5.1 The Area of a Parallelogram
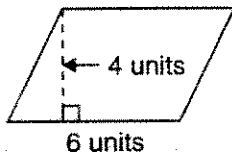
Develop and apply the formula for the area of a parallelogram.

1. Fill in the blanks for the parallelogram below.

   height _____

   4 units

   base _____

   6 units

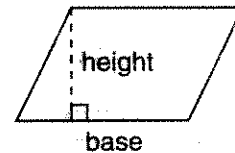   area _____

At-Home Help

The **height** is a line segment drawn to form a right angle with one side of a shape.

The **base** is the side of a shape that is measured to calculate the area or perimeter of the shape; any side of a shape can be the base of the shape.

For example,

height

base

The **formula** for the area of a parallelogram with base b and height h is $A = b \times h$.

2. Complete the table.

	Base	Height	Area of Parallelogram
a)	3 cm	5 cm	
b)	2 m		16 m²
c)		6 cm	30 cm²
d)	5.3 m	3.2 m	
e)		2.4 mm	3.6 mm²
f)	1.2 dm		0.6 dm²

3. a) Estimate the area of each parallelogram, in square units, by counting the squares.
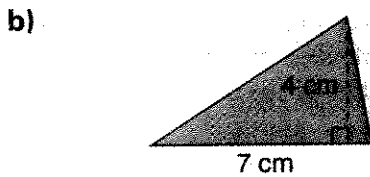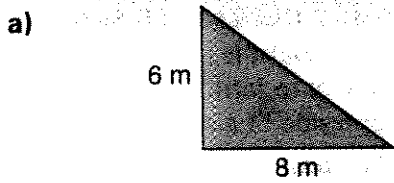
   A.

   B.

   C.
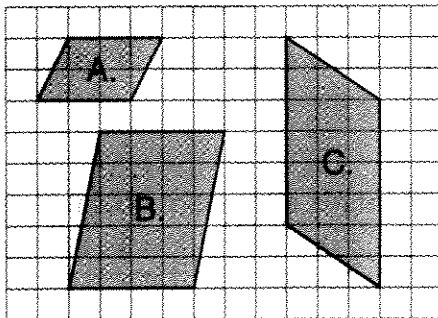
   b) Calculate the area of each parallelogram, in square units, using a formula.

5.2 The Area of a Triangle
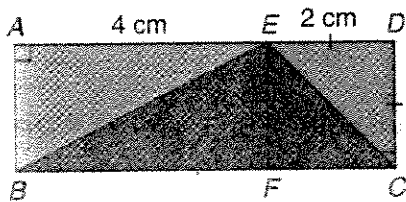
Develop and apply the formula for the area of a triangle.

1. Calculate the area of each triangle.

   a)

   6 m

   8 m

   b)

   4 cm

   7 cm

At-Home Help

You can think of a triangle as being half a rectangle or a parallelogram.

For example, the shaded triangle below is half the size of a rectangle with the same height and base.

5 cm

10 cm

The area of a triangle is half the area of a rectangle or parallelogram with the same height and base.

Area of a triangle:
$A = (b \times h) \div 2$

2. Complete the table.

	Base	Height	Area of Triangle
a)	6 cm	12 cm	
b)		8 mm	32 mm²
c)	120 m		1200 m²
d)	14.2 cm	12.3 cm	

3. Calculate the area of each shape.

   A   4 cm   E 2 cm D

   B   F   C

   a) triangle ABE

   b) triangle ECD

   c) triangle BEC

5.3 Exploring Circumference and Diameter

Investigate the relationship between the diameter and circumference of a circle.

You will need tracing paper, tape, scissors, and a ruler.

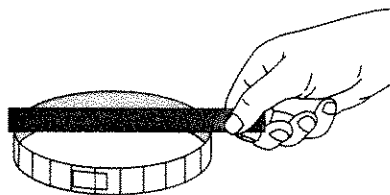You can determine the diameter of a circle by following these steps:

Step 1: Use the centimetre grid at the bottom of the page. Trace and cut out a strip of paper the same length as the circumference of the circle you want to measure.
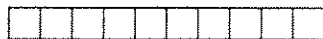
Step 2: Bend the paper strip into a circle and tape it closed. Don't overlap the edges.
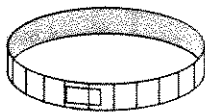
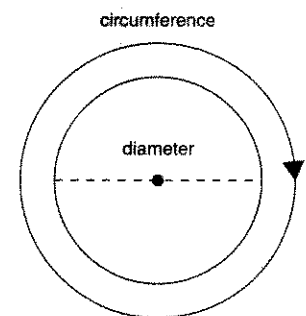**Step 3:** Measure the diameter of your paper circle.

At-Home Help

A **circumference** is the boundary of a circle. It is also the length of this boundary.

A **diameter** is a line segment that joins two points on the circumference of a circle and passes through the centre. It is also the length of this line segment.

For example,

circumference

diameter

1. What is the diameter of a circle with a circumference of 10 cm?

2. What is the diameter of a circle with a circumference of 15 cm?

5.4 Calculating Circumference

GOAL

Apply the formula for the circumference of a circle using π.
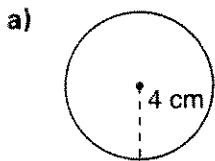
You can use a calculator to answer these questions.

1. Determine the circumference of a circle with each diameter.

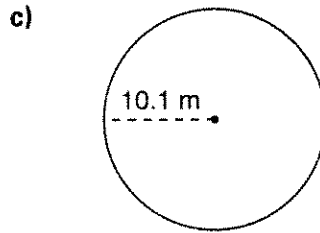   a) 6 cm _____   c) 23.7 m _____

   b) 11.3 mm _____   d) 0.05 cm _____

2. Determine the diameter and the circumference of a circle with each radius.
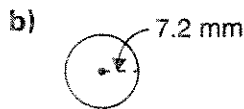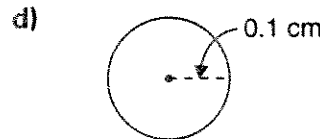
   a)

   4 cm

   diameter _____

   circumference _____

   c)

   10.1 m

   diameter _____

   circumference _____

   b)

   7.2 mm

   diameter _____

   circumference _____

   d)

   0.1 cm

   diameter _____

   circumference _____

> ### At-Home Help
>
> π (pi) is the ratio of the circumference of a circle to its diameter. Its value is approximately 3.14.
>
> The **radius** of a circle is half its diameter. The radius is the distance from the center of a circle to a point on a circumference. You can multiply the radius by 2 to calculate the diameter of a circle.
>
> To calculate the circumference of a circle, use this formula:
>
> $C = \pi \times d,$
>
> where C is the circumference and d is the diameter.

3. Jessica made a circular garden. The radius of her garden is 4.5 m.

   a) What is the diameter of the garden?

   b) Jessica wants to put a wire fence around her garden. How many metres of fencing will she need?
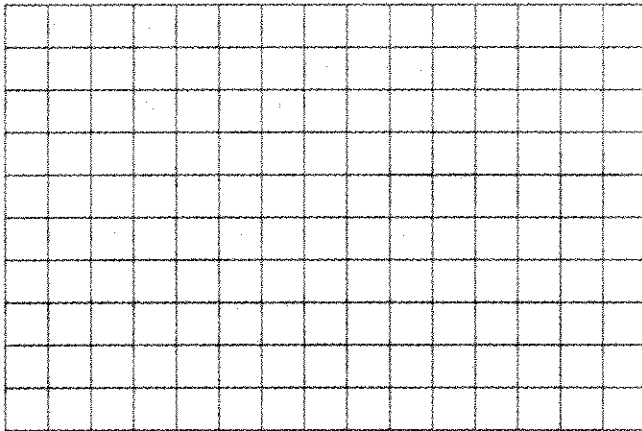
4. The circumference of a CD is 37.7 cm. What is its diameter?
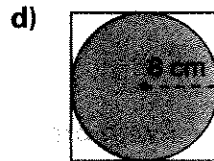
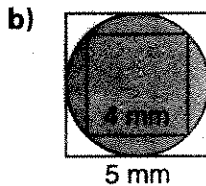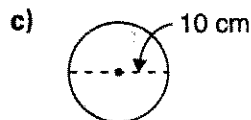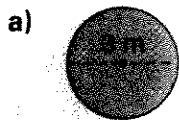# 5.5 Estimating the Area of a Circle

GOAL

Estimate the area of a circle.

1. Use the grid to estimate the area of a circle with each diameter.

   a) 2 units   c) 6 units

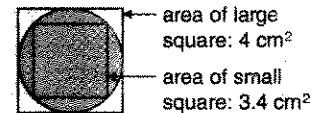   b) 4 units   d) 5 units

2. Estimate the area of each circle.

   a)

   b)
   5 mm

   c) 10 cm

   d)

3. Katie drew a happy face with a diameter of 6 cm. Estimate the area of the happy face.

5.6 Calculating the Area of a Circle
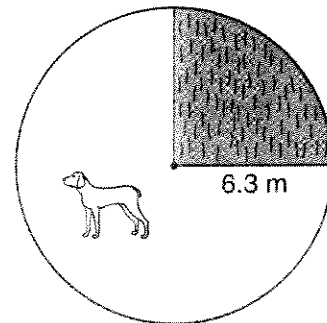
GOAL

Develop and apply the formula for the area of a circle.

You can use a calculator to answer these questions.

1. Determine the area of a circle with each radius.

   a) 8 cm _____

   b) 2.4 m _____

   c) 10.3 mm _____

   d) 5.5 cm _____

2. Complete the table. Record your answers to one decimal place.

	Diameter	Radius	Circumference	Area
a)	5.0 cm			
b)		7.5 mm		
c)			45.0 cm	
d)				23.4 m²
e)	1.8 cm			

3. Yan's parents breed dogs. Yan built a circular dog run for the dogs to exercise in. The dog run has a radius of 6.3 m.

   a) What is the diameter of the dog run?

   b) What is the area of the dog run?

   c) Yan wants to cover one quarter of the area with grass. How much area does she need to cover?

6.3 m

4. Jacob constructed a clock face with a diameter of 22.4 cm.

   a) What is the circumference of the clock face?

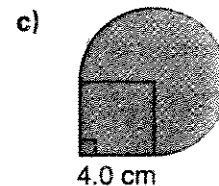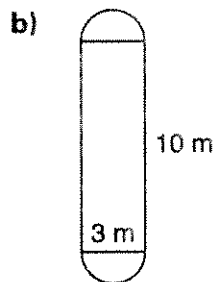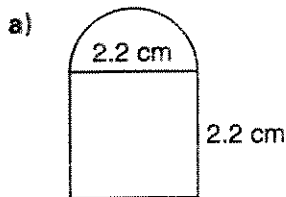   b) What is the area of the clock face?

5.7 Solve Problems Using Diagrams

GOAL

Use diagrams to solve problems about the number of degrees in a circle.

1. What is the total area of each figure?

a)

2.2 cm

2.2 cm

b)

10 m

3 m

c)

4.0 cm

Draw diagrams to solve questions 2 to 4.

2. Rectangle A has a base of 8 cm and a height of 4 cm. The base and height of rectangle B are double those of rectangle A. What is the area of rectangle B?

3. Each angle of a triangular block is 60°. How many blocks can fit around a point?

60°

4. Circle A has a diameter of 9.0 cm. Circle B has a radius that is four times as long as the radius of circle A. What is the circumference of circle B?