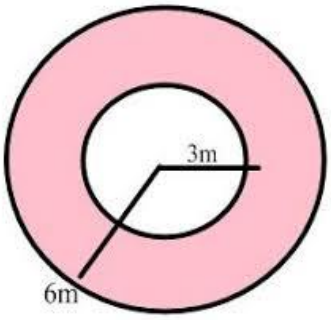
Goals



This week we are going to:

- Review metric units of area, their abbreviations, and conversions between them (EMA03)
- Use formulas to calculate areas of regular shapes, including triangles, squares, rectangles, parallelograms, trapeziums, circles, and sectors (EMA04)
- Find the area of irregular figures by decomposition into regular shapes (EMA05)

Theoretical Components

Resources:
PDF file: Week 2 Notes and Exercises

Knowledge Checklist

- Review of units of measurement
- Abbreviations and conversions
- Perimeters of familiar shapes
- Metric units of area
- Use formulas to calculate areas of regular shapes

Order

1. Read through the notes and examples
2. Work through the exercises
3. Complete the Portfolio Task
4. Complete the reflection at the end of the booklet
5. Come and see your teacher and make sure you are up to date.

Practical Components

Work through the exercises and show the completed tasks to your teacher.

Be sure to ask for help as you need for the successful completion of all tasks.

Remember to regularly check Google Classroom for messages.

Portfolio Task

Complete the task at the end of the booklet and submit your work for checking. ☺

QFO

Quiz/Forum/Other

Remember to check hawkermaths.com **for each week's learning brief.**

Make sure you have joined Google Classroom. If you have not, see your teacher.

WEEK 2 NOTES AND EXERCISES

Area

The space found inside a shape is said to be the area of the shape. Just as perimeter is measured in linear units, area is measured in square units.

Common units of area are:

- square millimetres mm^2 $1\ mm^2 = 1\ mm \times 1\ mm$
- square centimetres cm^2 $1\ cm^2 = 1\ cm \times 1\ cm$
- square metres m^2 $1\ m^2 = 1\ m \times 1\ m$
- square kilometres km^2 $1\ km^2 = 1\ km \times 1\ km$

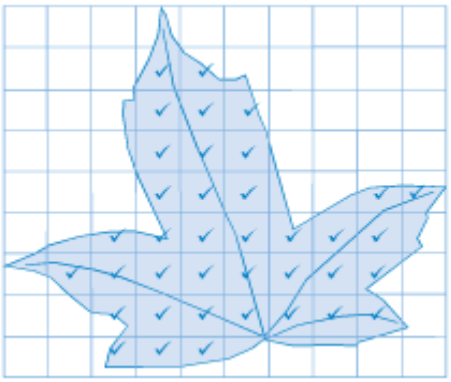
ESTIMATING AREA

Just as we can estimate length, we are able to estimate area. You would only use mm^2 for very small areas and km^2 for very large areas.

One way of estimating area is to determine the number of small squares that can cover it.

Example

Estimate the area of this autumn leaf, which is drawn on 1 cm grid.

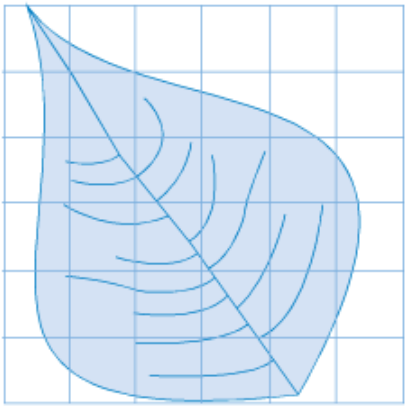


Solution

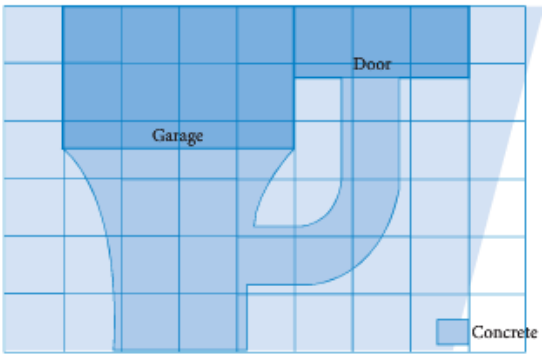
We need to count how many squares with side 1 cm it takes to cover the leaf. We count a square only if more than half of the square is on the leaf, and we put a tick in the square to show we are counting it. The unit of area will be square cm or cm^2 because we are using square centimetres to cover the leaf. 38 squares have ticks in them, so the area is about 38 square cm or 38 cm^2.

EXERCISE 1

1. Estimate the area of this leaf which is drawn on 1 cm grid.



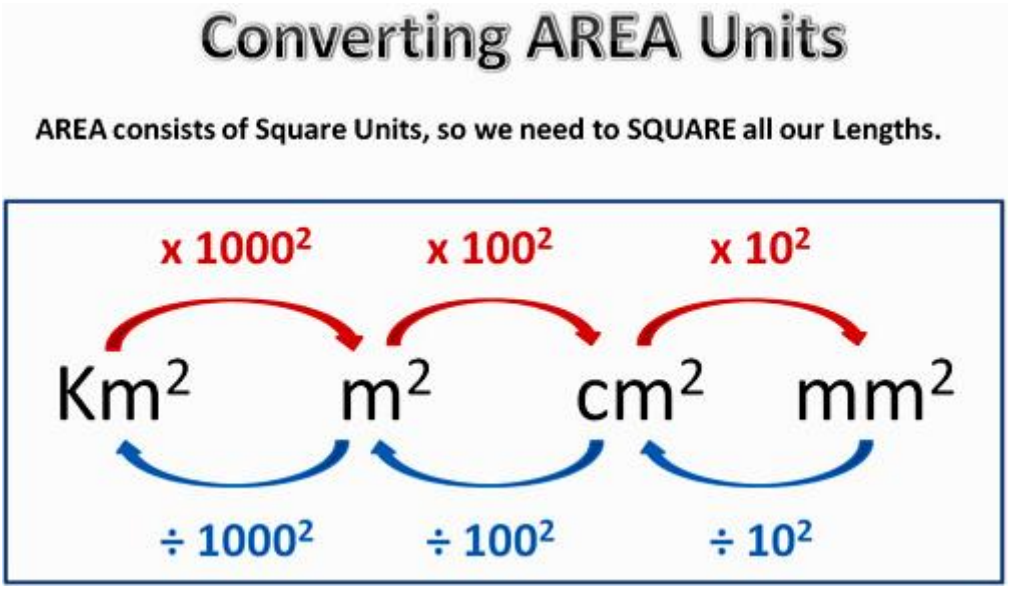
2. Jack is having the driveway and path of his new house covered in patterned concrete. The concrete company will charge $65 per square metre. Each square on the plan represents 1 m^2.



a. Estimate the area of the driveway and path.

b. Approximately how much will the concrete company charge Jack?

CONVERSION AREA UNITS



EXERCISE 2

1. Complete the following conversions of units:

a. 3 cm^2 = mm^2

b. 5 m^2 = cm^2

c. 2 km^2 = m^2

d. 30 mm^2 = cm^2

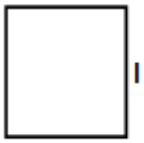
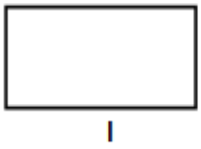
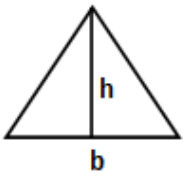
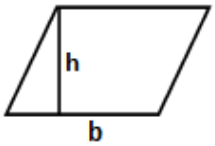
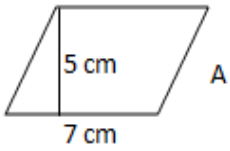
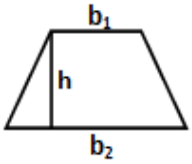
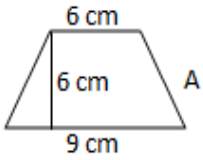
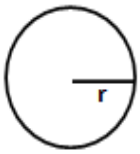
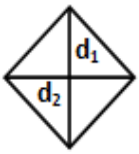
e. 60 cm^2 = mm^2

f. 250 m^2 = km^2

g. 4500 m^2 = km^2

h. 90 m^2 = cm^2

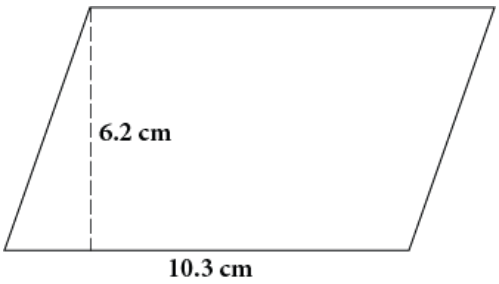
FINDING AREAS

Shape	Formula	Example
Square 	$A = l \times l = l^2$	What is the area of a square of length 4 cm? $A = 4 \times 4 = 16\ cm^2$
Rectangle 	$A = l \times w$	What is the area of a rectangle of length 7 inches and width 5 inches? $A = 7 \times 5 = 35\ in^2$
Triangle 	$A = 1/2 \times b \times h$	What is the area of a triangle with height 6 inches and base 5 inches? $A = 1/2 \times 6 \times 5 = 15\ in^2$
Parallelogram 	$A = h \times b$	 $A = 5 \times = 7 = 35\ cm^2$
Trapezoid 	$A = 1/2 \times h \times (b_1 + b_2)$	 $A = 1/2 \times 6 \times (9 + 6) = 45\ cm^2$
Circle 	$A = \pi \times r^2$ ($\pi = 3.14$ or $22/7$)	What is the area of a circle with radius 9 feet? $A = \pi \times 9^2 = 81\pi = 254.34\ ft^2$
Rhombus 	$A = 1/2 \times d_1 \times d_2$	What is the area of a rhombus with diagonals 8 inches and 7 inches? $A = 1/2 \times 8 \times 7 = 28\ in^2$

EXERCISE 3

1. Using the formulas given on the previous page, calculate the area of the following shapes. ***Show working when calculating the area.***

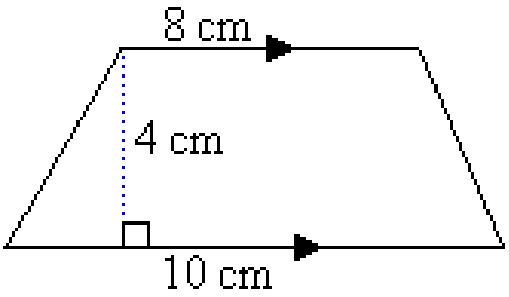
a. Name the shape below: _____



Write out the formula needed to work out this area: _____

Calculate the area and show working.

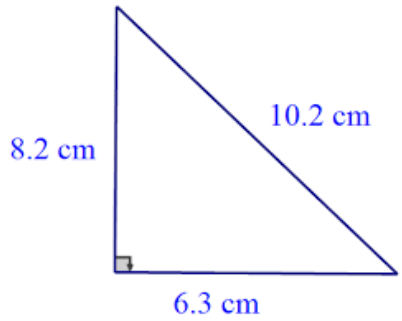
b. Name the shape below: _____



Write out the formula needed to work out this area: _____

Calculate the area and show working.

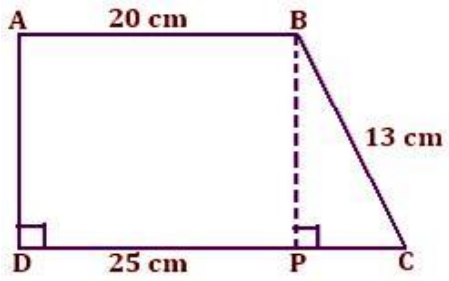
c. Name the shape below: _____



Write out the formula needed to work out this area: _____

Calculate the area and show working.

d. Name the shape below: _____

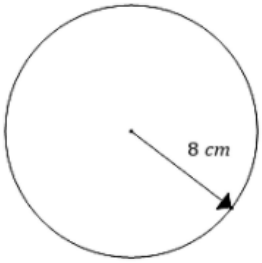


Write out the formula needed to work out this area: _____

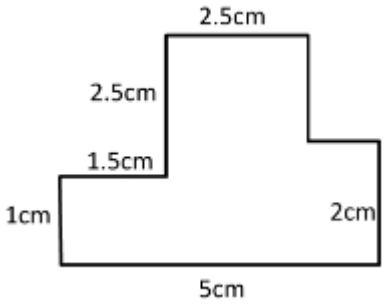
Calculate the area and show working. (Hint: you may need to use Pythagoras' Theorem, $c^2 = a^2 + b^2$, first to find the height).

2. Calculate the area of the following shapes. Make sure you show your working

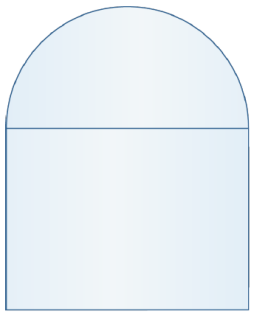
a.



b.



c. The base of the rectangle in the diagram below is 8 cm and the height is 6 cm.



3. Draw a neat sketch of a triangle whose area is 96 cm^2. The diagram does not need to be to scale but label the base and height dimensions clearly on your sketch.

4. Draw a neat sketch of a trapezium (trapezoid) whose area is 160 cm^2. The diagram does not need to be to scale but label the base lengths and the perpendicular height dimensions clearly on your sketch.

5. Calculate the area of your maths classroom to the nearest square metre. Draw a diagram and show all working.

WEEK 2 PORTFOLIO TASK

1. What is an example of a time that you have had to use an area calculation outside of the Maths classroom?

2. Think of three trades or professions that would need to use area calculations as part of their work. List each trade and an example of calculations

Trade	**Calculation Example**

MARKING RUBRIC

CRITERIA	EXPECTATIONS	POSS	MULT	GIVEN	TOTAL
Practical	Student completes practical work of the brief to an acceptable standard set by the teacher.	**2**	**3**		**/6**
Portfolio Task	Student completes the portfolio task of the brief to an acceptable standard set by the teacher.	**2**	**2**		**/4**
Communication and Reasoning	Student responses are **accurate** and appropriate in presentation of mathematical ideas in different contexts, with **clear** and logical **working out** shown.	**4**	**-**		**/4**
Knowledge and Application	Student submitted work selects and applies **appropriate** mathematical modelling and **problem solving techniques** to solve practical problems, and demonstrates **proficiency** in the use of **mathematical facts, techniques** and **formulae.**	**4**	**-**		**/4**
	Submission Guidelines				
Timeliness	Student submits the exercises and portfolio task by the set deadline. See scoring guidelines for specific details.	**2**	**-**		**/2**
		FINAL			**/20**

Student Reflection:
How did you go with this week's work?

What was interesting?

What did you find easy?

What do you need to work on?