Measuring Linear Dimensions

At Home
At School

Quick Review

Length, width, height, thickness, and depth are linear dimensions.
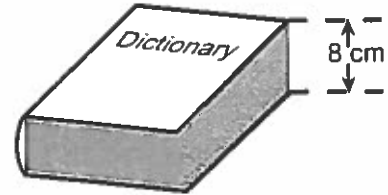
Width

MATH CAMP

←60 cm→

60 cm wide

Height

6 m

6 m tall

Thickness

Dictionary

8 cm

8 cm thick

Depth

1 m

1 m deep

Length

Pineville ←—3 km—→ Denton
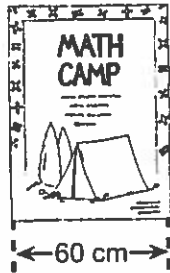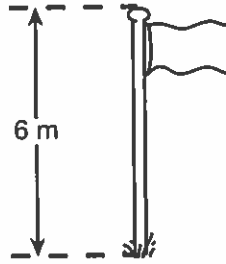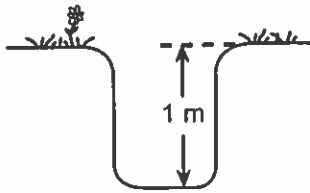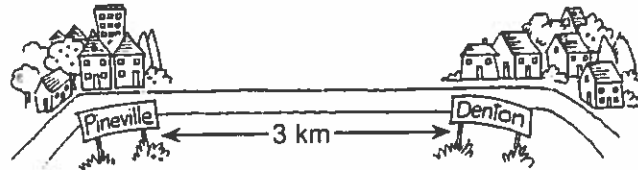
3 km long

Try These

1. Measure each item to the nearest centimetre or metre.

   a) the height of your desk _____

   b) the length of your teacher's desk _____

   c) the width of your thumb _____

   d) the thickness of a blackboard eraser _____

Practice

1. Find an object that fits each description.
   Measure to the nearest centimetre or metre.
   Complete the chart.

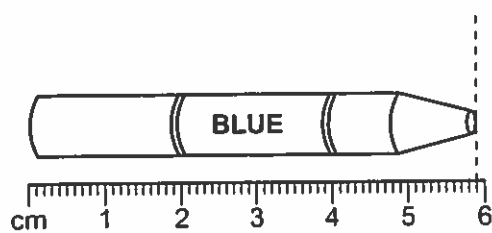| Description	Object	Measure
About 2 m long		
Taller than you		
About 20 cm wide		
Thicker than 1 cm		
About 15 cm deep		

Stretch Your Thinking

Draw a rectangle that is 6 cm × 2 cm.
Label its linear dimensions.

Measuring in Millimetres

Quick Review

You can read the length of this crayon to the nearest centimetre.
The crayon is about 6 cm long.

BLUE

cm 1 2 3 4 5 6

To be more precise, you can read the length in millimetres.
The crayon is 59 mm long.

One millimetre is one-tenth of a centimetre.

So, you can say the length in centimetres.
The crayon is 5.9 cm long.

You say: 5 and 9 tenths centimetres

> **10 mm = 1 cm**
> **So, 1 mm = 0.1 cm**

Try These

1. Estimate the length of each line to the nearest centimetre.
   Then, measure and record the actual length in millimetres and centimetres.

		Estimate (cm)	Length (mm)	Length (cm)
a)				
b)				
c)				

Practice

1. Work with a partner.

   You will need:
   Small objects, such as a pencil, a crayon, a paper clip, a straw, a craft stick
   A 30-cm ruler

   ➤ Choose an object.
   ➤ Both of you estimate the object's length to the nearest centimetre.
   ➤ Record your estimates.
   ➤ Measure and record the actual length in millimetres and in centimetres.
   ➤ Repeat with other objects.

Object	Our Estimates (cm)	Actual Length (mm)	Actual Length (cm)
Pencil			
Crayon			
Paper Clip			
Straw			
Craft stick			

Stretch Your Thinking

Measure and record the width of your hand and your foot.
Complete the chart.

	Width (mm)	Width (cm)
Hand		
Foot		
Difference		

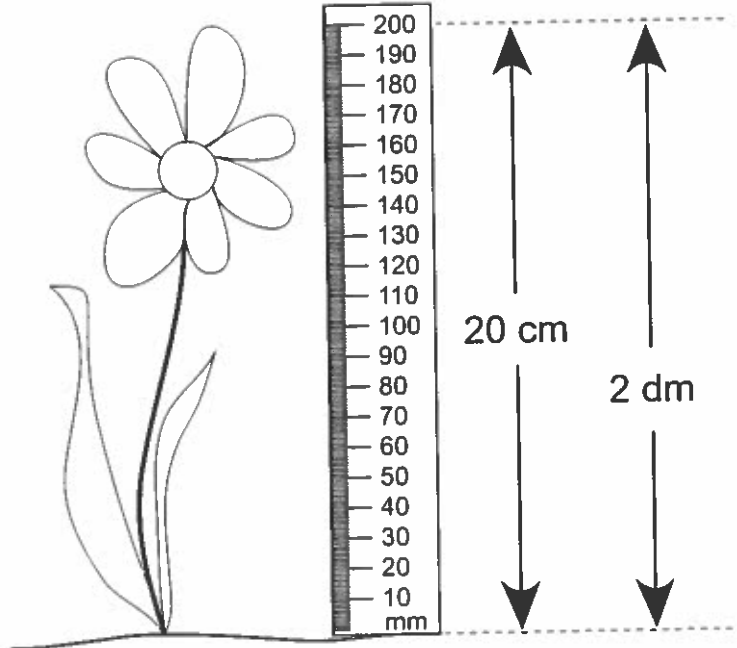# Measuring in Decimetres

Quick Review

A decimetre is the same length as 10 centimetres.
A Base Ten rod is 1 decimetre long.
An orange Cuisenaire rod is 1 decimetre long.

The flower is 200 mm tall.

The flower is 20 cm tall.

The flower is 2 dm tall.

| 1 dm = 10 cm |
| 1 dm = 100 mm |

20 cm

2 dm

Try These

1. Use Base Ten rods or orange Cuisenaire rods. Measure each item to the nearest decimetre.

    a) the width of your desk _____

    b) the width of your math book _____

    c) the length of a bookcase _____

    d) the width of the classroom door _____

    e) the length of this page _____

Practice

Use a metre stick to help you.

1. Complete.

    a) 50 dm = _____ cm   b) 35 dm = _____ cm   c) 15 dm = _____ cm

    d) 50 cm = _____ dm   e) 20 cm = _____ dm   f) 90 cm = _____ dm

2. Which is longer?
    a) 22 cm or 2 dm   b) 500 mm or 7 dm   c) 36 cm or 300 mm

    _____   _____   _____

3. Play this game with a partner.

    You will need:
    Index cards
    Paper to keep track of your points
    Metre stick

    How to play:

    ➤ Make two sets of cards. Label cards in one set:
       1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 dm.
       Label cards in the other set 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100 cm.
       Shuffle each set.
    ➤ Give one partner the decimetre set and the other partner the centimetre set.
    ➤ Each player takes a card from the top of the set.
    ➤ Compare the lengths that come up. Use a metre stick to help you.
    ➤ The player with the longer length gets a point.
    ➤ If the lengths are equal, no one gets a point.
    ➤ Continue until one player has 10 points.

Stretch Your Thinking

Play the game again. This time the player with the longer length gets an extra point for naming the length in millimetres.
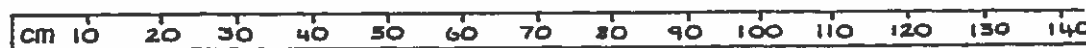
Relating Units of Measure

Quick Review

One metre equals 100 cm.
So, 1 cm is $\frac{1}{100}$ of a metre, or 0.01 m.

You can write the length of the fishing pole as:

| 120 cm | or | 1 m 20 cm | or | 1.20 m | or | 12 dm |

Remember these.

1 m = 10 dm	1 dm = 10 cm	1 cm = 10 mm	1 mm = 0.1 cm
1 m = 100 cm	1 dm = 100 mm	1 cm = 0.01 m	
1 m = 1000 mm		10 cm = 0.1 m	

Try These

Complete.

1. a) 5 m = _____ cm   b) 0.50 m = _____ cm

   c) 140 cm = _____ m   d) 60 cm = _____ m

2. a) 1 dm = _____ cm   b) 70 dm = _____ cm

   c) 30 cm = _____ dm   d) 3 cm = _____ dm
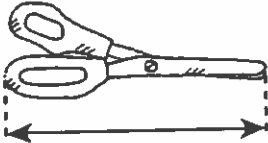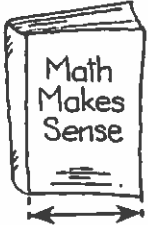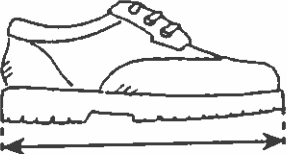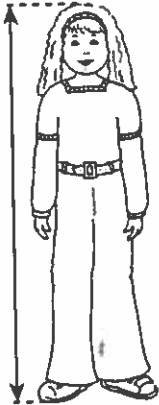
3. a) 70 cm = _____ mm   b) 18 cm = _____ mm

   c) 40 mm = _____ cm   d) 43 mm = _____ cm

Practice

1. Look around the room to find the items pictured in the chart.
   Estimate the measurement of each item to the nearest centimetre.
   Measure and record the measurements.

Object	Estimate (cm)	Length (cm)	Length (mm)	Length (m)

Stretch Your Thinking

Cut off a piece of string any length. Measure the string.
Record its length in as many ways as you can.

Measuring Perimeter

Quick Review

The distance around an object or figure is its **perimeter**.

Find the perimeter of an object by measuring the lengths of its sides and then adding the lengths together.

Perimeter = 4 cm + 3.4 cm + 4 cm + 3.4 cm
Perimeter = 14.8 cm

When the side lengths are given, add to find the perimeter. This figure is drawn to **scale**. That is, each side represents the given length.

Perimeter = 25 cm + 25 cm + 15 cm
Perimeter = 65 cm

25 cm   25 cm
15 cm
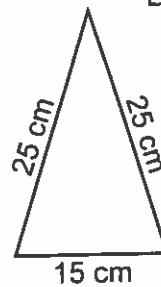
Try These

1. Find the perimeter of each object or figure.

a)
15 cm
7 cm   7 cm
5
15 cm

Perimeter = _____

b)
8 dm
Hill School
6 dm   6 dm
8 dm

Perimeter = _____

c)
4 cm

Perimeter = _____

d)
2 cm
6 cm
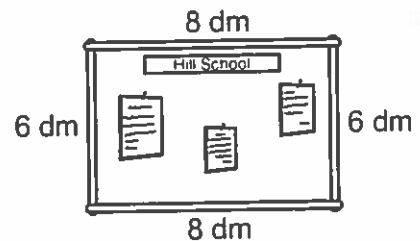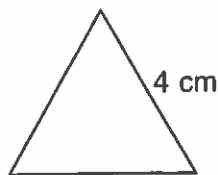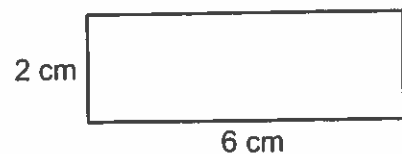
Perimeter = _____

Practice

1. Find objects to fit each description.
   Complete the chart.

Description	Object	Actual Perimeter
Perimeter between 50 and 80 cm		
Perimeter between 100 and 200 mm		
Perimeter greater than 15 dm		
Perimeter less than 20 cm		
Perimeter between 10 and 20 dm		
Perimeter less than 1 m		
Perimeter about 50 cm		

Stretch Your Thinking

The perimeter of an isosceles triangle is 30 cm.
How long might its sides be?
Give two different answers.
Explain.

Finding the Perimeter of a Large Region

Quick Review

To measure the perimeter of a large region, use metres or kilometres as the unit of length.

800 m

700 m   700 m

800 m

Lincoln Pond Park
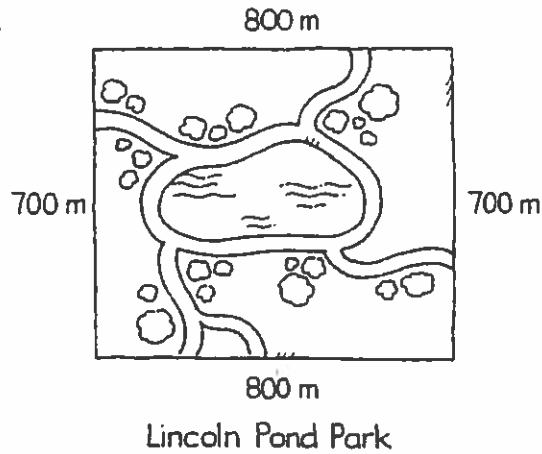
The perimeter of this park = 800 m + 700 m + 800 m + 700 m = 3000 m
Since 1000 m = 1 km, then 3000 m = 3 km
The perimeter of the park is 3 km.

1 km = 1000 m

Try These

1. Complete.

   a) 2000 m = _____ km   b) 9000 m = _____ km   c) 5000 m = _____ km

   d) 7 km = _____ m   e) 4 km = _____ m   f) 10 km = _____ m

2. Find the perimeter of each region.

   a)
   50 m

   75 m   75 m

   50 m

   Perimeter = _____

   b)
   2 km
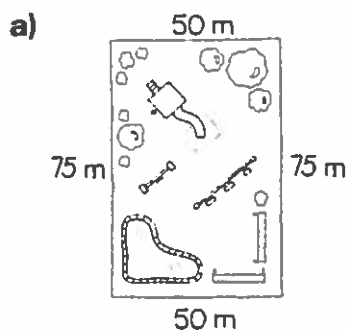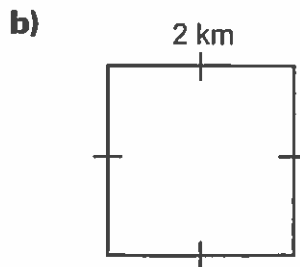
   We use hatch marks to show equal sides.

   Perimeter = _____

Practice

1. Find the perimeter of each figure.

   a)

   7 m

   Perimeter = _____

   b)

   3 km

   3.5 km

   2.3 km

   1.5 km
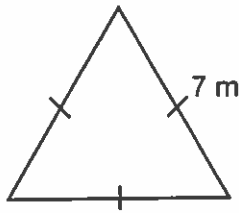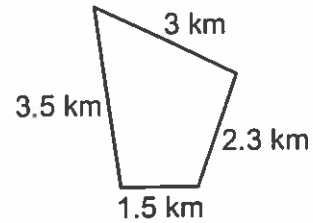
   Perimeter = _____

2. Label the lengths of the sides of each square.

   a)
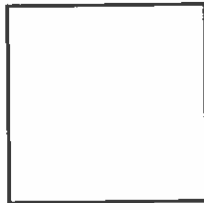
   Perimeter = 8 km

   b)
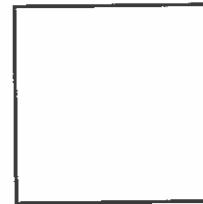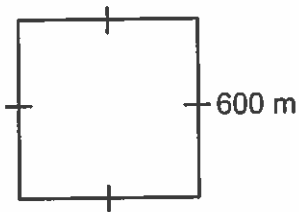

   Perimeter = 2 km

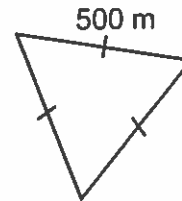3. Number the figures in order from least to greatest perimeter.

   a)

   600 m

   _____

   b)

   2 km

   1 km

   _____

   c)

   500 m

   _____
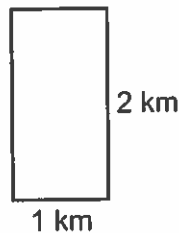
Stretch Your Thinking

Suppose you bought 16 m of fencing to put around your rectangular garden.
What dimensions might your garden be?
Give two different answers.

_____

_____

Exploring Area

Quick Review

To find the **area** of a figure, count the number of square units needed to cover it.

The area of this figure is 5 square units.
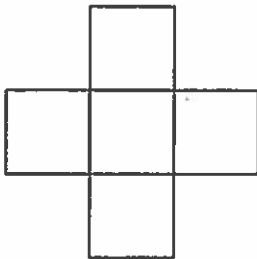
To find the area of a rectangle, you can count the number of square units or you can multiply. There are 2 rows of 5 squares.
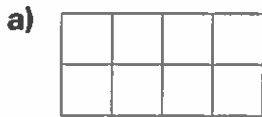
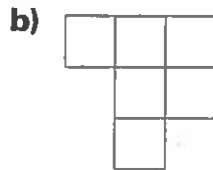$2 \times 5 = 10$

The area of this rectangle is 10 square units.

Try These
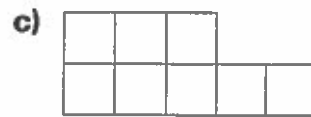
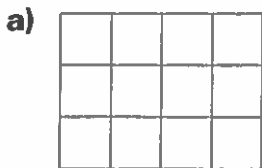**1.** Find the area of each figure in square units.

a)

b)

c)

_____ square units   _____ square units   _____ square units

2. Write a multiplication sentence to find the area of each rectangle.

a)

b)

c)
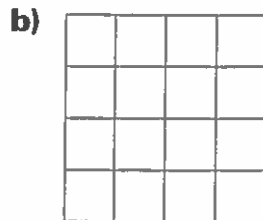
Measuring Area in Square Centimetres

At Home
At School

Quick Review

Each side of every square on this grid paper is 1 cm long.

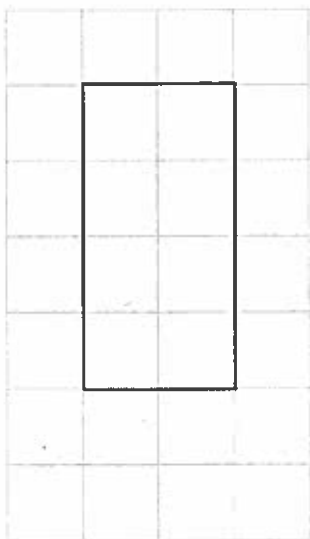Every square has an area of one **square centimetre** (1 cm^2).

You can use square centimetres to measure area.

Try These
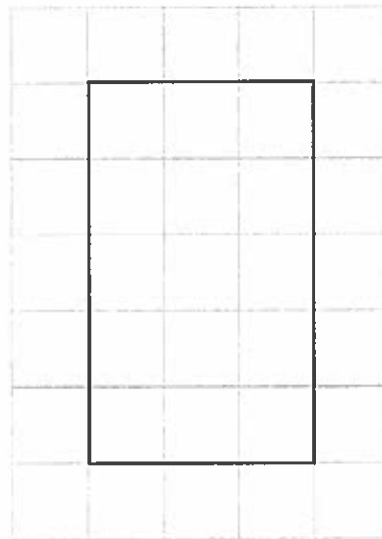
1. Find the area of each figure in square centimetres.
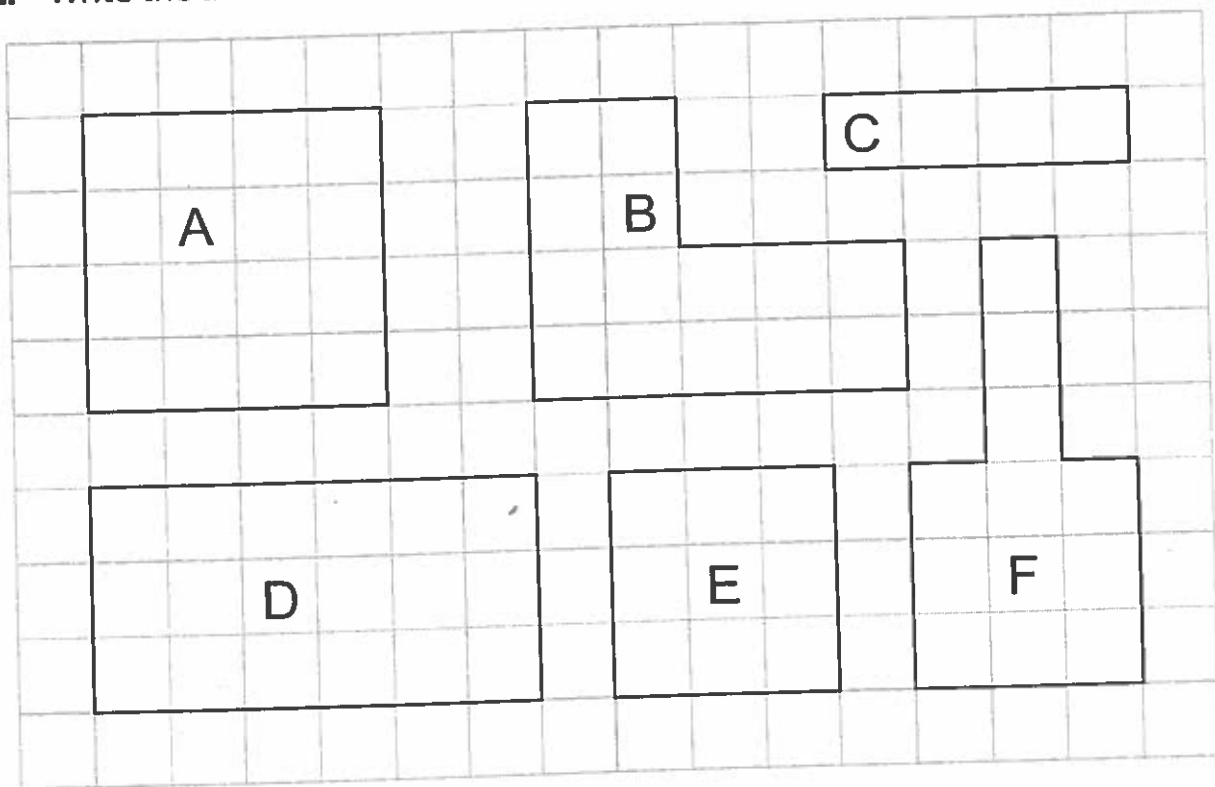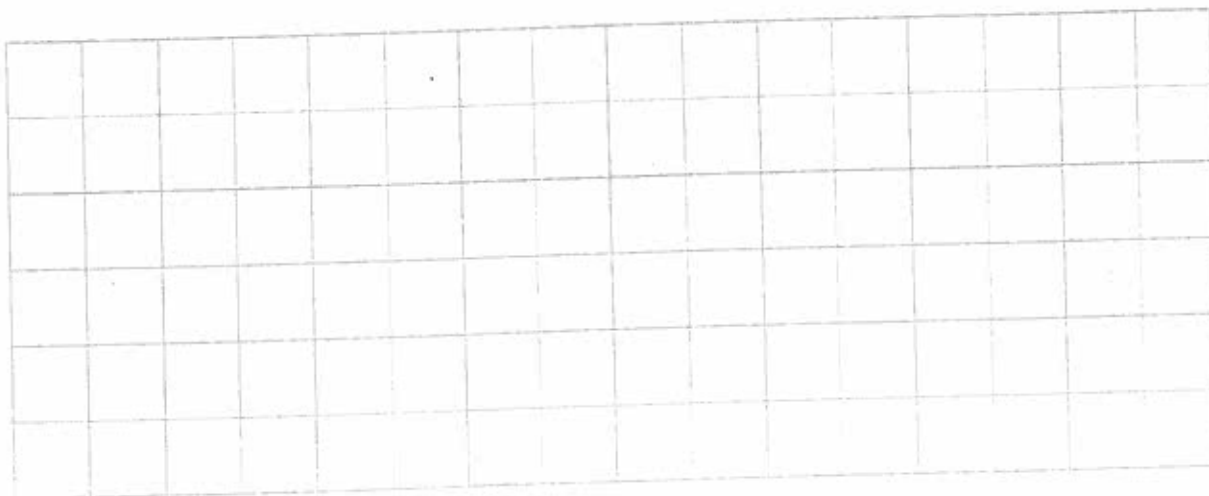
a)

b)

c)

Area = _____   Area = _____   Area = _____

1. Write the area inside each figure in square centimetres.

2. Draw three different rectangles with area 12 cm².

Stretch Your Thinking

The area of a square is 25 cm². What are its linear dimensions?

Estimating and Measuring Area

At Home
At School

Quick Review

This is one way to find the approximate area of a triangle.

➤ Count each whole square.
 There are 8 whole squares.
➤ Count each half square.
 There are 4 half squares.
 This equals 2 whole squares.
➤ Count each part greater than $\frac{1}{2}$ a square as 1 square.
 There are 2 parts greater than $\frac{1}{2}$ a square.
➤ Ignore each part less than $\frac{1}{2}$ a square.
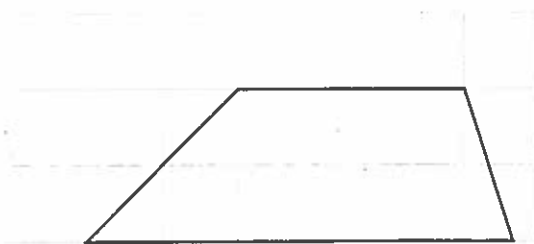➤ Add to find the total number of squares: $8 + 2 + 2 = 12$
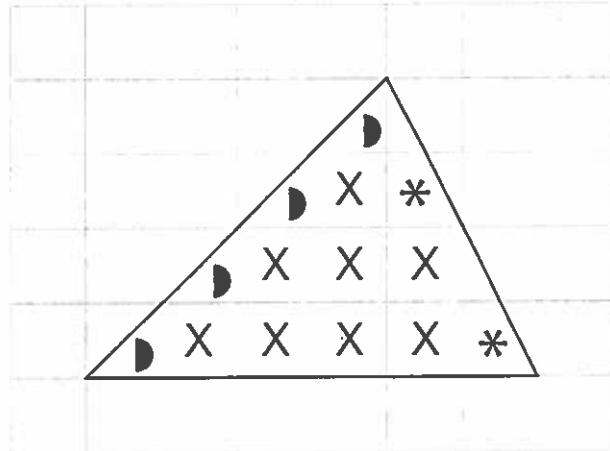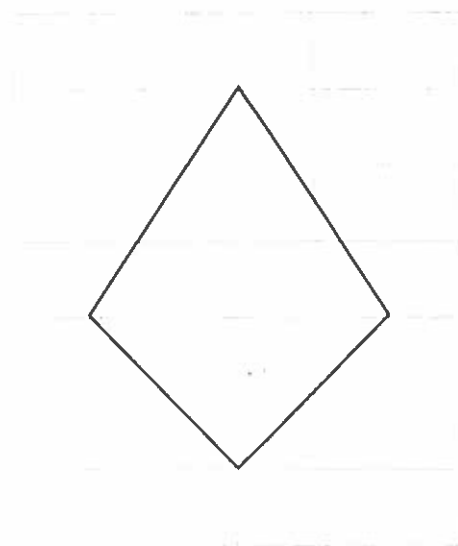
This triangle has an area of about 12 cm².

Try These

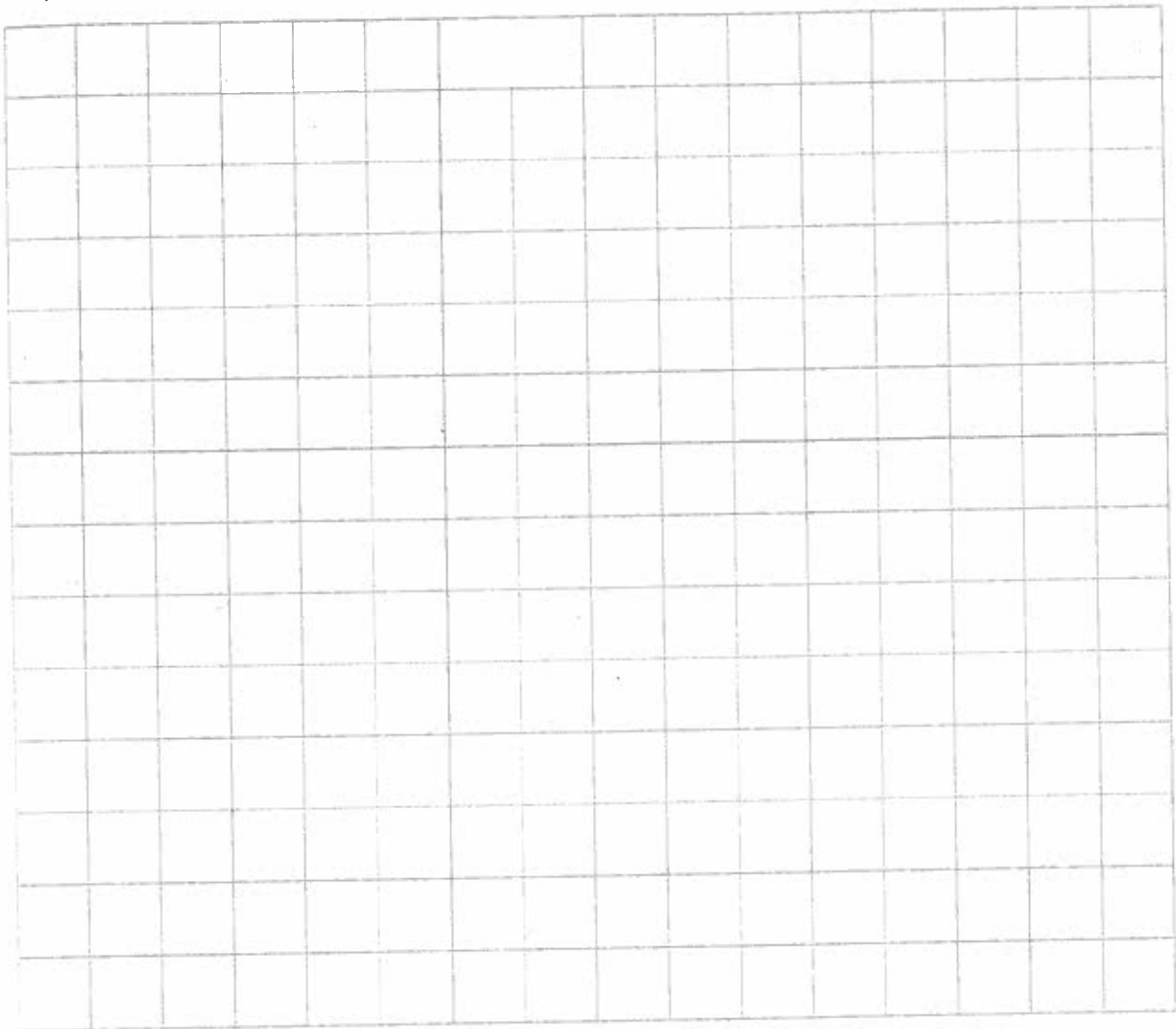1. Find the approximate area of each figure.

a)

Area = about _____

b)

Area = about _____

1. Draw a large clown's head on the grid. Use as many different polygons as you can. Find the approximate area of each part of the head.

	Nose	Mouth	One Eye	Whole Head
Approximate Area				

Stretch Your Thinking

Explain how you would find the approximate area of a leaf.

_____

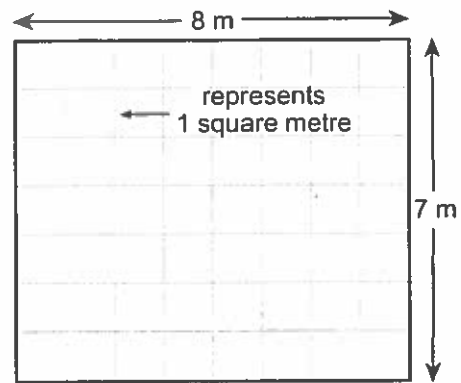_____

Finding Area in Square Metres

At Home
At School

Quick Review

A square with side lengths of 1 m has an area of one **square metre** (1 m²).

You can use grid paper to model a large area.
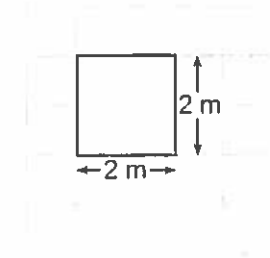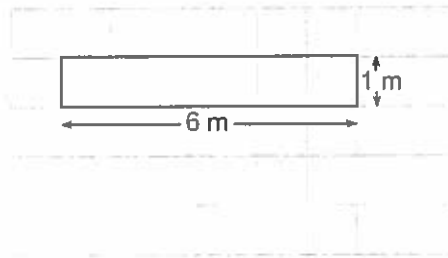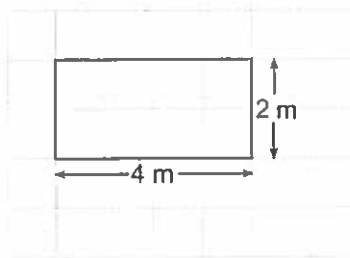Each square represents 1 m².

This is a model of a strawberry patch.
It is 7 m wide and 8 m long.
The model has 7 rows of 8 squares.
$7 \times 8 = 56$

The area of the strawberry patch is 56 m².

8 m

represents
1 square metre

7 m

Try These

1. Find the area of each garden. Each square has an area of 1 m².

2 m
4 m

1 m
6 m

2 m
2 m

a) Area = _____   b) Area = _____   c) Area = _____

2. Put the rectangles in question 1 in order from least to greatest area.
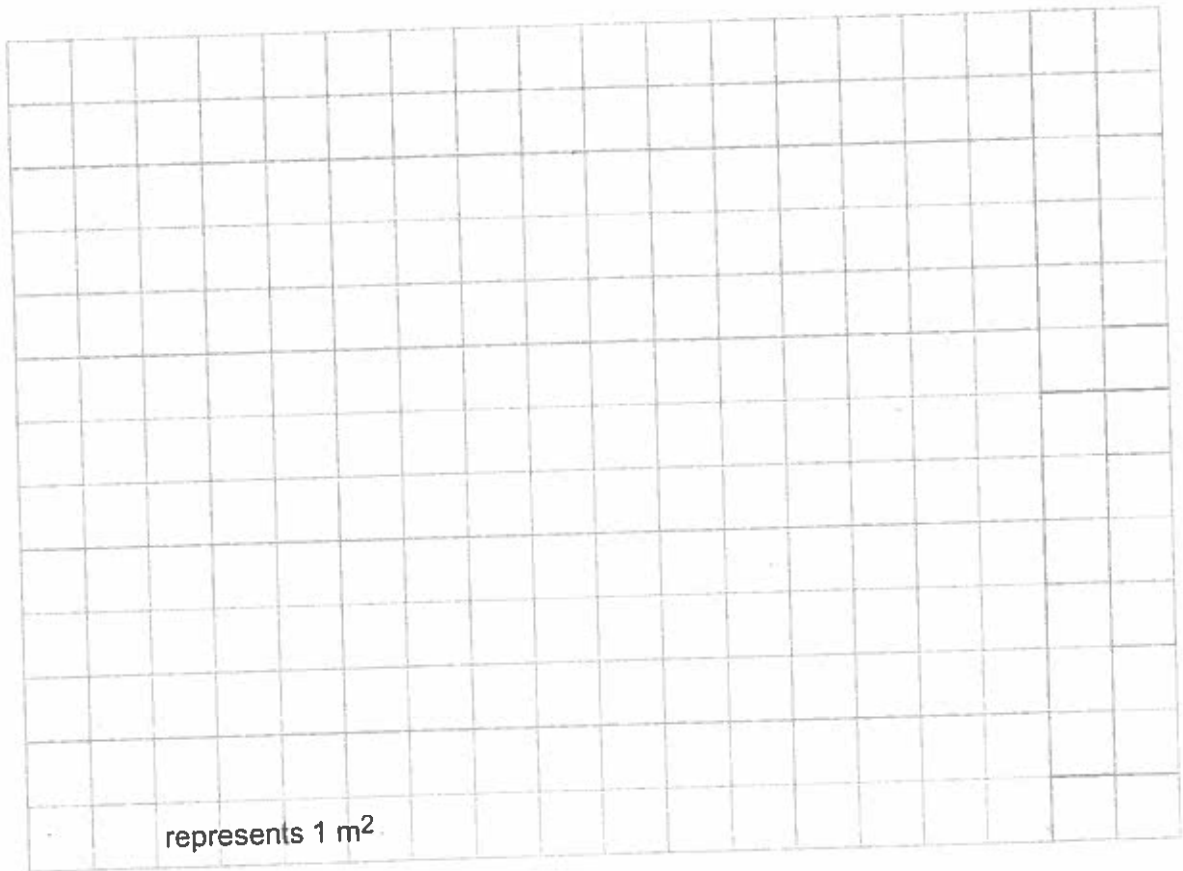
_____

Practice

1. Here are the dimensions of each of Sheila's gardens.
   Model each of the gardens on the grid.
   ➤ Find the area of each garden.
   ➤ On each model, record the area and the type of flowers.

Sheila's Gardens

Flowers	Width	Length
Roses	7 m	3 m
Wildflowers	5 m	4 m
Pansies	1 m	8 m
Petunias	6 m	4 m
Daisies	10 m	2 m

represents 1 m²

Stretch Your Thinking

Sheila has a rectangular pumpkin patch with area 36 m².
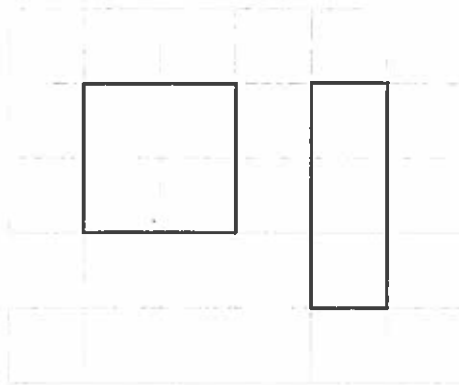The patch is 4 m wide. How long is it?

Exploring Figures with Equal Perimeters

Quick Review

Perimeter is the distance around an object.
Figures can have equal perimeters, even if they have different areas.

Each figure has a perimeter of 8 cm.

The square has an area of 4 cm² and the rectangle has an area of 3 cm².

Try This

1. Draw all possible rectangles with a perimeter of 18 cm.
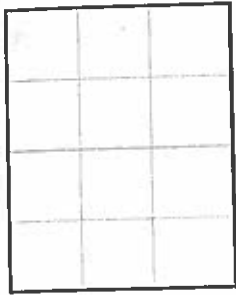   Label each rectangle with its area.

    = 1 cm²

Find the perimeter and the area of each rectangle.
Then draw another rectangle with the same perimeter.
Record the area of the rectangle you drew.

Each small square has an area of 1 cm².

1.

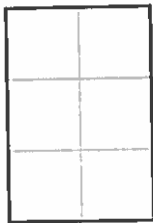Perimeter = _____

Area = _____

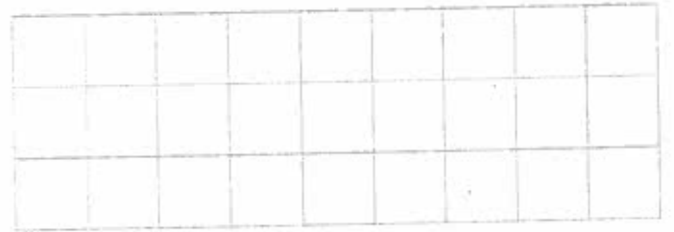Area = _____

2.

Perimeter = _____

Area = _____

Area = _____

Stretch Your Thinking

Suppose the area of your rectangular garden is 5 m².
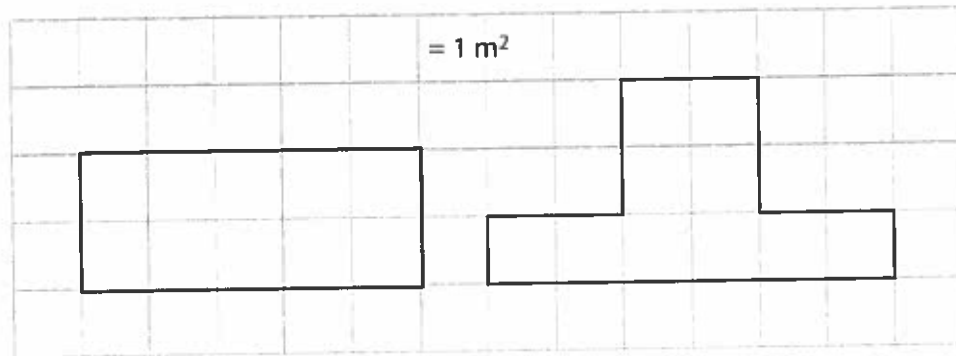What is its perimeter? Explain.
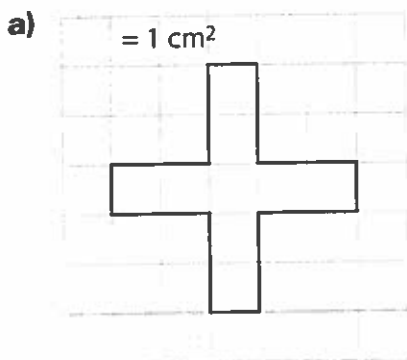
_____

_____

Exploring Figures with Equal Areas

Quick Review

Figures with different perimeters can have equal areas.
Each figure below has a different perimeter, but has an area of 10 m².
The rectangle has a perimeter of 14 m, while the other figure
has a perimeter of 18 m.

= 1 m²

Try These

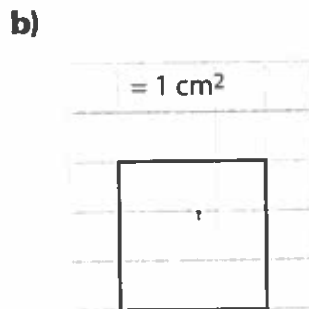1. Find the area and perimeter of each figure.

a) = 1 cm²
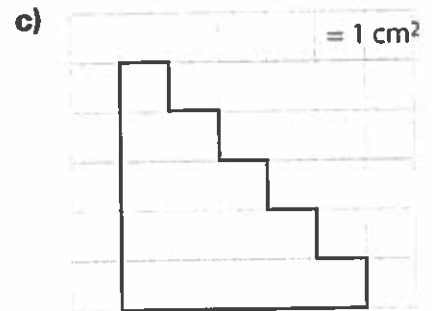
b) = 1 cm²

c) = 1 cm²

Area = _____

Perimeter = _____

Area = _____

Perimeter = _____

Area = _____

Perimeter = _____

d) Which figures have equal areas? _____

Practice

1. Work with a partner.

   ➤ Draw a figure on the grid.
   ➤ Record the area and the perimeter on the figure.
      Your partner draws a different figure with the same area,
      and records the area and the perimeter.
   ➤ Switch roles and repeat. Continue the game until the grid is full.

$= 1 \text{ cm}^2$

Stretch Your Thinking

Draw two figures on the grid,
each with an area of 1 cm^2.