.** 26 feet
   B. 25 feet   **D.** 27 feet

Scale Drawings + Coord. Geometry Worksheet   Name: _____

1.   An outline of Florida is sketched on a grid. If each grid unit represents 150 miles, which is
     the best ESTIMATE of the length of Florida's coastline?

     a.   900 mi   c.   1,850 mi
     b.   1,200 mi   d.   2,500 mi

2.

Mrs. Lewis wants to have a new house built. She used graph paper to sketch some
thoughts for a possible floor plan for her house. The bold outline in the figure below
represents the outline of the first floor of the house.

Mrs. Lewis intends to have the dining room floored with wood flooring that comes in
squares 1 foot wide. A 12-pack of the squares sells for $38.40 and single squares can

be purchased for $3.70 each. What will it cost, in dollars, to buy just enough squares to cover her dining room floor?

3. A landscape architect planned a new garden using graph paper. The garden includes a circular fish pond as shown below.
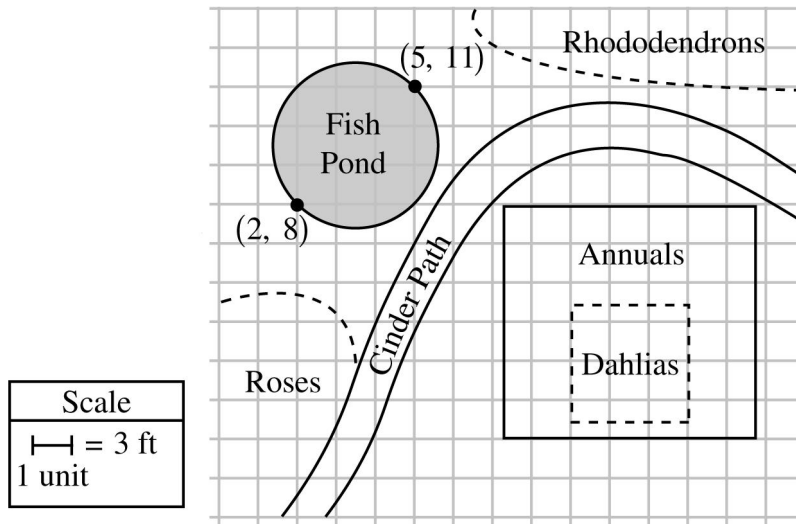
The fish pond is to be surrounded by a low brick wall. To the nearest foot, which is the best approximation of the circumference of the fish pond?

[A] 13 feet   [B] 27 feet   [C] 38 feet   [D] 51 feet

4. Three vertices of an isosceles trapezoid are shown in the figure below.
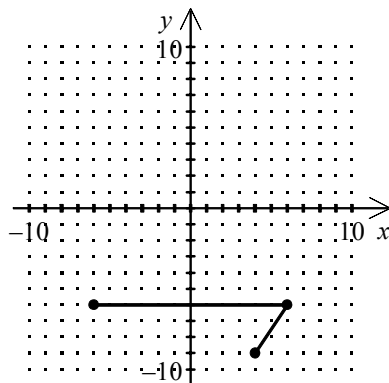
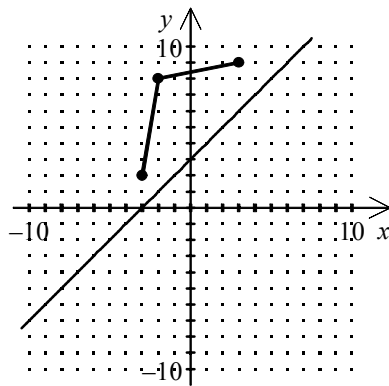What are the coordinates of the missing vertex that make the *y*-axis the line of symmetry?

[F] $(-4, -9)$　　　[G] $(-9, -4)$　　　[H] $(-3, -9)$　　　[I] $(-4, -10)$

5. The line shown in the figure below is the only line of symmetry for a hexagon. The figure shows three of the hexagon's vertices.

What are the coordinates of the other three vertices of the hexagon?
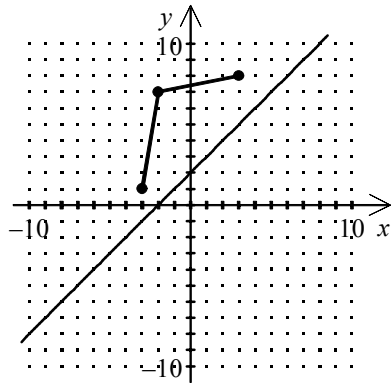
[F] $(6, 6), (5, 1), (-1, 0)$　　　　　　　[G] $(6, 6), (5, 1), (0, -1)$

[H] $(6, 6), (1, 5), (0, -1)$　　　　　　　[I] $(6, 6), (6, 0), (-1, 1)$

6. The line shown in the figure below is the only line of symmetry for a hexagon. The figure shows three of the hexagon's vertices.

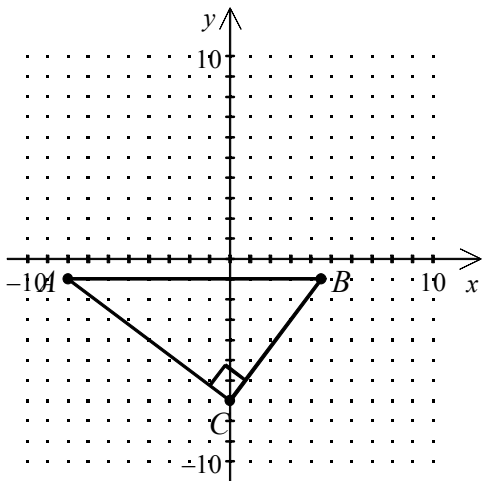What are the coordinates of the other three vertices of the hexagon?

[F] $(6, 5), (5, 0), (-1, -1)$ [G] $(6, 5), (5, 0), (-2, 0)$

[H] $(6, 5), (6, 1), (-1, 0)$ [I] $(5, 6), (0, 5), (-1, -1)$

7. Triangle ABC is a right triangle, with $A = (-8, -1)$, $C = (0, -7)$, $AC = 10$ and $CB = 7\frac{1}{2}$.

Which of the following are the coordinates of B? Round to the nearest hundredth if needed.
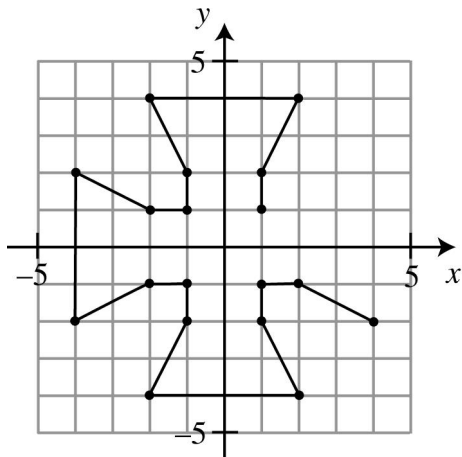
[F] $(4.71, -1)$ [G] $(4.5, -1)$ [H] $(5.5, -1)$ [I] $(4.32, 4.5)$

8. Sela is creating a design for a variation on the Maltese cross using a coordinate grid.

Which two ordered pairs will complete the design so that it has rotational symmetry?

[F] $(1, 2), (2, 4)$ [G] $(2, 1), (2, 4)$ [H] $(2, 1), (4, 2)$ [I] $(4, 1), (2, 2)$