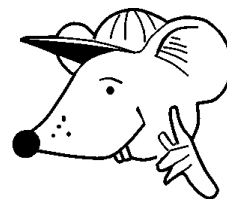




MATHEMATICS



N.S. Yr. 5 P.97

**Measure and calculate the perimeter
and area of simple shapes.**

Equipment

Paper, pencil, ruler
Squared paper, dotted paper useful
Transparent grid (1cm) useful

MathSphere

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Concepts

In Year 5 children should re-inforce their knowledge of the difference between the perimeter and area of regular shapes.

They will be expected to work out the perimeter of rectangles and write their method, firstly in words and then as a formula eg a child might say double the length and double the width and then add the two answers or double the length plus width.

$P = 2(l + w)$ Children may express these ideas in a variety of ways.

The perimeter of regular polygons will be worked out and a formula written in words eg for a hexagon the perimeter is 6 times the length of one side.

A range of terms need to be re-inforced, including:

Perimeter, length, distance, area, surface 2D, edge

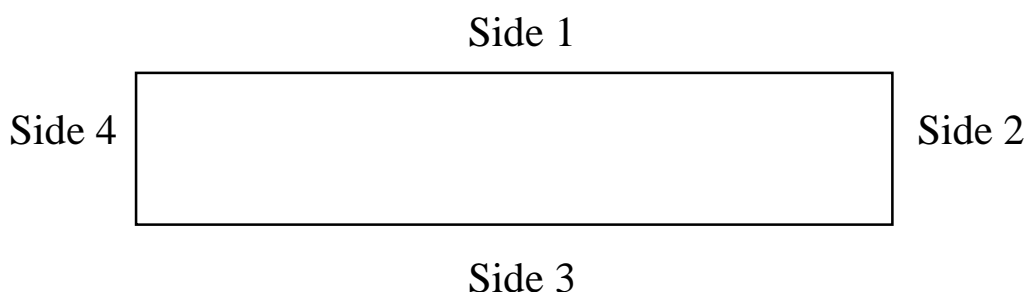
and children will be encouraged to use the square cm (cm^2) sign and be introduced to square meters (m^2) and square millimetres (mm^2).

When giving answers it is important to stress the need to write down what the unit of measurement is eg cm, m, cm^2 , m^2 etc and not just to give a numerical answer.

Perimeter of rectangles



Remember: perimeter is the distance all the way round the outside of a shape. It is usually measured in mm, cm, m, or km.



1. Measure side 1 2. Measure side 3

What do you notice?

When measuring the opposite sides of any rectangle you will notice that the lengths are exactly the same. So, if you measure one there is no need to measure the opposite side - it will be the same.

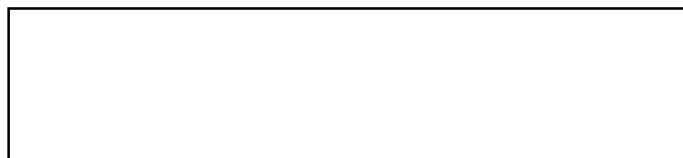
Check this for sides 2 and 4.

So, to find the perimeter of a rectangle you only need to measure two sides. But you will need to double your answer to get the distance round a shape.

Write down how to find the perimeter of a rectangle without measuring all four sides:

.....

Perimeter of rectangles



The length (or base) of this rectangle is 9cm
Length can be shortened to l , so that $l = 9\text{cm}$

The width (or height) of this rectangle is 2cm.
Width can be shortened to w , so that $w = 2\text{cm}$

The perimeter of the rectangle is the length twice ($2l$) plus
the width twice ($2w$) or

$$\text{Perimeter (P)} = 2l + 2w$$

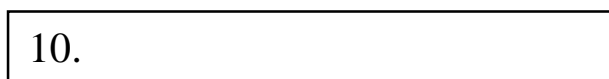
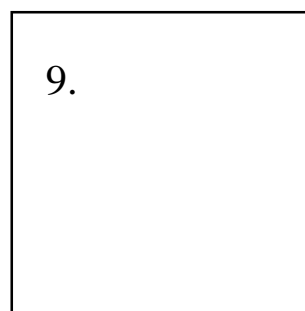
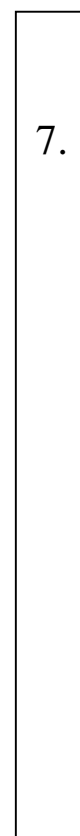
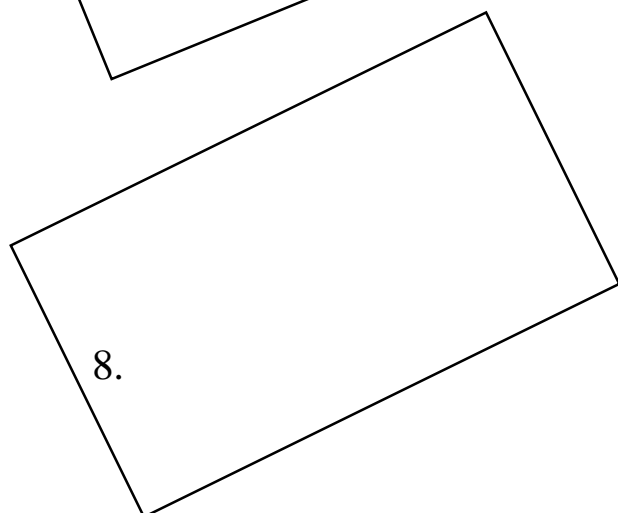
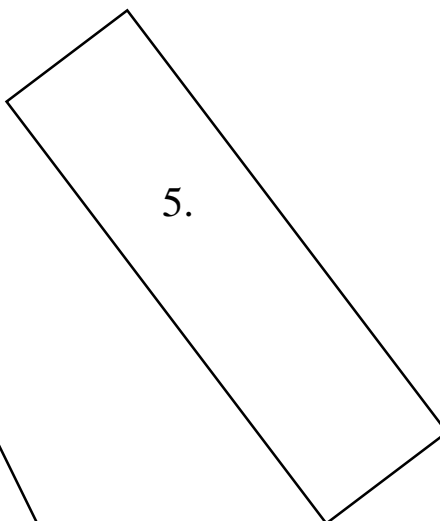
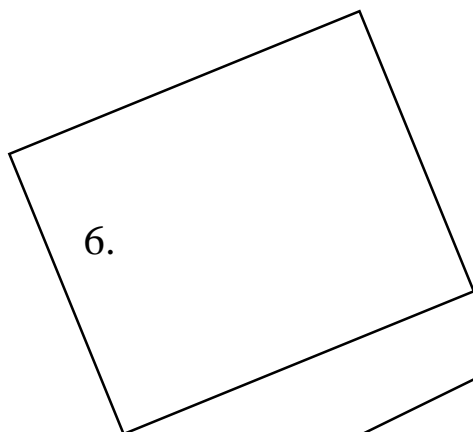
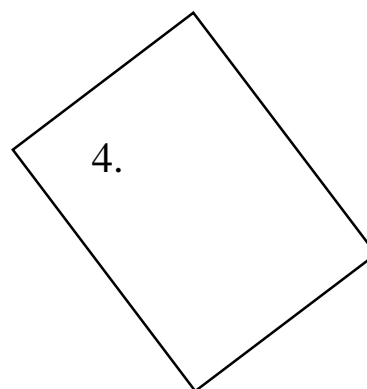
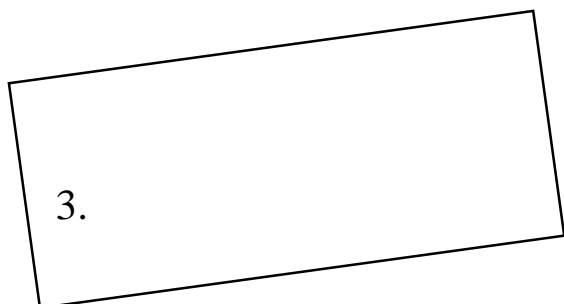
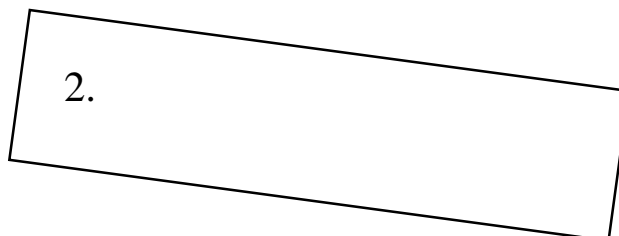
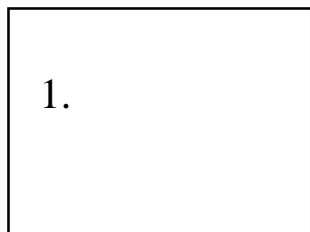
You may have found another way of working out the perimeter, such as adding the length and width and then doubling the answer. This can be written: $P = 2(l + w)$

Try to use the formula $P = 2l + 2w$ or

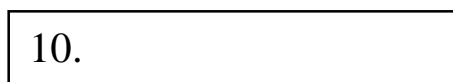
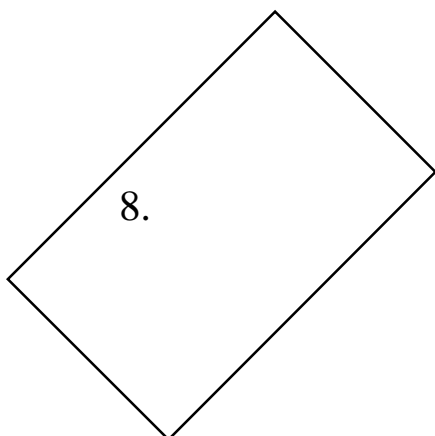
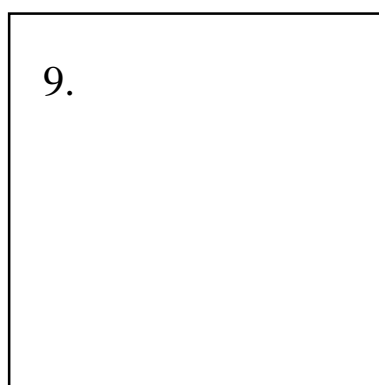
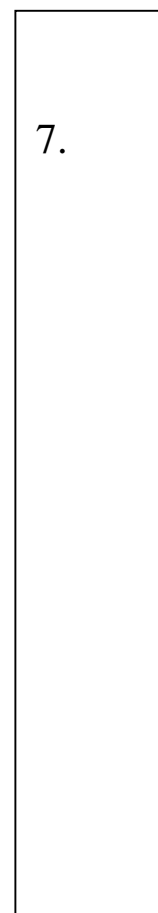
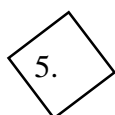
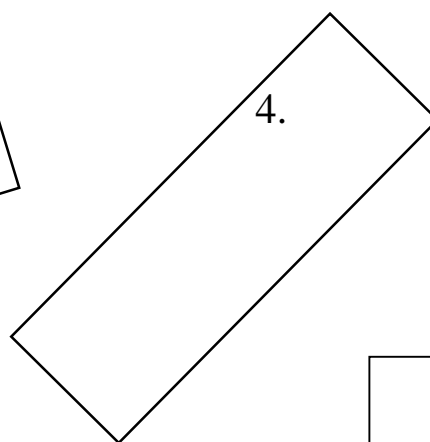
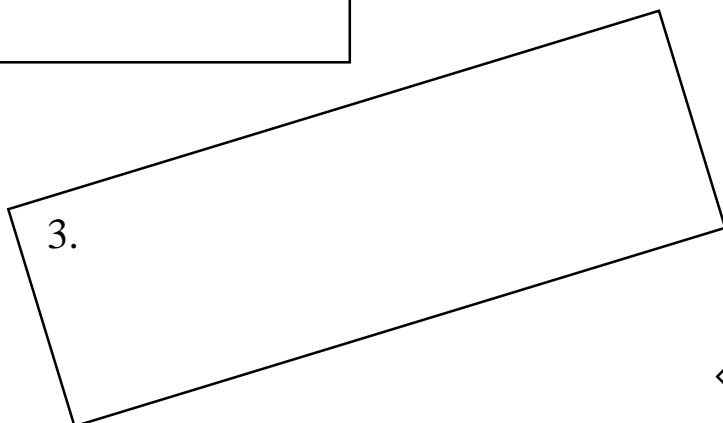
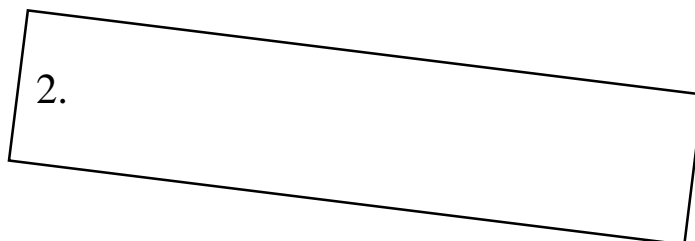
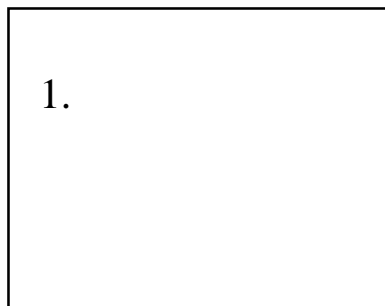
$P = 2(l + w)$ to work out the perimeter of these rectangles:

1. A rectangle with a length of 6 cm and a width of 4 cm.
2. A rectangle 8 cm long and 4 cm wide.
3. A rectangle with a base of 7 cm and a height of 6 cm.
4. A rectangle with a 9 cm length and a 4 cm width.
5. A rectangle with a base of 10 cm and a height of 5 cm.

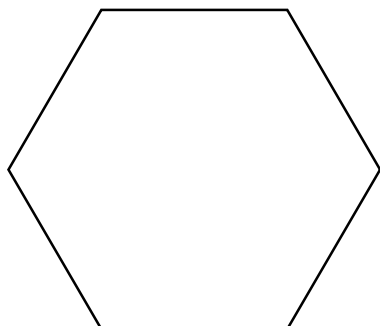
Find the perimeter of these rectangles, just by measuring two sides and then working out the total distance round each shape:



Find the perimeter of these rectangles, just by measuring two sides and then working out the total distance round each shape:



Perimeter of regular polygons

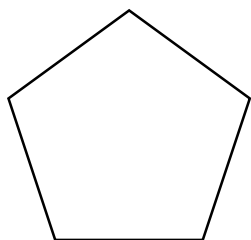


This is a regular hexagon. It has 6 sides. Each side is equal in length.

Can you work out a quick way of finding the perimeter, by only measuring one side?



1. Find the perimeter of a regular hexagon, if one side is 3 cm long.
2. Find the perimeter of a regular hexagon, if one side is 5 cm long.
3. Find the perimeter of a regular hexagon, if one side is 10 cm long.

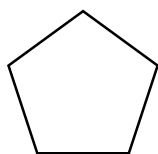


Now, how about a pentagon?

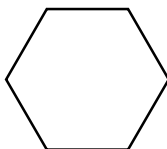


4. Find the perimeter of a regular pentagon, if one side is 4 cm long.
5. Find the perimeter of a regular pentagon, if one side is 6 cm long.
6. Find the perimeter of a regular pentagon, if one side is 8 cm long.

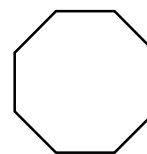
Perimeter of regular polygons



pentagon



hexagon



octagon

What is the perimeter of each of these shapes:

1. A pentagon with 7 cm sides.

2. A hexagon with 4 cm sides.

3. An octagon with 5 cm sides.

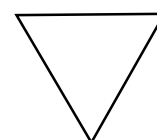
4. An equilateral triangle with 6 cm sides.

5. An octagon with 10 cm sides.

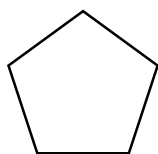
6. A pentagon with 20 cm sides.

7. An equilateral triangle with 7 cm sides.

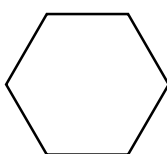
8. A hexagon with 9 cm sides.



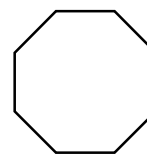
Equilateral
triangles
make superb
parachutes!

Perimeter of regular polygons

pentagon



hexagon



octagon

What is the perimeter of these shapes:

1. A pentagon with 4 cm sides.

2. A hexagon with 8 cm sides.

3. An octagon with 6 cm sides.

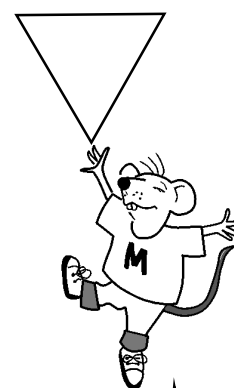
4. An equilateral triangle with 12 cm sides.

5. An octagon with 11 cm sides.

6. A pentagon with 30 cm sides.

7. An equilateral triangle with 9 cm sides.

8. A hexagon with 15 cm sides.

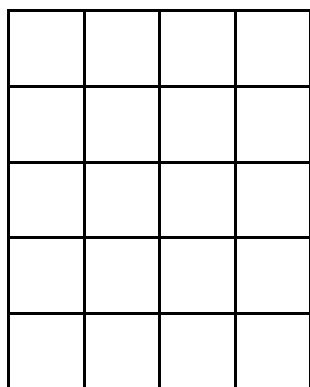
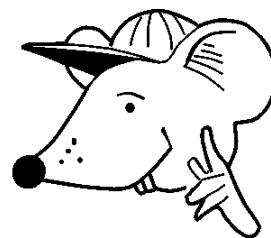


Up, up
and
away!

Area of rectangles

Remember: area is measured in squares. Usually we measure small areas in square centimetres.

This can be written sq cm or cm².



**This shape has 5 rows of squares and there are 4 squares in each row. (5 lots of 4)
 The area can be worked out by multiplying 5 by 4.**

5 X 4 = 20. The area is 20 sq cm or 20 cm².

Count to check that this is correct.

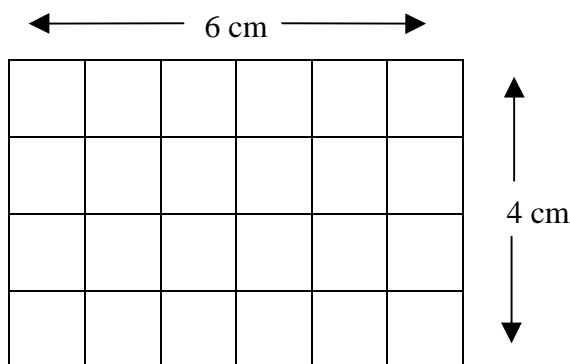
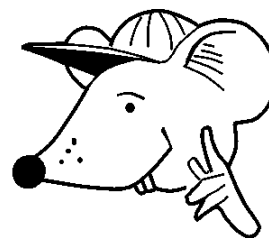
Write down a rule for finding the area of a rectangle.....

Find the area of these rectangles, by using the rule you wrote above.

- | | |
|---|--|
| 1. A rectangle 6 cm long and 3 cm wide | 2. A rectangle 5 cm long and 2 cm wide |
| 3. A rectangle 10 cm long and 5 cm wide | 4. A rectangle 8 cm long and 6 cm wide |
| 5. A rectangle 4 cm long and 2 cm wide | 6. A rectangle 15 cm long and 10 cm wide |
| 7. A rectangle 20 cm long and 4 cm wide | 8. A rectangle 11 cm long and 9 cm wide |
| 9. A rectangle 25 cm long and 4 cm wide | 10. A rectangle 20 cm long and 8 cm wide |

Area of rectangles

You might have worked out an easy way to find the area of rectangles by now. Multiply the length by the width.



This rectangle is 6 cm long.
Its width or height is 4 cm.
Its area is 6 lots of 4, or 4 lots of 6 squares.
 $\text{Area} = 6 \times 4 = 24 \text{ sq cm}$
or 24 cm^2

Can you find a quick way of writing down how to find the area of a rectangle. You could use L for length and W for width and A for area. Write your formula in the box below:

Find the area of these rectangles:

1. A rectangle 7 cm long and 4 cm wide
2. A rectangle 7 cm long and 6 cm wide
3. A rectangle 20 cm long and 3 cm wide
4. A rectangle 6 cm long and 11 cm wide
5. A rectangle 5 cm long and 7 cm wide
6. A rectangle 12 cm long and 6 cm wide
7. A rectangle 30 cm long and 3 cm wide
8. A rectangle 14 cm long and 10 cm wide
9. A rectangle 50 cm long and 10 cm wide
10. A rectangle 40 cm long and 4 cm wide

Using suitable units to measure area

Very small areas might be measured in square millimetres (mm^2)

Areas about the size of a piece of paper might be measured in square centimetres (cm^2)

Large areas might be measured in square metres (m^2)

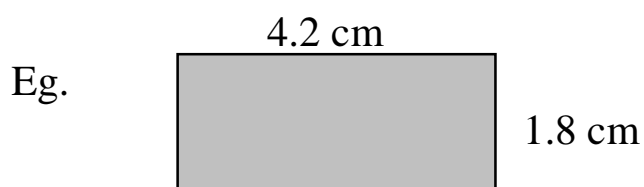
Choose a suitable unit of measurement and then estimate the area of the items below.
 By measuring calculate the area of each. You may need a calculator and you may need to approximate in some cases.

Item	Unit of measurement	Estimate	Measurement
1. A piece of paper			
2. The top of a table			
3. A stamp			
4. A room			
5. A leaf			
6. A page of a book			
7. A play area			
8. A door			

Finding the approximate area



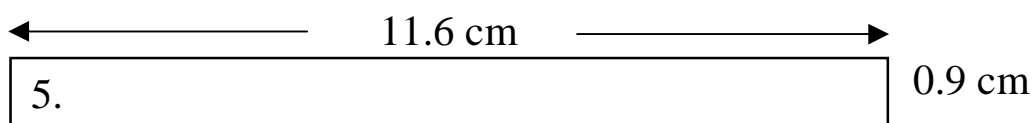
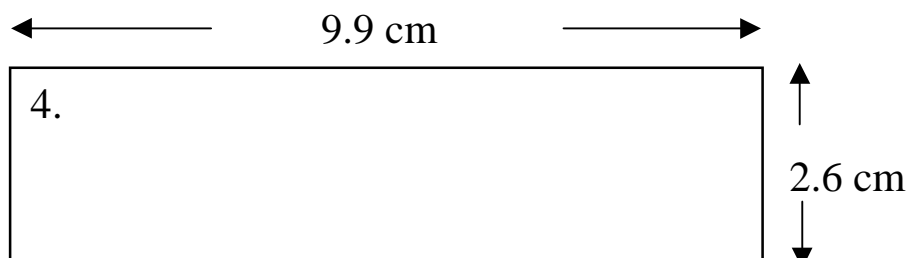
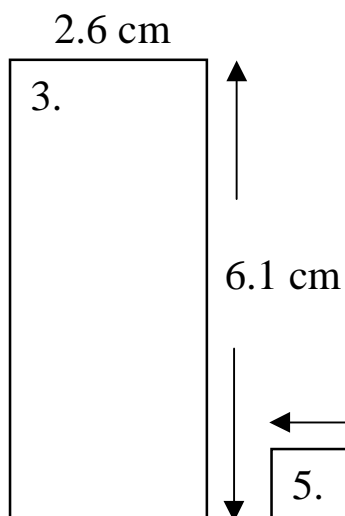
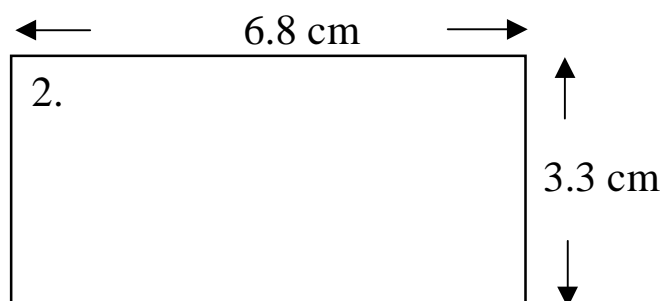
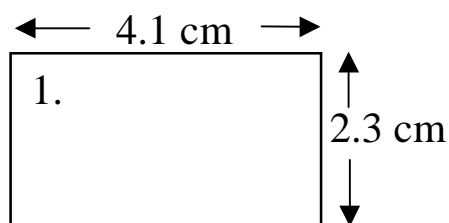
You don't always want to know exactly what an area is. Sometimes it is better to approximate. Round the measurements to the nearest whole centimetre and then find the approximate area of these shapes:



Length is approx. 4 cm

Width is approx 2 cm

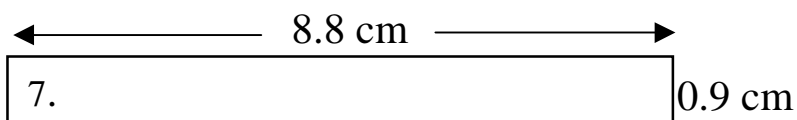
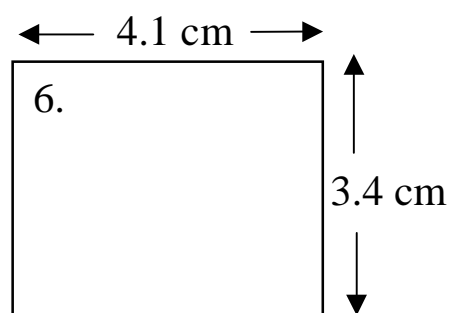
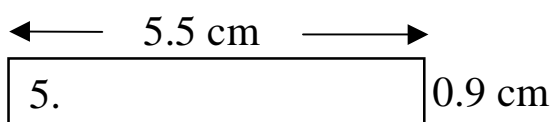
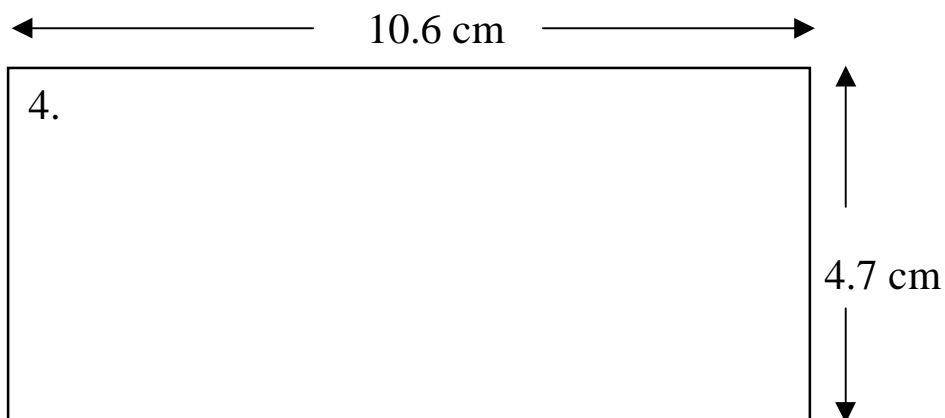
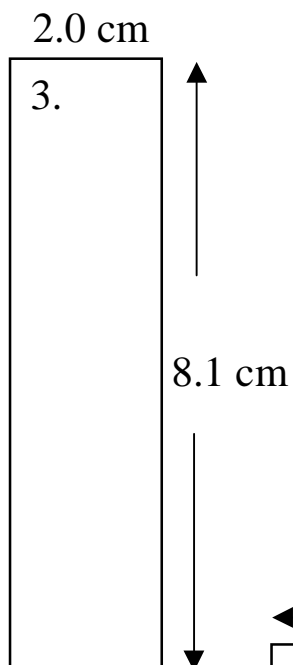
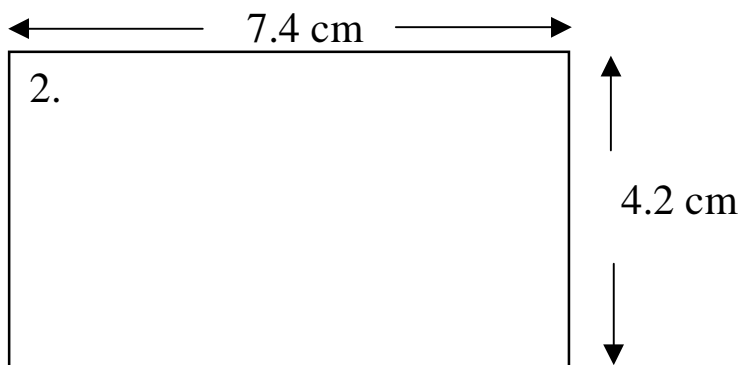
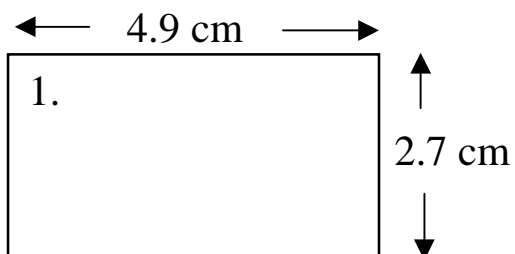
Area is approx $4 \times 2 = 8$ sq cm



Finding the approximate area

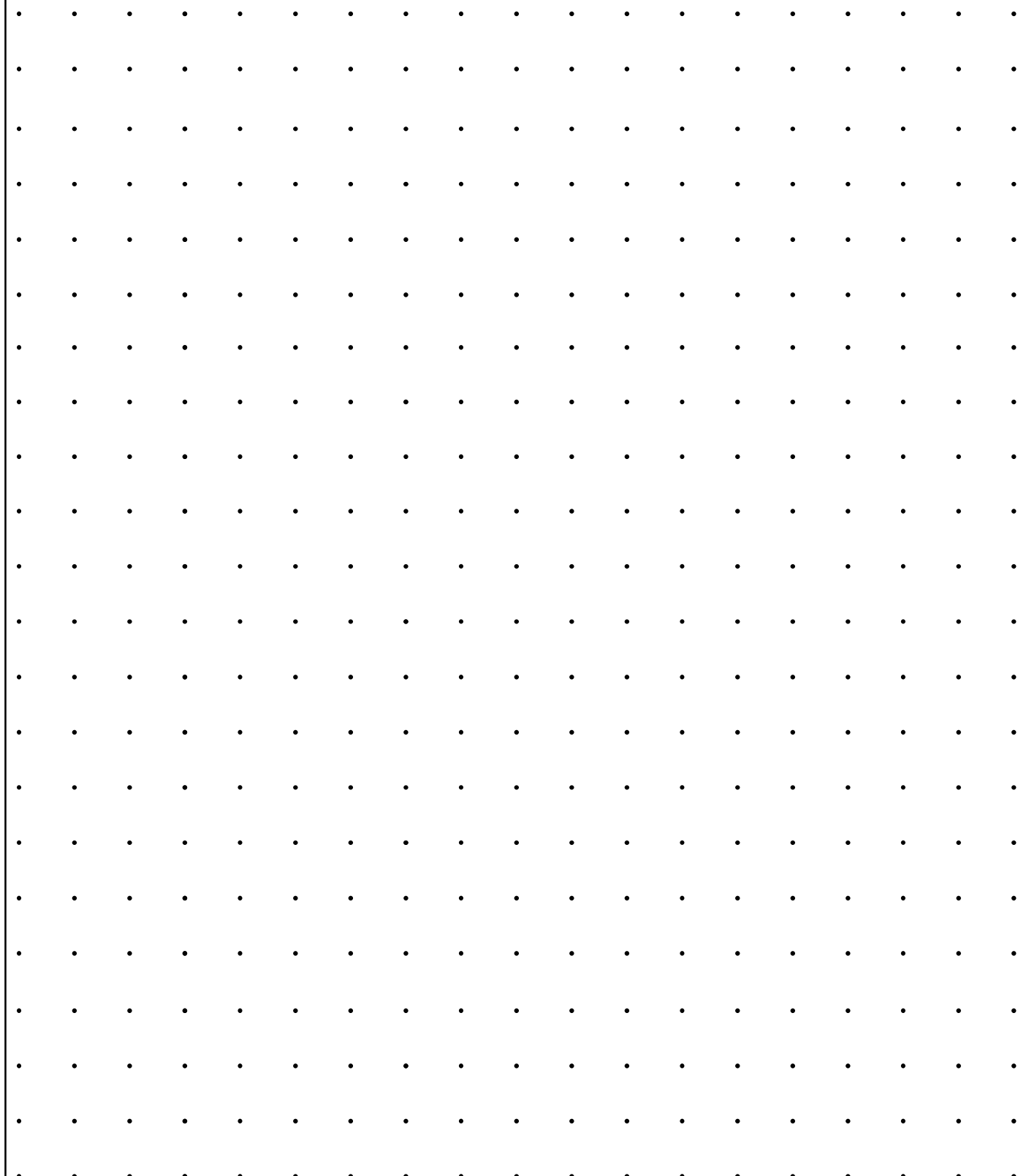


Round the measurements to the nearest whole centimetre and then find the approximate area of these shapes:



Investigate

How many different shapes can you draw, each with an area of 24 square centimetres?



Answers

Page 3

1. 10 cm 2. 10 cm - the same measurement sides 2 and 4 both 2 cm.

Page 4

1. 20 cm 2. 24 cm 3. 26 cm 4. 26 cm 5. 30 cm

Page 5

1. 14 cm 2. 20 cm 3. 20 cm 4. 14 cm 5. 18 cm
 6. 18 cm 7. 24 cm 8. 22 cm 9. 16 cm 10. 18 cm

Page 6

1. 18 cm 2. 22 cm 3. 24 cm 4. 16 cm 5. 4 cm
 6. 28 cm 7. 28 cm 8. 16 cm 9. 20 cm 10. 14 cm

Page 7

1. 18 cm 2. 30 cm 3. 60 cm 4. 20 cm 5. 30 cm 6. 40 cm

Page 8

1. 35 cm 2. 24 cm 3. 40 cm 4. 18 cm 5. 80 cm 6. 100 cm 7. 21 cm 8. 54 cm

Page 9

1. 20 cm 2. 48 cm 3. 48 cm 4. 36 cm 5. 88 cm 6. 150 cm 7. 27 cm 8. 90 cm

Page 10

1. 18 sq cm 2. 10 sq cm 3. 50 sq cm 4. 48 sq cm 5. 8 sq cm
 6. 150 sq cm 7. 80 sq cm 8. 99 sq cm 9. 100 sq cm 10. 160 sq cm

Page 11

1. 28 sq cm 2. 42 sq cm 3. 60 sq cm 4. 66 sq cm 5. 35 sq cm
 6. 72 sq cm 7. 90 sq cm 8. 140 sq cm 9. 500 sq cm 10. 160 sq cm

Page 13

1. 8 cm² 2. 21 cm² 3. 18 cm² 4. 30 cm² 5. 12 cm²

Page 14

1. 15 cm² 2. 28 cm² 3. 16 cm² 4. 55 cm² 5. 6 cm² 6. 12 cm² 7. 9 cm²