Find $x$ and $y$.

1.  
   \[
   \begin{array}{c}
   \text{45°} \\
   x \\
   9 \\
   y
   \end{array}
   \]

2.  
   \[
   \begin{array}{c}
   \text{60°} \\
   x \\
   25 \\
   y
   \end{array}
   \]

3.  
   \[
   \begin{array}{c}
   26 \\
   y
   \end{array}
   \]

4.  
   \[
   \begin{array}{c}
   x \\
   28
   \end{array}
   \]

5.  
   \[
   \begin{array}{c}
   \text{60°} \\
   x \\
   3.5 \\
   y
   \end{array}
   \]

6.  
   \[
   \begin{array}{c}
   11 \\
   y \\
   45°
   \end{array}
   \]

For Exercises 7–9, use the figure at the right.

7. If $a = 4\sqrt{3}$, find $b$ and $c$.

8. If $x = 3\sqrt{3}$, find $a$ and $CD$.

9. If $a = 4$, find $CD$, $b$, and $y$.

10. The perimeter of an equilateral triangle is 39 centimeters. Find the length of an altitude of the triangle.

11. $\triangle MIP$ is a 30°-60°-90° triangle with right angle at $I$, and $IP$ the longer leg. Find the coordinates of $M$ in Quadrant I for $I(3, 3)$ and $P(12, 3)$.

12. $\triangle TJK$ is a 45°-45°-90° triangle with right angle at $J$. Find the coordinates of $T$ in Quadrant II for $J(-2, -3)$ and $K(3, -3)$.

13. **BOTANICAL GARDENS** One of the displays at a botanical garden is an herb garden planted in the shape of a square. The square measures 6 yards on each side. Visitors can view the herbs from a diagonal pathway through the garden. How long is the pathway?
8-3 Word Problem Practice

**Special Right Triangles**

1. **ORIGAMI** A square piece of paper 150 millimeters on a side is folded in half along a diagonal. The result is a 45°-45°-90° triangle. What is the length of the hypotenuse of this triangle?

2. **ESCALATORS** A 40-foot-long escalator rises from the first floor to the second floor of a shopping mall. The escalator makes a 30° angle with the horizontal. How high above the first floor is the second floor?

3. **HEXAGONS** A box of chocolates shaped like a regular hexagon is placed snugly inside of a rectangular box as shown in the figure. If the side length of the hexagon is 3 inches, what are the dimensions of the rectangular box?

4. **WINDOWS** A large stained glass window is constructed from six 30°-60°-90° triangles as shown in the figure. What is the height of the window?

**MOVIES** For Exercises 5–7, use the following information.

Kim and Yolanda are watching a movie in a movie theater. Yolanda is sitting $x$ feet from the screen and Kim is 15 feet behind Yolanda.

5. How high is the top of the screen in terms of $x$?

6. What is $\frac{x+15}{x}$?

7. How far is Yolanda from the screen? Round your answer to the nearest tenth.
8-3 Enrichment

Constructing Values of Square Roots

The diagram at the right shows a right isosceles triangle with two legs of length 1 inch. By the Pythagorean Theorem, the length of the hypotenuse is \( \sqrt{2} \) inches. By constructing an adjacent right triangle with legs of \( \sqrt{2} \) inches and 1 inch, you can create a segment of length \( \sqrt{3} \).

By continuing this process as shown below, you can construct a “wheel” of square roots. This wheel is called the “Wheel of Theodorus” after a Greek philosopher who lived about 400 B.C.

Continue constructing the wheel until you make a segment of length \( \sqrt{18} \).