



# CAPACITY MATRIX - MATHEMATICS 3

TOPIC: TIME

(2 weeks)

CONTENT	CAPACITY BREAKDOWN!	DONE IT!!!!	GOT IT!!!!	ON MY WAY!	WORKING ON IT!	HELP!!!
1. Estimating areas	Australian Areas investigation Google Earth investigation One square metre competition					
2. Developing formulae for area of Square and Rectangle	Area units W/S Salute the Flag					
3. Applying formulae for area of Squares and Rectangles	Area of bedroom W/S Ex 12B Q2-8 LHS (with working) Area task EXT: Dot investigation					
4. Converting units	Ex 12C Q1-3 LHS, 7, 8					
5. Area of triangle	Investigation Rattler Triangles W/S Ex 12D Q1 (with working)					
6. Calculating area of composite figures	Ex 12D Q2, 7, 8					
7. Investigating area of parallelogram	Parallelogram W/S					
8. Area of a circle, including fractional parts	Circle Area investigation Circle W/S Thinking about Area and Perimeter task					

# BIG ATCH

3	7	5
8	8	6
6	2	1
7	7	2
1	8	6
8	4	1

4	3	9
5	3	5
7	2	4
5	2	4
1	6	3
3	9	4

Find

--	--	--

means - find a VERTICAL PAIR whose

numbers multiply together to make 10.  $5 \times 2 = 10$ 

5	2
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Find

--	--	--

18 means - find a HORIZONTAL

1	6	3
---	---	---

 $1 \times 6 \times 3 = 18$ 

TRIPLE whose numbers multiply together to make 18.

Find:

① 

--	--	--

 $64$     ② 

--	--	--

 $49$     ③ 

--	--	--

 $24$     ④ 

--	--	--

 $28$     ⑤ 

--	--	--

 $45$

⑥ 

--	--	--

 $36$     ⑦ 

--	--	--

 $40$     ⑧ 

--	--	--

 $40$     ⑨ 

--	--	--

 $80$

⑩ 

--	--	--

 $75$     ⑪ 

--	--	--

 $90$     ⑫ 

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 $140$     ⑬ 

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 $175$

Devise your own set of questions.

# DOZEN

Complete as much of the table as possible.

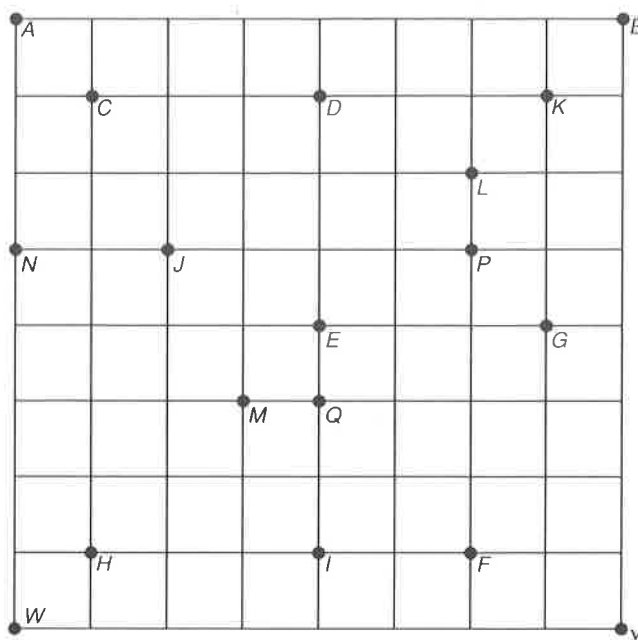
Each expression uses up to three of the digits at the top of the column.

Digits may not be repeated in an expression.

Expressions may not be repeated in a column.

ODD NUMBER	2, 3, 8	5, 1, 4	3, 6, 4
EVEN NUMBER			
PRIME NUMBER BETWEEN 10 AND 40	23		$43 - 6$
PRIME NUMBER BETWEEN 50 AND 100			
SQUARE NUMBER			
CUBE NUMBER			
DIVISOR OF 36	8 - 2		
TRIANGULAR NUMBER			
NUMBER LESS THAN 12			
NUMBER MORE THAN 60		$51 \times 4$	
NUMBER BETWEEN 10 AND 20			
MULTIPLE OF 3			
MULTIPLE OF 4			
MULTIPLE OF 5			$36 + 4$

# Area grid



The area of each small square in the diagram is  $x \text{ cm}^2$ .

1. Name the shape of each figure:

- (a) *IBA* ..... (c) *CKFI* ..... (e) *CJHN* .....  
 (b) *JDPQ* ..... (d) *JLGM* ..... (f) *NDPE* .....

2. Find the area of each figure in terms of  $x$ . Count squares and parts of squares.

- (a) *ABYW* ..... (e) *DPJ* ..... (i) *CKI* .....  
 (b) *CDIH* ..... (f) *DPQJ* ..... (j) *NJFI* .....  
 (c) *CKGE* ..... (g) *NPFH* .....  
 (d) *ANP* ..... (h) *AKYW* .....

3. What is the length of the side of a square:

- (a) if it has area  $9 \text{ cm}^2$ ? ..... (b) if it has area  $x \text{ cm}^2$ ? .....

4. From the diagram, find the distance between:

- (a) *M* and *Q* ..... (c) *C* and *D* ..... (e) *C* and *H* .....  
 (b) *N* and *J* ..... (d) *A* and *N* ..... (f) *B* and *Y* .....

5. Find the perimeter of:

- (a) *DKGE* ..... (b) *CDIH* ..... (c) *ABYW* .....

6. A circle is drawn, with centre *E*.

- (a) If it passes through *D*, name *two* other points it also goes through. .... and .....  
 (b) If it passes through *B*, name *three* other points it also goes through. .... and .... and .....

7. State the shortest distance along the lines of the grid from:

- (a) *H* to *G* ..... (c) *F* to *E* ..... (e) *E* to *K*, passing through *L* .....  
 (b) *C* to *I* ..... (d) *N* to *J*, passing through *M* .....

8. A path,  $11\sqrt{x} \text{ cm}$  long, links *D* and *M*.

- (a) Draw it.  
 (b) Name the lettered points you pass through .....

# area task

You are to create 5 different shapes. The only constraint is that each shape MUST HAVE AN AREA OF  $120\text{cm}^2$ .

Neatly sketch each shape. Ensure that its dimensions are clearly given on the sketch. In the next cell, display your working for the area.

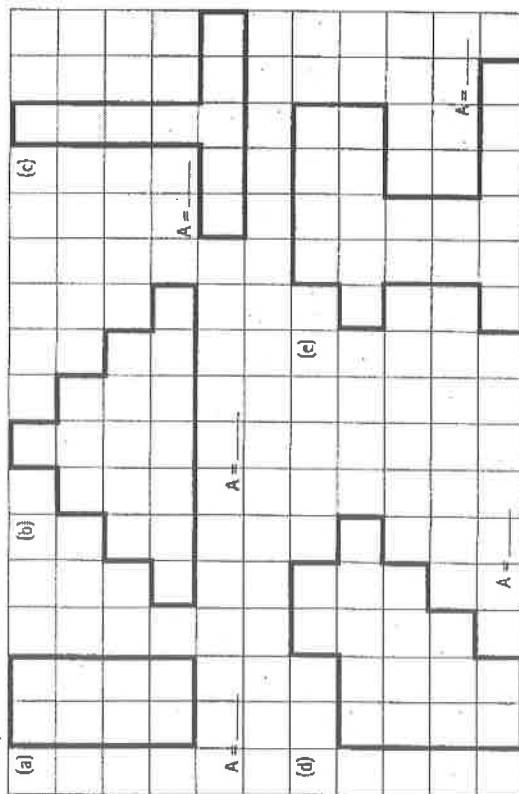
HAVE FUN!!!

SKETCH OF SHAPE	JUSTIFICATION

## MEASURING AREA

Area is the amount of surface space inside a shape. Area can be measured in square centimetres ( $1 \text{ cm} \times 1 \text{ cm}$ ), square metres ( $1 \text{ m} \times 1 \text{ m}$ ), square kilometres ( $1 \text{ km} \times 1 \text{ km}$ ) or hectares (one ha = 10 000 square metres)

- Find the area of these shapes by counting the number of square centimetres inside each shape and record your answer in  $\text{cm}^2$ .



- On the grid draw three different shapes with the following areas:

- $8 \text{ cm}^2$
- $12 \text{ cm}^2$
- $16 \text{ cm}^2$



On a sheet of grid paper, trace around your right foot and count the whole and half squares to find its area.

Area =  $\text{cm}^2$

## UNITS TO MEASURE AREA

- Tick the best unit of measure for measuring these large areas.

Area	Square metres ( $\text{m}^2$ )	Hectares (ha)	Square kilometres ( $\text{km}^2$ )
(a) a zoo			
(b) a tennis court			
(c) a farm			
(d) a golf course			
(e) Australia			
(f) a car park			
(g) a backyard			

- Explain why a paddock on a farm is measured in hectares and not square metres.

- Recall area facts to complete the grid.

	square centimetre	metre	square kilometre
$100 \text{ mm}^2$	$\text{cm}^2$	$\text{m}^2$	$100 \text{ km}^2$
$10 \text{ mm}$	$\text{cm}$	$100 \text{ m}$	$\text{km}$

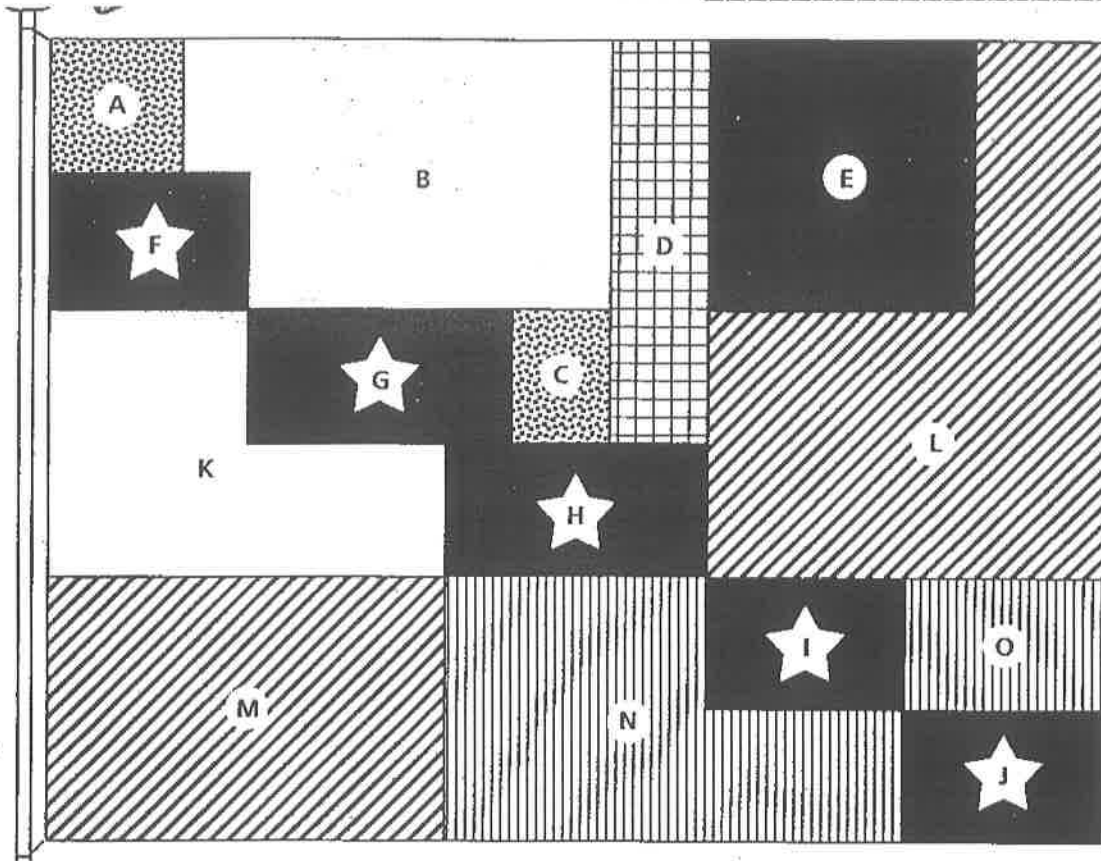
- Sketch and label something you would measure in:

$\text{mm}^2$	$\text{cm}^2$	$\text{m}^2$	$\text{km}^2$	$\text{ha}^2$
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Think about different areas of the school grounds. How would you measure them? Make a list on the back of this sheet.

# Salute the Flag!!!!

NAME: \_\_\_\_\_



I'll honour  
my country.  
I'll stand up  
for my count  
I'll fight for  
my country.  
I'll die for my  
country.

Might reconsider  
that last point



1. Work out the areas of each shape in the flag and record them in the table below.

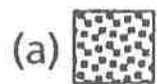
A		F		K	
B		G		L	
C		H		M	
D		I		N	
E		J		O	

2. Circle the square areas.

3. What is the total area of the flag (justify your answer)

4. How can you work out the total area of the flag in two different ways - justify your answers.

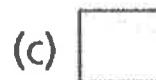
5. What area is covered by the following patterns?



\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_

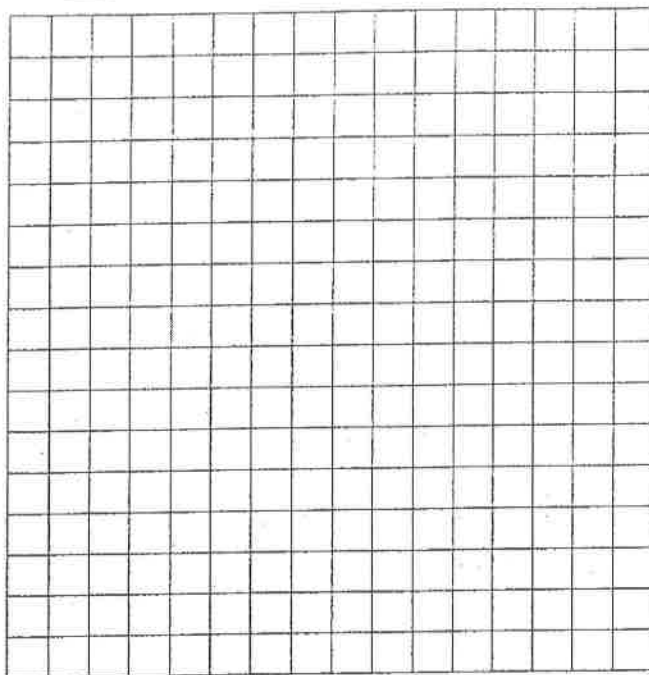


\_\_\_\_\_



# BEDROOM PLANNER

Can you use my memory to help with Q5?



Scale: 1 square = 30 cm (Real-life floor area = \_\_\_\_\_)

This is your spacious bedroom. It and the bedroom furniture are drawn to the same scale.

- 1 Cut out the furniture around the outlines.
- 2 Arrange it in your bedroom until you are pleased with the arrangement.
- 3 Glue the pieces in place.
- 4 Mark locations of windows and door.

5 Calculate the areas taken up by the furniture (to the nearest hundredth of a m<sup>2</sup>).

Furniture	Area(m <sup>2</sup> )	Furniture	Area (m <sup>2</sup> )
A		F	
B		G	
C		H	
D		I	
E		J	

6 Total furniture area: \_\_\_\_\_ m<sup>2</sup>



7 What floor area is left uncovered after the furniture is in place? \_\_\_\_\_ m<sup>2</sup>.

Your furniture

**A**  
76 x 76  
Tub chair

**B**  
Bunk  
Bed  
91 x 191

**C**  
Shelf/Bookcase  
46 x 192

**D**  
Piano  
61 x 142

**E**  
Stereo Unit  
43 x 137

**F**  
Desk  
76 x 153

**G**  
Dressing  
Table  
56 x 107

**H**  
Wardrobe  
58 x 104

**I**  
Colour TV  
48 x 91

**J**  
Square  
Table  
71 x 71

★ All dimensions are in cm.  
Change them to metres for calculating e.g. 48 cm = 0.48 m.

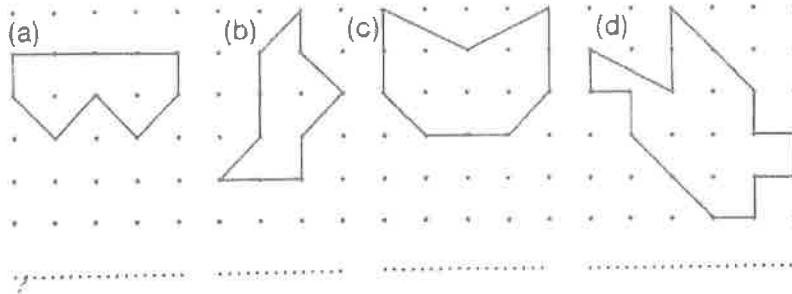
88

Problem solving: arranging area models  
TIB p. 158



# Dot investigation

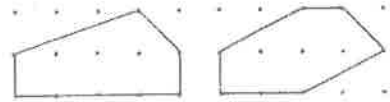
1. Find the areas of these shapes:



2. Make up 3 more yourself. Find their areas. Ask someone to check your answers.



3. These shapes have 3 dots inside. Do they have the same area? How many dots on each perimeter? .....



4. Draw 2 shapes with perimeters going through 14 dots. How many dots inside? .....
5. Draw 2 shapes with 5 internal dots.



## Puzzle

Join 12 dots to make a Greek cross (like a Red Cross symbol) with 5 dots inside and 8 dots outside.



# AREA

# PROBLEMS

The area of the frame.

Area =

The area of grass to mow.

Area =

The area of black on the flag.

Area =

The area of white on the flag.

Area =

5 The cost to tile a bathroom floor at \$25 per square metre.

Cost =

Total parking area.

Area =

Fill in the missing information. (All shapes are rectangles.)

Length	Width	Area
16 m		400 m <sup>2</sup>
	30.5 cm	1281 cm <sup>2</sup>
120 cm		0.6 m <sup>2</sup>
	4.5 cm	0.225 m <sup>2</sup>



# FIND THE RATTLER

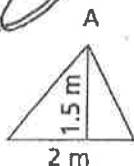


1 One of these tents has a rattlesnake inside!

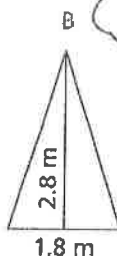
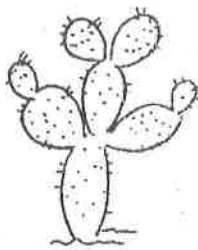
Which tent are you sleeping in? \_\_\_\_\_ (Choose one.)

To find the tent with the snake, calculate the areas of the front of each tent. The tent with a front area closest to  $4 \text{ m}^2$  has it!

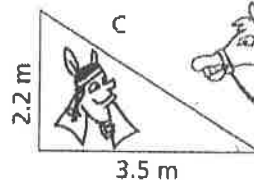
Remember, the area of a triangle is **base  $\times$  (perpendicular) height, then halve it.**



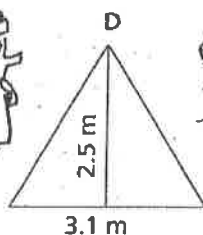
Area = \_\_\_\_\_



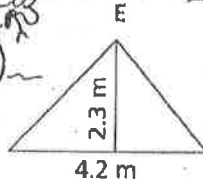
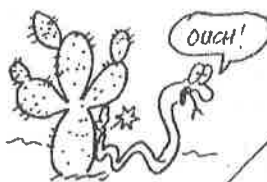
Area = \_\_\_\_\_



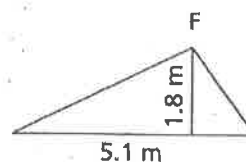
Area = \_\_\_\_\_



Area = \_\_\_\_\_



Area = \_\_\_\_\_



Area = \_\_\_\_\_

It is tent \_\_\_\_\_.

2 Use the formula for the area of a triangle to calculate these areas. (Write your estimate first.)



	Length of base	Perpendicular height	Area
(a)	15 m	4.1 m	
(b)	10 cm	12.3 cm	
(c)	9.5 cm	9.5 cm	
(d)	1.4 km	1.5 km	
(e)	17 mm	12 mm	
(f)	4.9 m	5.1 m	
(g)	0.2 cm	1 cm	
(h)	*20 cm	*0.5 m	

\*both measurements must be in the same unit



\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

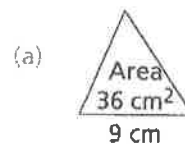
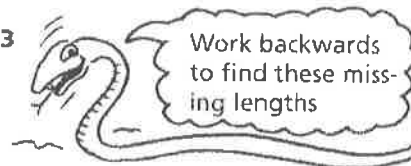
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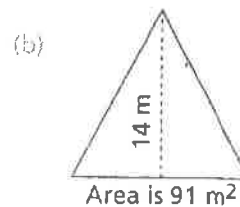
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3



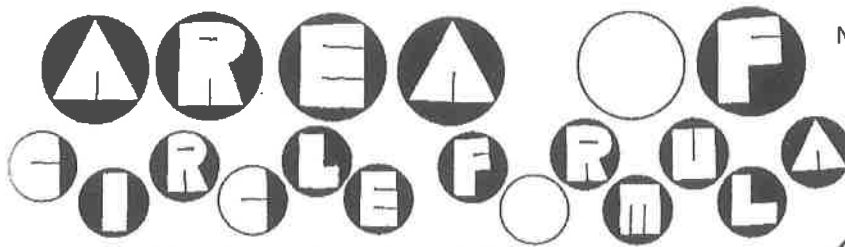
(a)

Height is \_\_\_\_\_



(b)

Length of base is \_\_\_\_\_

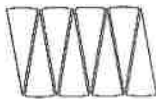


Name: \_\_\_\_\_

**You need:** scissors, glue

Follow this activity to find a formula for calculating the area of a circle.

- 1 Cut around the outside of the circle, leaving the thick boundary on the circle.
- 2 Cut it into the sectors marked. Give them inside the dotted oblong below, arranged so they touch each other like this:



etc.



The circle is now arranged into a rectangular area (approximately). But what are the dimensions?



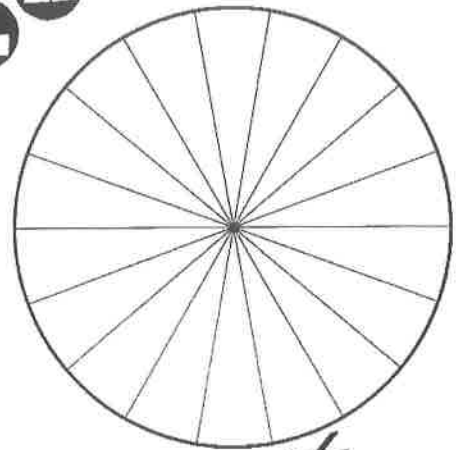
- 3(a) The width is approximately equal to the \_\_\_\_\_ of the circle so call the width 'r'.  
(Write it alongside the box above.)

- (b) The two lengths of the rectangle are approximately equal to the \_\_\_\_\_ of the circle.  
Each length is \_\_\_\_\_ the \_\_\_\_\_. If one circumference equals  $2\pi r$  then half the circumference, one length, equals \_\_\_\_\_. (Write that as the length in the diagram.)

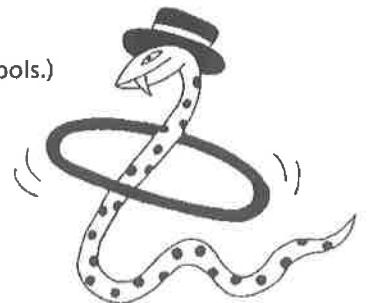
- (c) Now you have a rectangle with approximate dimensions (Fill in the symbols.)  
length \_\_\_\_\_ width \_\_\_\_\_

- (d) The area of the rectangle is  $L \times W$   
Which is \_\_\_\_\_  $\times$  \_\_\_\_\_ (or  $\square \square \square$ )

- (e) Area of circle = \_\_\_\_\_



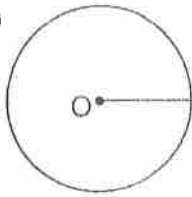
Write symbols



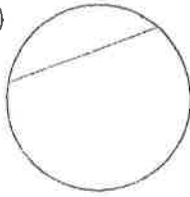
# CIRCLE FEATURES

Name the feature shown on each circle.

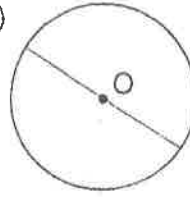
(a)



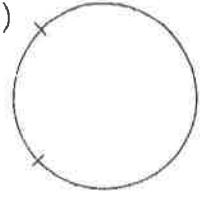
(b)



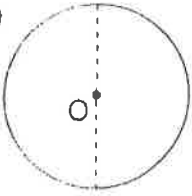
(c)



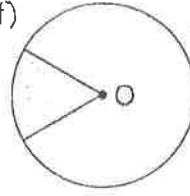
(d)



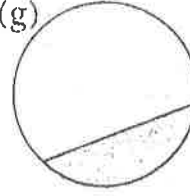
(e)



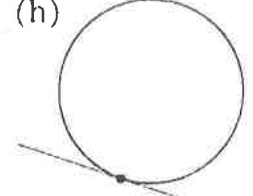
(f)



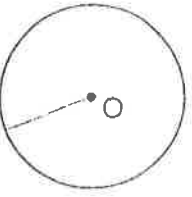
(g)



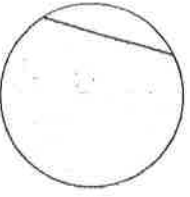
(h)



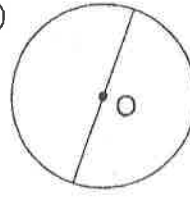
(i)



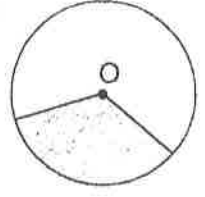
(j)



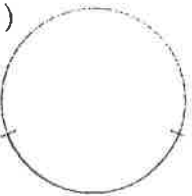
(k)



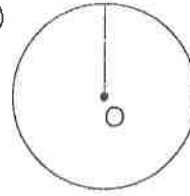
(l)



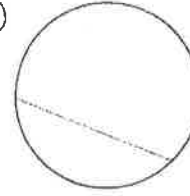
(m)



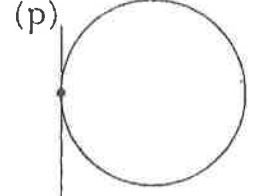
(n)



(o)



(p)



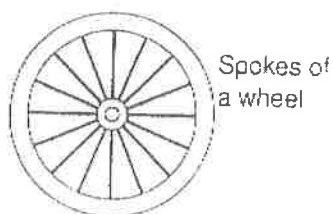
a)	b)
c)	d)
e)	f)
g)	h)
i)	j)
k)	l)
m)	n)
o)	p)

Name all the circle features you notice in these example:

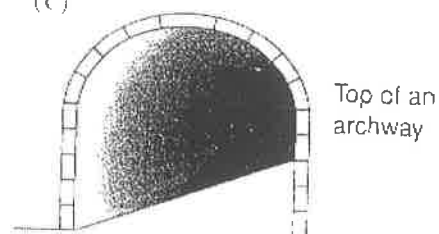
(a)



(b)

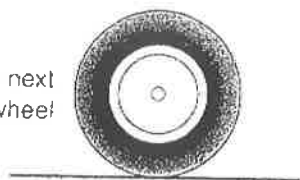


(c)

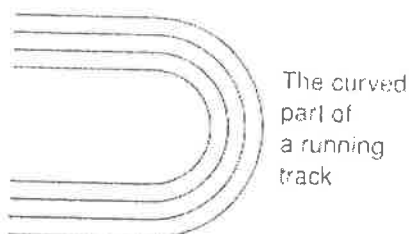


(d)

Road next to a wheel



(e)



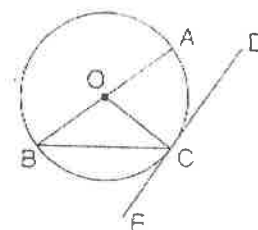
3 Name the feature shown by interval:

(a)  $AB$

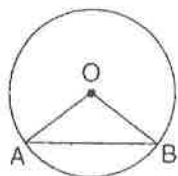
(b)  $OC$

(c)  $BC$

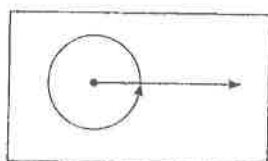
(d)  $DE$



4



If  $O$  is the centre of the circle, what type of triangle must  $AOB$  be? Why?



Remember!  
There are  $360^\circ$   
in a complete  
revolution.

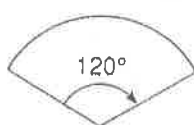
5

What fraction of the area of a complete circle is each of these sectors?

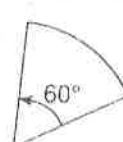
(a)



(b)



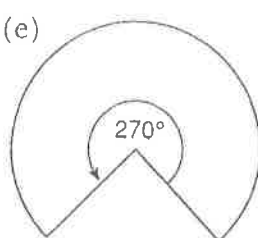
(c)



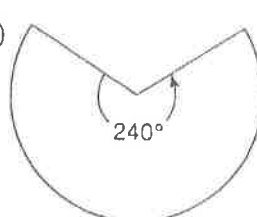
(d)



(e)



(f)



$$\text{Fraction} = \frac{\text{Angle}}{360^\circ}$$