

Circles and Area

Just for Fun

Counting Rectangles

Challenge a classmate to see who can find the greatest number of rectangles in the room.

Set a time limit of 1 minute.

Write down all the rectangles you can see.

At the end of 1 minute, exchange papers with your classmate.

Check each other's list.

Geometric Designer

Use only circles, triangles, rectangles, and parallelograms.

Draw any 3 of the following items:

- car, bus, truck, motorcycle
- person
- building
- animal
- landscape

Trade drawings with a classmate.

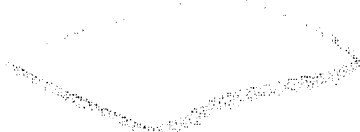
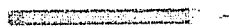
Identify your classmate's drawings.

A Game for 2

Products and Factors

Work with a partner.

You will need two number cubes labelled 1 to 6 and 7 to 12, a pencil, and paper.



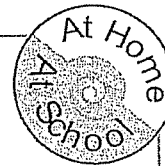
Take turns to roll the two cubes.

Record the two numbers and find their product.

In 10 seconds, write all the factors of that product that you can.

Score 1 point for each factor you find.

For which products did you score the fewest points? Why?



Quick Review

- A circle is a closed curve. All points on the circle are the same distance from the centre of the circle.

The distance between a point on a circle and the centre of the circle is a **radius** of the circle.

The plural of radius is *radii*.

The distance between two points on a circle through its centre is a **diameter** of the circle.

- The length of the diameter, d , of a circle is two times the length of the radius, r .

That is, $d = 2r$

Also, the radius, r , of a circle is one-half the diameter, d .

That is, $r = \frac{1}{2}d$, or $\frac{d}{2}$

You can find the radius of a circle, given the diameter.

For example, in a circle, d is 10 cm.

Since $r = \frac{1}{2}d$, $r = \frac{1}{2} \times 10 = 5$

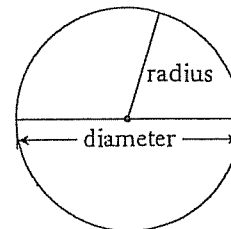
The radius is 5 cm.

You can find the diameter of a circle, given the radius.

For example, in a circle, r is 4 cm.

Since $d = 2r$, then $d = 2 \times 4 = 8$.

The diameter is 8 cm.



Practice

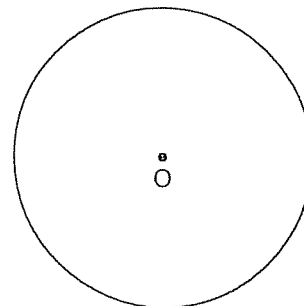
1. This circle has its centre at point O.

- a) Draw a radius of the circle.

What is the length of the radius? _____

- b) Draw a diameter of the circle.

What is the length of the diameter? _____



2. From your results in question 1, write a relationship between the radius and the diameter of a circle.

3. Find the diameter of the circle with each radius.

- a) 12 cm _____ b) 27 cm _____ c) 3.4 cm _____

4. Find the radius of the circle with each diameter.

- a) 12 cm _____ b) 28 cm _____ c) 3.4 cm _____

5. Write the steps you would take to draw a circle with radius 1 cm.
Draw the circle.

6. Draw 4 radii in the circle you drew in question 5.
What is the sum of the central angles of the circle? _____

7. Write the steps you would take to draw a circle with diameter 4 cm.

8. Circular plates with diameter 20 cm are placed side by side on a table.
The table measures 2.4 m by 1.2 m.

- a) What is the length of the table in centimetres? _____
- b) How many plates can fit side by side along the length of the table?

- c) What is the width of the table in centimetres? _____
- d) How many plates can fit side by side along the width of the table? _____
- e) How many plates can fit on the table? _____
- f) How many plates can fit around the perimeter of the table? _____

Tip
To convert metres
to centimetres,
multiply by
100.



Quick Review

- The distance around a circle is its **circumference**.

The ratio of the circumference, C , to the diameter, d , of a circle, $\frac{C}{d}$, is a number close to 3.

That is, the circumference is approximately 3 times the diameter, or 6 times the radius.

- The Greek letter π is used to represent the constant for $\frac{C}{d}$.

In symbols: $\frac{C}{d} = \pi$

π is an **irrational number** equal to about 3.14.

So, the circumference, C , is π multiplied by d .

$$C = \pi d$$

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

- You can use one of the formulas above to find the circumference of a circle given the diameter or radius.

The radius of a circle is 5 cm.

To estimate the circumference,
use: $C = 6r$

Substitute: $r = 5$

$$\begin{aligned} C &= 6(5) \\ &= 30 \end{aligned}$$

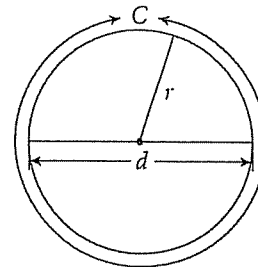
The circumference is about 30 cm.

To calculate the circumference,
use: $C = 2\pi r$

Substitute: $r = 5$

$$\begin{aligned} C &= 2 \times \pi \times 5 \quad \text{Use a calculator.} \\ &= 31.4 \end{aligned}$$

The circumference is 31.4 cm to one decimal place.



HINT

An irrational number is a decimal that never repeats and never terminates.



Practice

1. Estimate the circumference of each circle with the given diameter.

a) 2 cm

b) 24 cm

c) 4.2 m

TIP

Use $\pi = 3$ for estimates.

2. Estimate the circumference of each circle with the given radius.

a) 2 cm

b) 24 cm

c) 4.2 m

3. Calculate the circumference of each circle in question 2.

Give the answers to one decimal place.

a) $r = 2$ cm

b) $r = 24$ cm

c) $r = 4.2$ m

4. The circumference of each circle is given.

Calculate the diameter and radius. Give the answers to one decimal place.

a) $d =$ _____

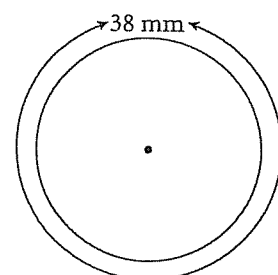
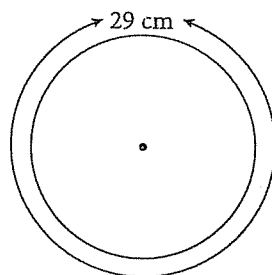
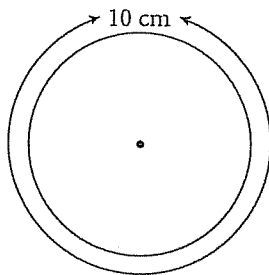
b) $d =$ _____

c) $d =$ _____

$r =$ _____

$r =$ _____

$r =$ _____



5. A drinking glass has a circular base with a circumference of 21.4 cm.

a) Calculate the diameter of the circular base. _____

b) Circular coasters are made to extend beyond the edge of the glass base by 1 cm.

What is the diameter of the coaster? _____

c) Calculate the circumference of the coaster. _____

6. A car tire has a radius of 36 cm. A stone gets stuck in the tire. How many times will the stone hit the ground when the car travels 1 km? Show your work.

H I N T

Think about the tire being cut and laid flat.



The stone will hit the ground _____ times.