# 1-8 Perimeter, Circumference, and Area

The **perimeter** $P$ of a polygon is the sum of the lengths of its sides. The **area** $A$ of a polygon is the number of square units it encloses. For figures such as squares, rectangles, triangles, and circles, you can use formulas for perimeter (or *circumference* $C$ for circles) and area.

take note

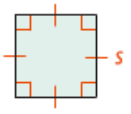
## Key Concept Perimeter, Circumference, and Area

### Square

side length $s$

$P = 4s$

$A = s^2$

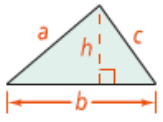



### Triangle

side lengths $a$, $b$, and $c$, base $b$, and height $h$

$P = a + b + c$

$A = \frac{1}{2}bh$

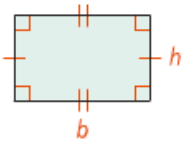



### Rectangle

base $b$ and height $h$

$P = 2b + 2h$, or $2(b + h)$

$A = bh$

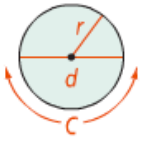



### Circle

radius $r$ and diameter $d$

$C = \pi d$, or $C = 2\pi r$

$A = \pi r^2$




The units of measurement for perimeter and circumference include inches, feet, yards, miles, centimeters, and meters. When measuring area, use square units such as square inches (in.$^2$), square feet (ft$^2$), square yards (yd$^2$), square miles (mi$^2$), square centimeters (cm$^2$), and square meters (m$^2$).

**1.** You want to frame a picture that is 5 in. by 7 in. with a 1-in.-wide frame.

**a.** What is the perimeter of the picture?

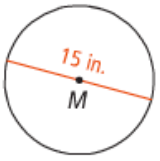
**b.** What is the perimeter of the outside edge of the frame?

You can name a circle with the symbol ⊙. For example, the circle with center $A$ is written $\odot A$.

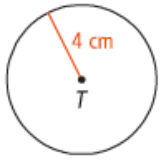
## Problem 2 Finding Circumference

**What is the circumference of the circle in terms of $\pi$? What is the circumference of the circle to the nearest tenth?**

**A** $\odot M$

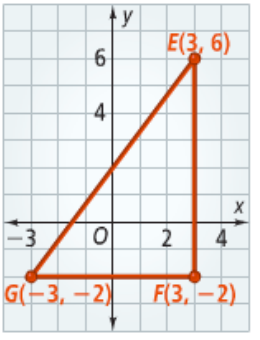



**B** $\odot T$



## Problem 3 Finding Perimeter in the Coordinate Plane

**Coordinate Geometry** What is the perimeter of $\triangle EFG$?



**4.** You are designing a poster that will be 3 yd wide and 8 ft high. How much paper do you need to make the poster? Give your answer in square feet.

**5.** The diameter of a circle is 14 ft.

**a.** What is the area of the circle in terms of $\pi$?

**b.** What is the area of the circle using an approximation of $\pi$?

take note

**Postulate 1-10 Area Addition Postulate**

The area of a region is the sum of the areas of its nonoverlapping parts.

**b.** What is the area of the figure at the right?