

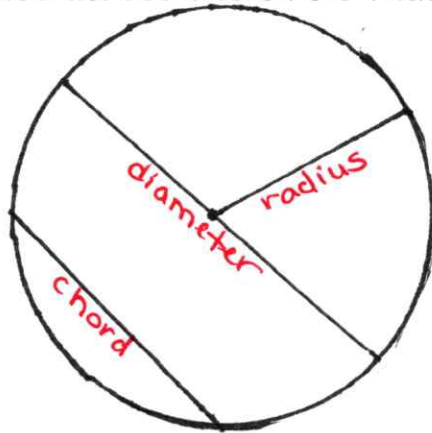
## 8.1 Circles and Circumference p.318

**Circle:** set of all points in a plane that are the same distance from the center

**Radius:** the distance from the center to any point on the circle (plural is radii) *radius is half a diameter*

**Diameter:** the distance across the circle through the center; divides a circle in half

**Chord:** distance across the circle that does not go through the center

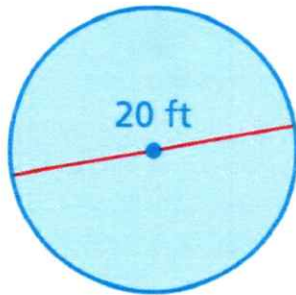


$$D = 2r$$

$$r = \frac{1}{2} D$$

Find the diameter and radius of each circle:

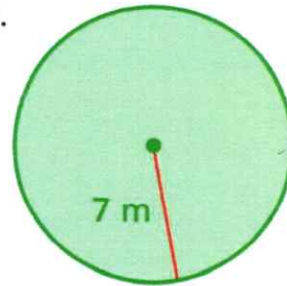
1.



$$d = 20 \text{ ft}$$

$$r = 10 \text{ ft}$$

2.



$$d = 14 \text{ m}$$

$$r = 7 \text{ m}$$

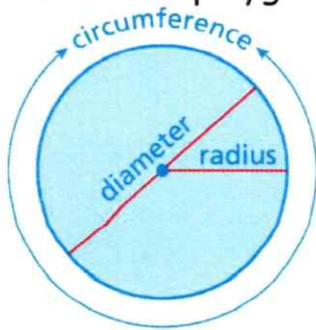
3. The diameter of a circle is 18 cm. Find the radius.

$$r = 9 \text{ cm}$$

4. The radius of a circle is 7 yards. Find the diameter.

$$d = 14 \text{ yds}$$

**Circumference:** the distance around a circle (like the perimeter of polygons)



The circumference of a circle is equal to pi ( $\pi$ ) times the diameter.

$$C = \pi d$$

Pi is a ratio (represented by the Greek letter  $\pi$ ) found by dividing the circumference by the diameter of every circle.

$$\pi = \frac{\text{circumference}}{\text{diameter}}$$

The value of  $\pi$  can be approximated as 3.14 or  $\frac{22}{7}$ .

We usually use 3.14 unless the diameter is divisible by 7. The diameter is divisible by 7, then use  $\frac{22}{7}$ .

Don't use 3.14  
 $(3.14)(21) = 65.94$

Find the circumference:

1.  $d = 16 \text{ cm}$   
 $C = \pi d$   
 $C = (3.14)(16)$   
 $C = 50.24 \text{ cm}$

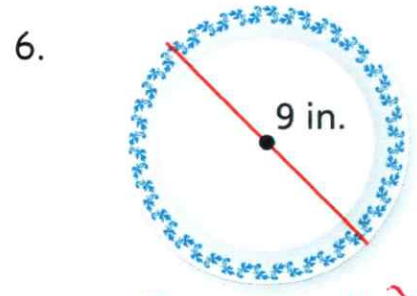
2.  $r = 10.5 \text{ yds}$   $d = 21$   
 $C = \pi d$   
 $C = (\frac{22}{7})(21)$   
 $C = 66 \text{ yds}$

3.  $r = 4.5 \text{ in}$   $d = 9$   
 $C = 3.14(9)$   
 $C = 28.26 \text{ in}$

4.  $d = 4 \text{ mi}$   
 $C = (3.14)(4)$   
 $C = 12.56 \text{ mi}$

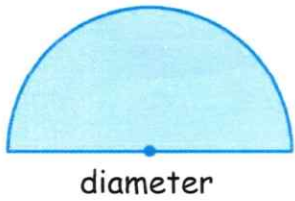


$$C = \frac{22}{7} \cdot \frac{14}{1}$$
$$C = 44 \text{ ft}$$



$$C = 3.14(9)$$
$$C = 28.26 \text{ in}$$

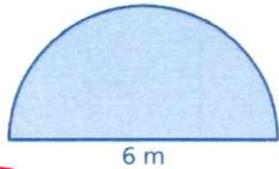
**Semicircle:** one-half of a circle



**To find the perimeter of a semicircular region:**

1. Find the circumference of the circle and divide by 2
2. Add the diameter to that number for the total perimeter

Example:



The straight side is 6 meters long. The distance around the curved part is one-half the circumference of a circle with a diameter of 6 meters.

semicircle

$$\frac{\pi d}{2} + d$$

$$\frac{C}{2} = \frac{\pi d}{2}$$

Divide the circumference by 2.

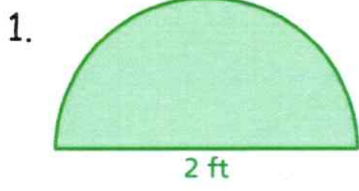
$$\approx \frac{3.14 \cdot 6}{2}$$

Substitute 3.14 for  $\pi$  and 6 for  $d$ .

$$= 9.42$$

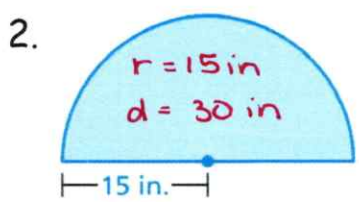
Simplify.

∴ So, the perimeter is about  $6 + 9.42 = 15.42$  meters.



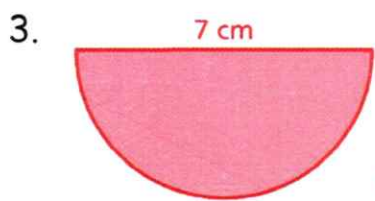
$$\frac{\pi d}{2} + d \rightarrow \frac{3.14(2)}{2} + 2$$

$$3.14 + 2 = \boxed{5.14 \text{ ft}}$$



$$\frac{\pi d}{2} + d \rightarrow \frac{3.14(30)}{2} + 30$$

$$47.1 + 30 = \boxed{77.1 \text{ in}}$$



use  $\frac{22}{7}$

$$\frac{\frac{22}{7} \cdot \frac{7}{1}}{2} + 7 = \frac{22}{2} + 7 = 11 + 7 = \boxed{18 \text{ cm}}$$

4. Find the circumference of both circles:

Small  $d=10$       Large  $d=20$

$$3.14(10) = \boxed{31.4 \text{ cm}}$$

$$3.14(20) = \boxed{62.8 \text{ cm}}$$

