Examples with Step-by-Step Solutions (using $\pi = 3.14$)

Examples:	*Solution*
1. A circle has a diameter of 12 cm. Find a. the radius b. the circumference	▪ Radius = $\frac{1}{2}$ x Diameter $= \frac{1}{2}$ x 12 = 6 cm ▪ Circumference = π x Diameter = 3.14 x 12 = 37.68 cm
2. A circle has a circumference of 25 cm. How long is its diameter?	▪ Circumference = 3.14 x Diameter 25 = 3.14 x Diameter ▪ Diameter = 25 ÷ 3.14 = 7.96 cm
3. A circle has a circumference of 23.55 cm. About how far is a point on the circle from the centre?	▪ The distance from a point on a circle to the centre of the circle is equal to the length of the radius. ▪ The radius of equal to one-half the diameter. ▪ The circumference (C) is equal to π times the diameter. ▪ 23.55 = 3.14 x D ▪ D = 7.5 ▪ The radius = 7.5 ÷2 = 3.75 cm

Exercises 6.1

For the problems that follow let $\pi = 3.14$.

1. The radius of a circle is 4.5 cm. Find

   a. the diameter b. the circumference

2. The diameter of a circle is 8.5 cm. Find

   a. the radius

   b. the circumference

3. The circumference of a circle is 33 cm. Find

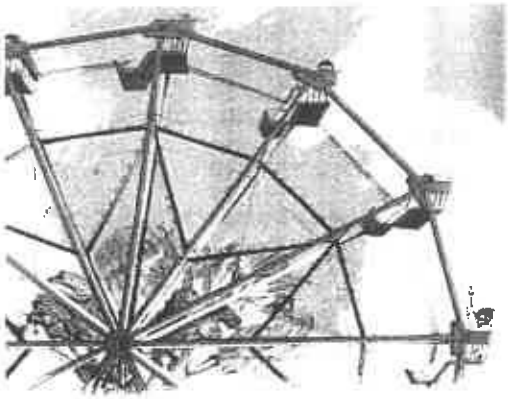
   a. the diameter

   b. the radius

4. Complete the chart for circles with the following dimensions. (round answers to one decimal place)

Radius	Diameter	Circumference
a. 15 cm	_____	_____
b. _____	24.6 m	_____
c. _____	_____	16 km
d. 1.2 m	_____	_____

5. A Ferris wheel at an amusement park has a diameter of 20 m.



a. What is its radius?

b. What is its circumference?

c. If the Ferris wheel turned for 100 revolutions, how far would a passenger sitting on it travel?

d. If a passenger sitting on the wheel travelled a distance of 314 m, approximately how many revolutions would she have travelled?

6. A bicycle wheel has a radius of 35 cm.

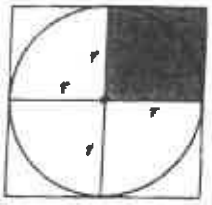
a. What is the diameter of the wheel?

b. If the wheel turns 40 revolutions, how far would the bike travel?

6.2 Area of Circles

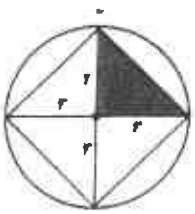
Area of a Circle

Let's look at the area of a circle with a radius of r.



First, look at the area of the 4 squares containing a circle

- *The area of the shaded square is $r \times r = r^2$*
- *The areas of 4 of these squares are equal to $4r^2$.*
- *So the area of the circle is less than $4r^2$.*



Next, look at the area of 4 triangles contained within the circle

- *The area of the shaded triangle is $\frac{1}{2} r \times r = \frac{1}{2} r^2$.*
- *The areas of 4 of these triangles are equal to $2r^2$.*
- *So the area of the circle is more than $2r^2$.*

- *To find an approximate value for the area of the circle we will take the average of $4r^2$ and $2r^2$ to get $\frac{4r^2 + 2r^2}{2} = \frac{6r^2}{2} = 3r^2$. (This is close to the actual area of the circle.)*
- *The actual area of a circle is: **Area** $= \pi r^2$ (where $\pi = \frac{22}{7}$ which is approximately 3.14). So Area $\approx 3.14r^2$.*

Example 1

Find the area of a circle with a radius of 8 cm.

Solution (using $\pi = 3.14$)

$A = \pi r^2$

$= 3.14(8)(8)$

$= 200.96$

- *The area of the circle is approximately 200.96 cm^2.*

Example 2

Find the area of a circle with a diameter of 30 cm.

Solution (using $\pi = 3.14$)

If the diameter is 30 cm, then the radius is $30 \div 2 = 15$ cm

$A = \pi r^2$

$= 3.14(15)(15)$

$= 706.5$

- *The area of the circle is approximately 706.5 cm^2.*

Example 3
The area of a circle is 78.5 cm.
What is its radius?

Solution (using $\pi = 3.14$)

$A = \pi r^2$

$78.5 = 3.14 r^2$

$r^2 = 25$

- *What two equal numbers have a product of 25? 5 x 5 = 25*
- *So the radius of the circle is 5 cm.*

Exercises 6.2

Use $\pi = 3.14$ in the following questions.

1. Find the area of each circle with the given radius.

   a. 12 cm

   b. 7 cm

   c. 2.5 m

   d. 120 m

2. Find the area of each circle with the given diameter.

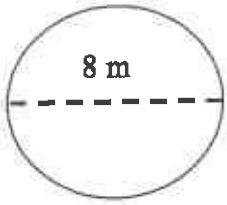
   a. 26 m

   b. 14 m

   c. 11 km

   d. 100 km

3. A circle has a diameter of 8 m. Find its area.



4. The face of the following clock has a diameter of 30 cm.

a. What is the area of the face?

b. What is the area of the part of its face determined between the minute hand pointing at 12 and the hour hand pointing at 3?

5. A jar lid has a radius of 2.5 cm. What is its area?

6. A circular man-hole cover has a diameter of 50 cm. What is its area?