CUMBERNAULD ACADEMY

Faculty of Mathematics & Numeracy

2nd/3rd Level

Block 4 - Homework Booklet

Multiples/Factors

Exercise 1

1. Write out the stations of the 3 times table for 1 to 10. Remember these are called **MULTIPLES** of 3.

2. Write true or false for each of these statements :-

   a) 35 is in the 5 times table

   b) 32 is a multiple of 4

   c) 28 is a multiple of 6

   c) 20 is a multiple of 5

   e) 35 is a multiple of 8

   f) 27 is a multiple of 3

3. Write down the first 5 multiples of 7 by copying and completing the list below. (Think of the stations of the 7 times table).

   7, _____, _____ , 28, _____

4. List the first 7 multiples of 8. (8, 16,.....)

5. List the first 6 multiples of 4. (4, ...)

6. Write down the first 8 multiples of 5.

7. Copy the three boxes below into your homework jotter.

Place the numbers below in the above boxes. Some numbers may be written in more than one box.

2 10 5 15 6 20 30 12 15 2 16

Exercise 2

1. Think of the numbers 1 to 25.

a) List all the numbers that divide by three.

b) List the numbers that divide by 7.

c) Write down all the even numbers from 1 to 25.

2. Write down all the numbers that divide into 10. Remember these are called **FACTORS**.

3. Write down two factors of 7. (Numbers that divide into 7)

4. Write down four factors of 6. (Think of all the numbers that divide into 6)

5. List all six factors of 20.

6. Write down all the factors 30.

Exercise 1 — Multiples & Lowest Common Multiples (l.c.m.)

1. a Write down all the multiples of 4 between 30 and 50.
   b Write down all the multiples of 7 between 30 and 65.

2. a List the first ten multiples of 3 and the first 10 multiples of 4.
   b List the **common multiples** of 3 and 4.
   c What is the **l.c.m.** of 3 and 4 ?

3. Find the l.c.m. of each of the following pairs of numbers :-

a	2 and 3	b	8 and 6	c	3 and 7	d	5 and 8
e	10 and 12	f	3 and 11	g	8 and 9	h	6 and 9.

4. Find the l.c.m. of :- a 2, 3 and 4 b 3, 5 and 9 c 2, 7 and 9.

5. 3 disco lights are set off at the same time and then flash at different intervals :-
   - the blue light flashes every 5 seconds.
   - the green light flashes every 6 seconds.
   - the red light flashes every 8 seconds.

   After they flash at the start, how long will it be until they flash together again ?

Exercise 2 — Factors & Highest Common Factor (h.c.f.)

1. Find all the factors of :-

a	10	b	18	c	23
d	24	e	72	f	100.

2. a List **all** the factors of 18 and all the factors of 24.
   b Make a list of the common factors of 18 and 24. (those that appear in both lists).
   c What is the **highest common factor** (or **h.c.f.**) of 18 and 24.

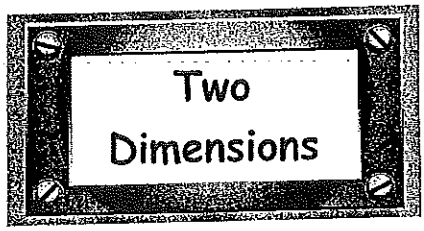
3. Find the highest common factor (h.c.f.) for each of the following :-

a	12 and 15	b	28 and 35	c	24 and 96
d	37 and 41	e	100 and 105	f	199 and 200.

4. Find the h.c.f. of :- a 12, 15, 21 b 24, 36, 40.

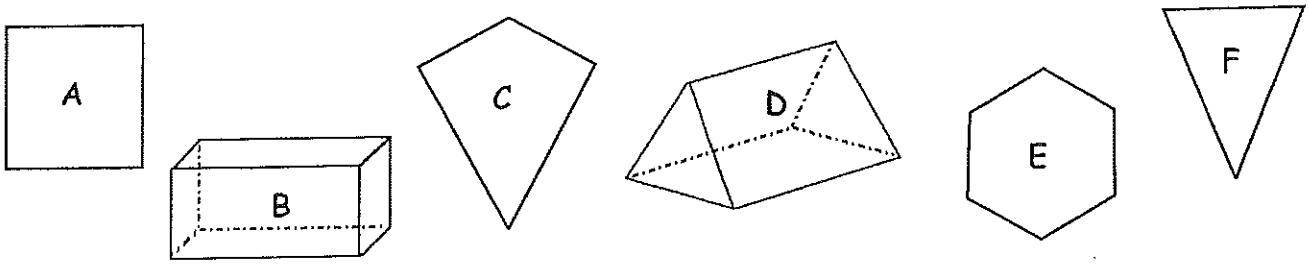
5. Write down all the factors of 360.

Chapter 8



Exercise 1

1. Look at each shape below :-



a Which of the shapes are two dimensional ?

b Make a neat sketch of each of the **two dimensional** shapes above.

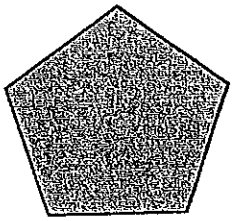
c Write down the name of each shape beside your sketches.

d Write down the name of 3 more **two dimensional** shapes.

2. Write down how many **edges** and how many **corners** there are in a :-

a square b rectangle c triangle d hexagon

3. a Name this shape. ⟶

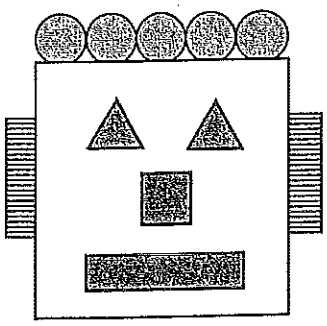


b How many edges does this shape have ?

c How many corners does this shape have ?

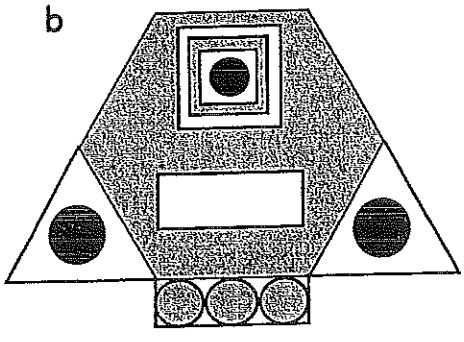
4. Write down what shapes are used to make the following :-

a



3 - rectangles
... - squares
... - triangles
... - .....

b



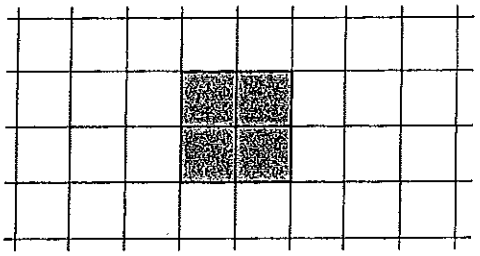
... rectangles
... squares
... triangles
... .
... .

Exercise 2

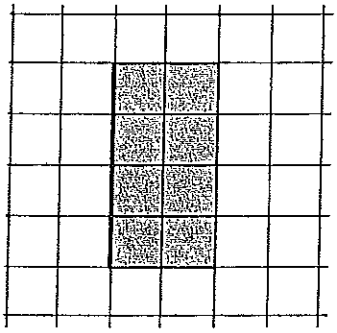
1. a Draw this square in your jotter.

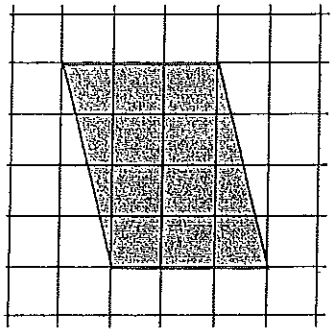
   b Shade or colour the shape neatly.

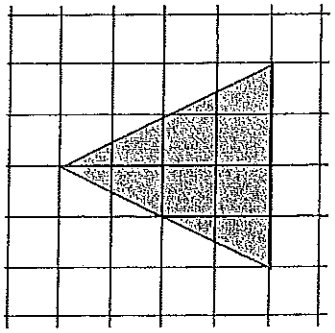
   c Draw 10 more of these shapes around it to show how it "**tiles**" the page.



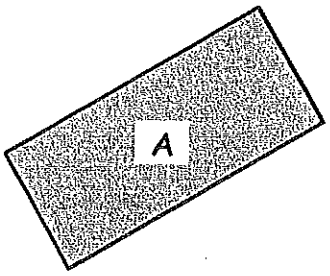
2. Show how each shape below "**tiles**" a page by surrounding it with at least ten identical tiles.

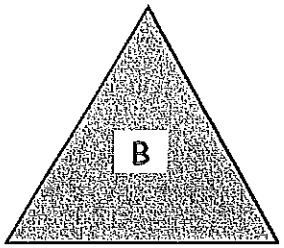
a 

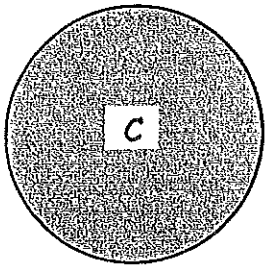
b 

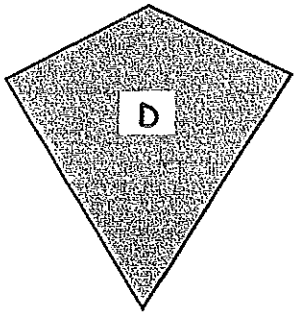
c 

3. Which of these shapes would NOT make good tiles :-

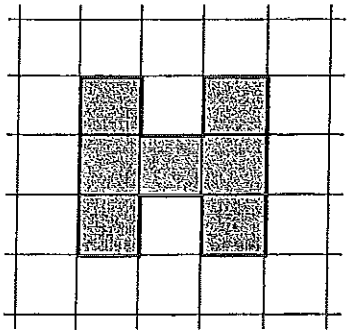


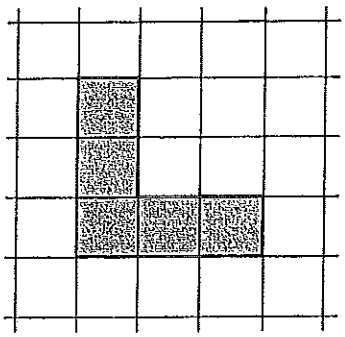






4. These are harder !
   Show how each shape can tile the page.

a 

b 

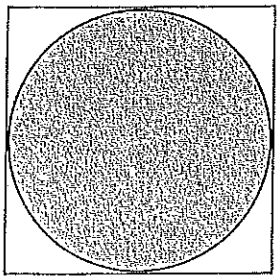
Exercise 3

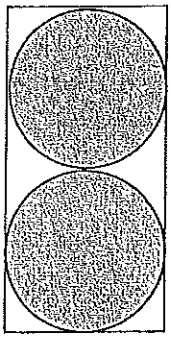
1. a Use a cup or a mug to draw a **large circle.**

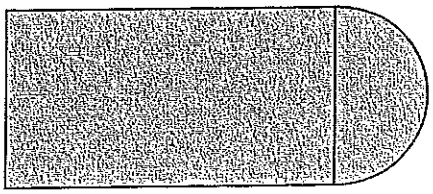
   b Draw a **diameter** line on your circle and label it "diameter".

   c Draw a **radius** on your circle and label it "radius".

2. Use a coin and a ruler or straight edge to (neatly) draw each diagram :-

   a 

   b 

   c 

Exercise 4 (You need a pair of compasses and a ruler)

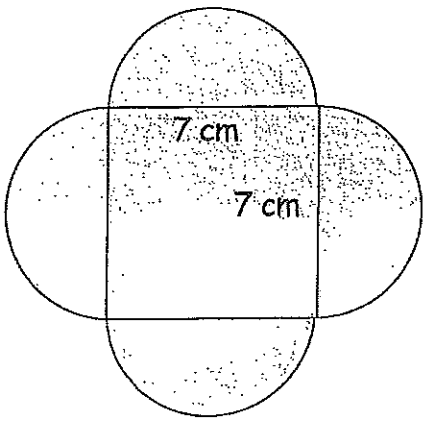
1. a Use your compasses to draw a neat circle with radius 4 centimetres.

   b Draw in the radius and mark it 4 cm.

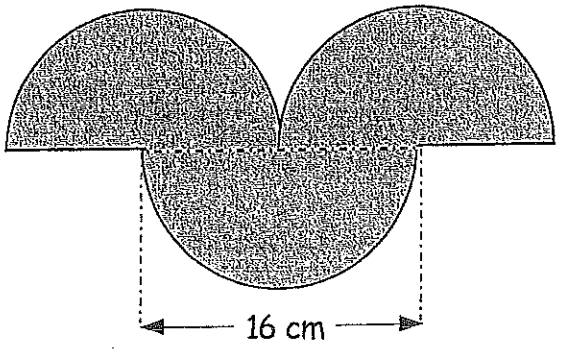
2. Use your compasses to draw a circle with a radius :-

   a 3 cm b 5 cm c $2\frac{1}{2}$ cm d $4\frac{1}{2}$ cm.

3. These are harder ! Draw each shape accurately.

   a 

   b 3 identical semicircles.



Revision Exercise

1. a Write down the name of **five** two dimensional shapes.

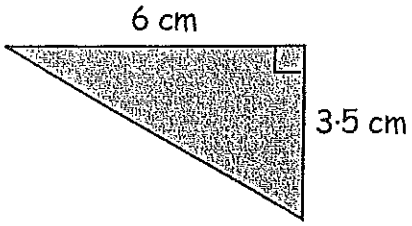
   b Write down the name of **four** three dimensional shapes.

2. How many **edges** and how many **corners** are there in a :-

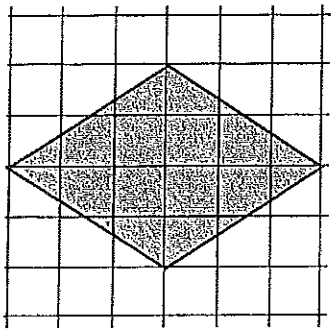
   a square b triangle c pentagon d octagon ?

3. List all the two dimensional shapes used to make a **square based pyramid**.

4. Make a full size accurate drawing of this triangle :-



5. Show that this shape will "**tile**" by drawing at least six identical shapes around it.



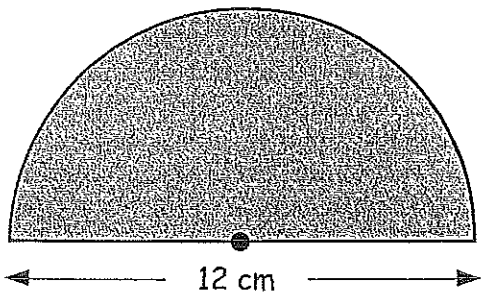
6. a Use a pair of compasses to draw a circle with radius 6 centimetres.

   b Show on your circle :- **(i)** a radius **(ii)** a diameter.

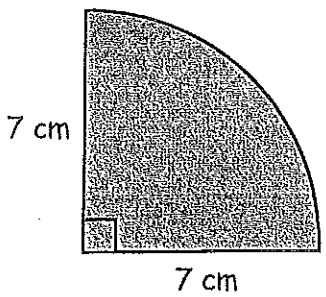
   c Write down the length of the diameter.

7. Draw accurately each shape shown below :-

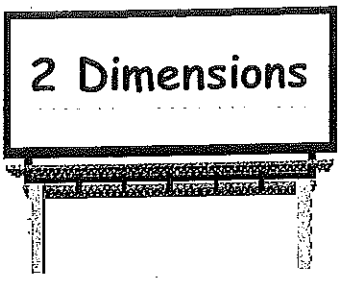
a



b

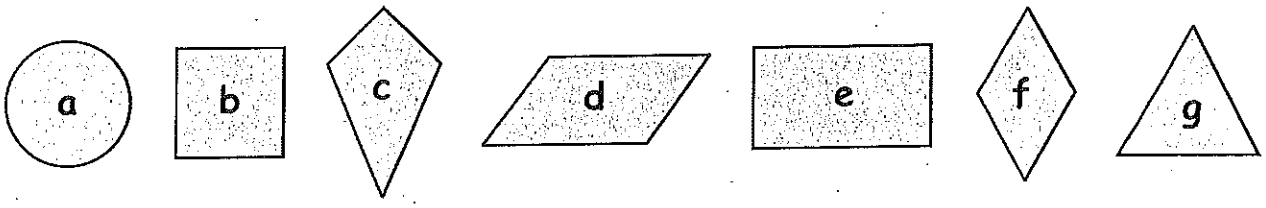


Chapter 10



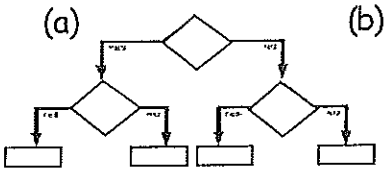
Exercise 1

1. Name these shapes :-

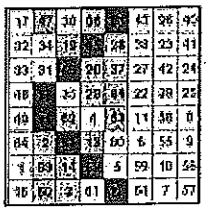


2. Identify all the **2 Dimensional** mathematical shapes in these figures :-

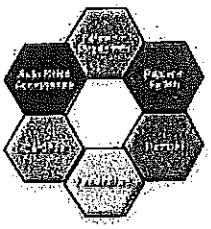
(a)



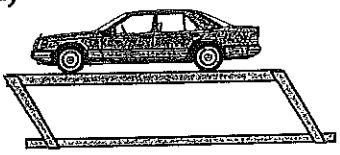
(b)



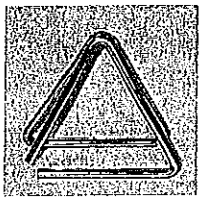
(c)



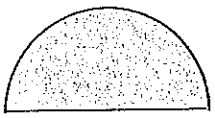
(d)



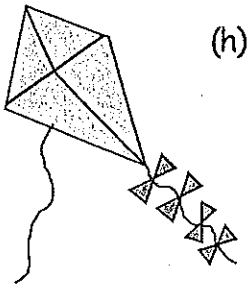
(e)



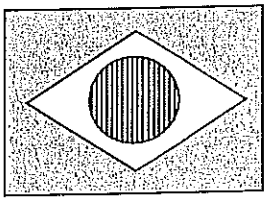
(f)



(g)



(h)

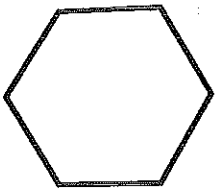


3. Write down the special name for a **polygon** :-

   (a) with 5 sides (b) with 6 sides (c) with 8 sides (d) with 10 sides.

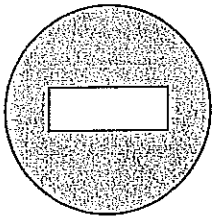
4. What is the special name for a polygon with 4 sides ?

5. How many diagonals does the polygon with 6 sides have ?
   (*Draw the polygon and put in its diagonals*).

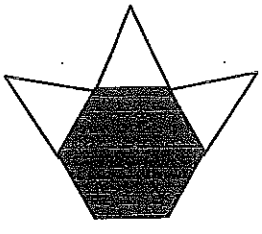


6. Describe each of these shapes FULLY :-

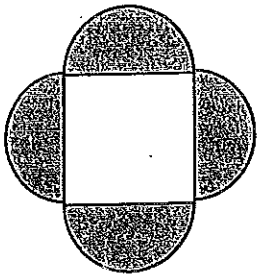
(a)



(b)



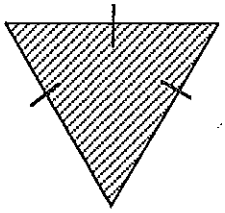
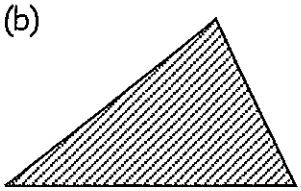
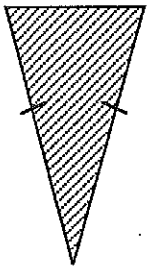
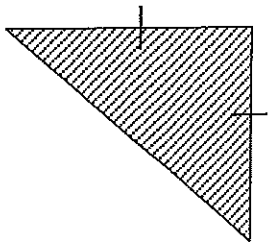
(c)



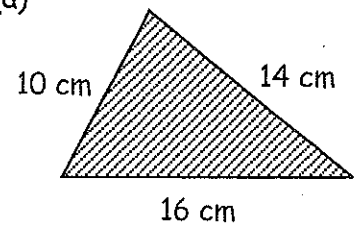
Exercise 2

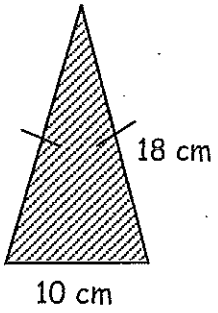
1. Write down the special name for the following types of triangles :-
   (a) a triangle where all 3 sides are different sizes.
   (b) a triangle with only 2 of its sides equal in length.
   (c) a triangle with all 3 of its sides equal in length.

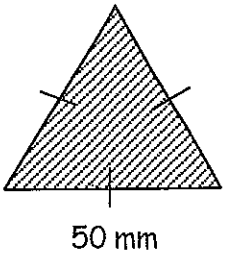
2. State which type of triangle each of the following is :-

(a)  (b)  (c)  (d) 

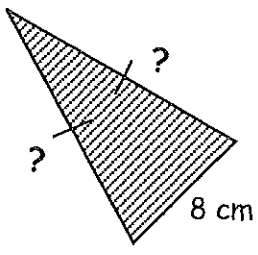
3. Calculate the PERIMETER of each of these triangles :-

(a)


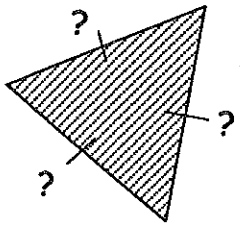
(b)


(c)


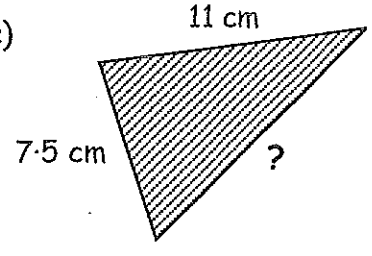
4. In each of the following triangles, the **perimeter** is given.
   Calculate the LENGTHS of the missing sides :-

(a)


Perimeter = 28 cm

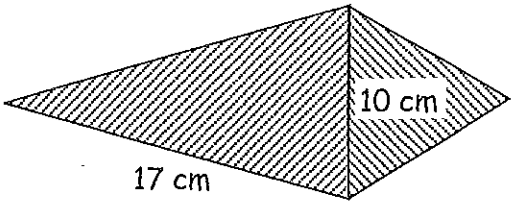
(b)


Perimeter = 27 cm

(c)


Perimeter = 32 cm

5. This kite figure consists of an isosceles and a equilateral triangle.
   Find the <u>perimeter</u> of the kite.



Exercise 3

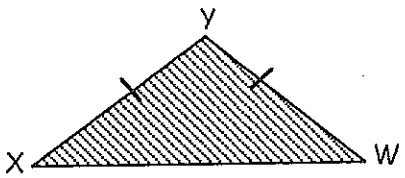
We can carefully and fully describe a triangle as follows :-

Step 1
NAME it using 3 letters

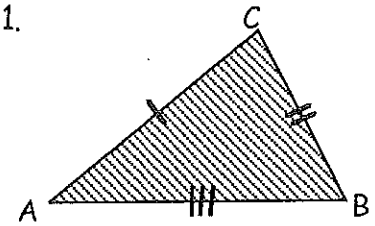
Step 2
DESCRIBE it as :-
(i) acute-angled
(ii) right-angled
(iii) obtuse-angled

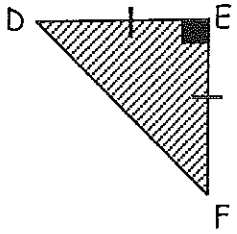
Step 3
Followed by :-
(i) isosceles triangle
(ii) equilateral triangle
(iii) scalene triangle

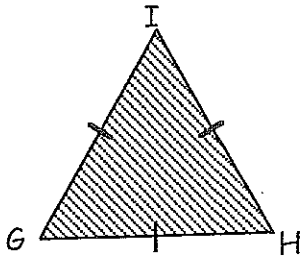
Example :- Triangle XWY is an OBTUSE angled ISOSCELES triangle.

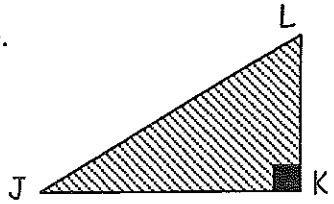


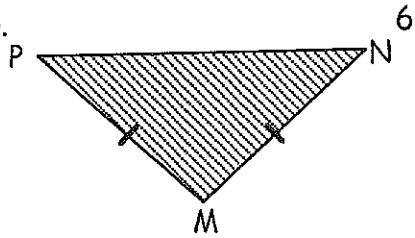
Do the same for each of these --> Name it and describe it fully.

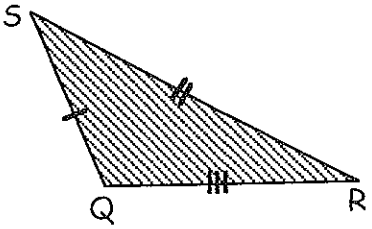
1.


2.


3.


4.


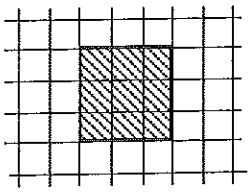
5.


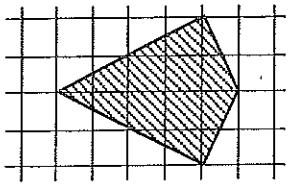
6.


Exercise 4

1. (a) Draw this square tile measuring 3 boxes by 3 boxes and colour or lightly shade it.

   (b) By completely surrounding the shape with similar squares, show that the square tiles.

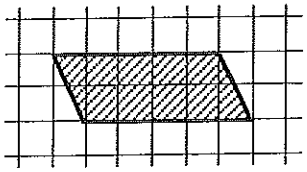


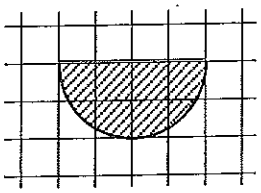
2.


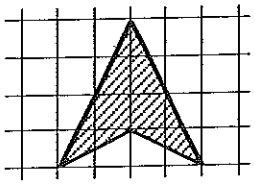
Show clearly how this kite shape will tile the surface.

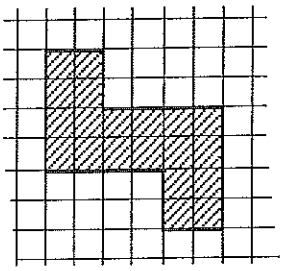
3. Decide which of the following shapes will tile.

For those that do, show how they do so by surrounding the given tile.

(a) 

(b) 

(c) 

4. 

(a) Trace or copy this shape onto a small piece of card and cut it out carefully.

(b) Show how to tile the surface by using this shape as a template to cover a small area of paper with the shape.

Exercise 5

1. (a) Draw round a 2p or 10p coin to create a circle.

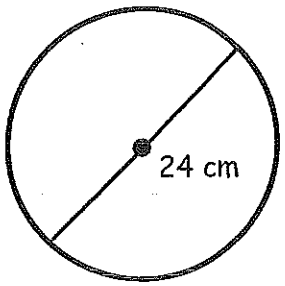
(b) Draw in a RADIUS and mark it R.

(c) Draw in a DIAMETER and mark it D.

(d) In your figure write the word CIRCUMFERENCE around the circumference.

2. This is a sketch of a circle whose diameter is 24 cm.

What must the length of its radius be ?



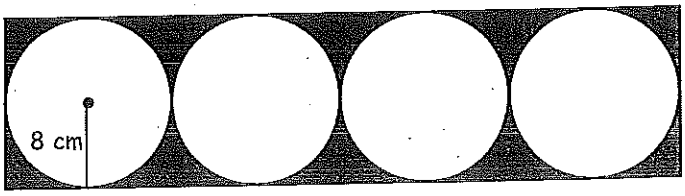
3. The radius of another circle is 30 centimetres.

What must the length of its diameter be ?

4. Shown is a sketch of 4 touching circles surrounded by a rectangular box.

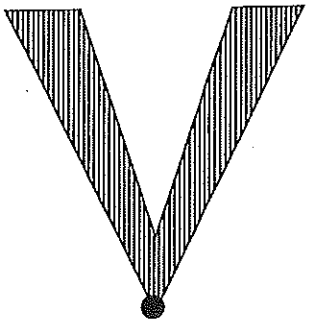
The radius of each circle is 8 cm.

Calculate what the length and breadth of the box must be.
(*Do not use a ruler*).



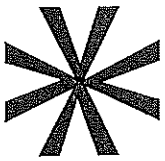
Exercise 6

1. (a) Trace (or copy) this V-shape onto a small piece of card, mark a dot on it as shown and carefully cut it out.

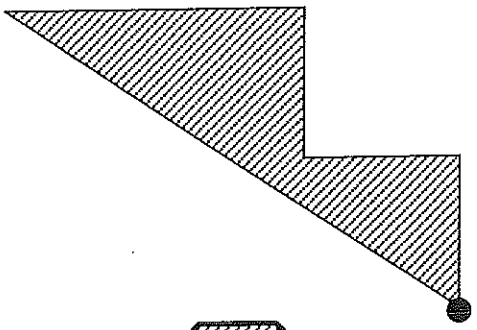


(b) Draw round your "template" onto your jotter. By putting a pin (or compass point) through the black dot, spin your shape by 90° (approx) and draw round it again.

(c) Repeat twice more to create this design.

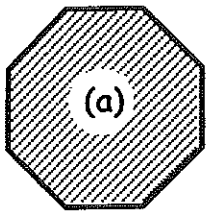


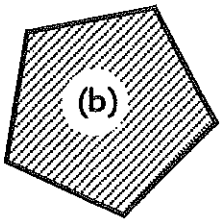
2. Try doing the same with this tile.



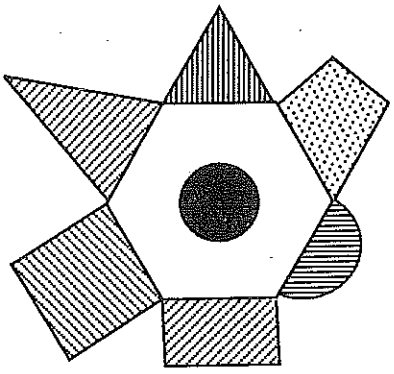
Revision Exercise

1. Write down the special names for each of these two polygons.

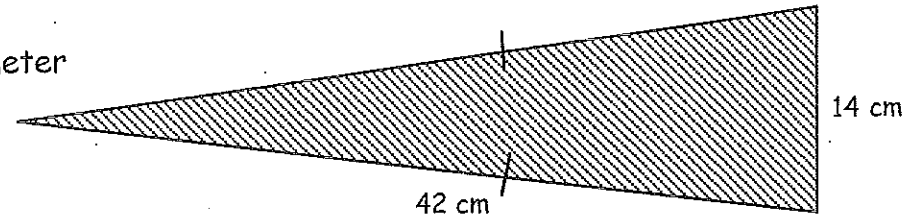




2. Name all the mathematical shapes you can see in this figure.



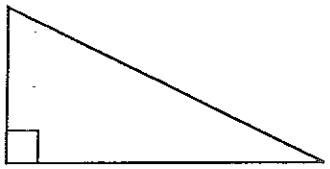
3. Calculate the perimeter of this triangle.



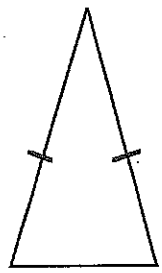
4. Describe each of the following triangles by using an expression from both lists shown opposite :-

right angled	scalene triangle
acute angled	isosceles triangle
obtuse angled	equilateral triangle

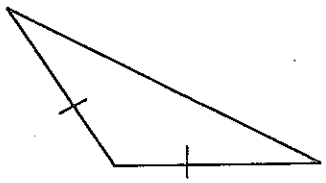
(a)



(b)

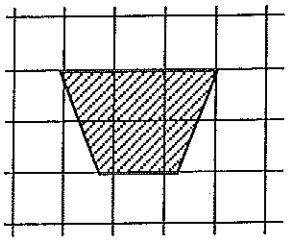


(c)



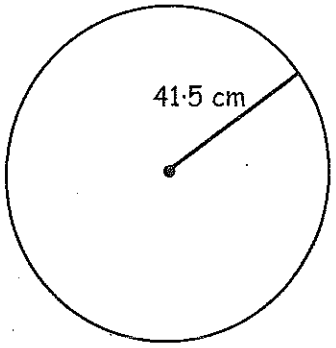
5. Copy the following shape onto squared paper.

Show that the shape tiles by completely surrounding the shape with identical tiles.

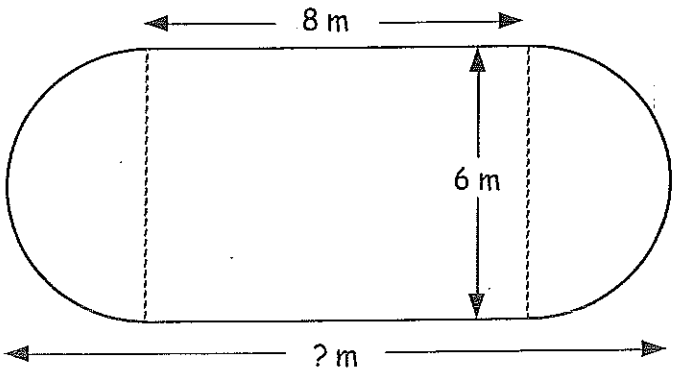


6. The radius of this circle is 41·5 cm.

Write down the length of its DIAMETER.



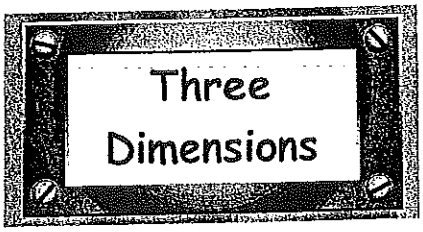
7. This shape consists of a rectangle measuring 6 metres by 8 metres, with two semi-circular ends.



Calculate the length of the shape.

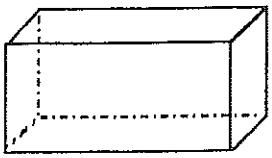
(*Do NOT measure it with a ruler*).

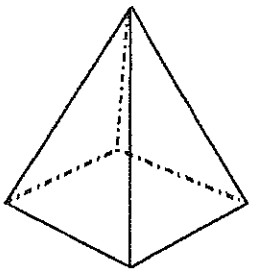
Chapter 14

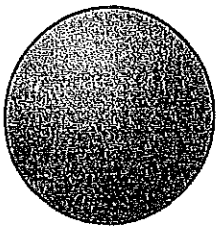


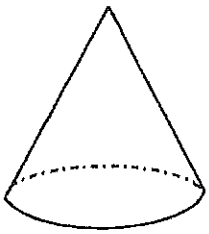
Exercise 1

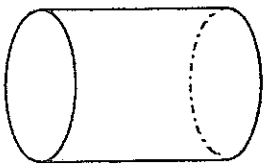
1. Name each of these three dimensional shapes :-

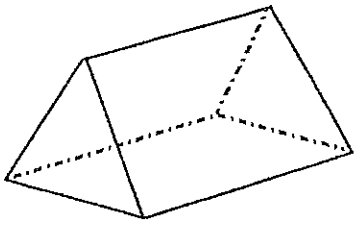
a 

b 

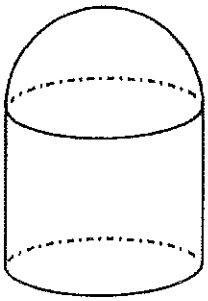
c 

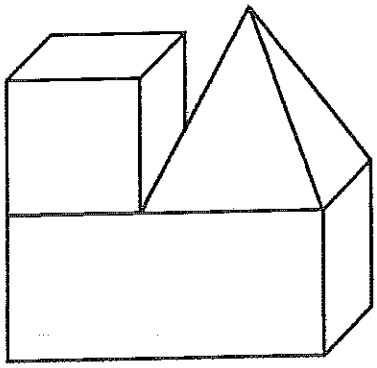
d 

e 

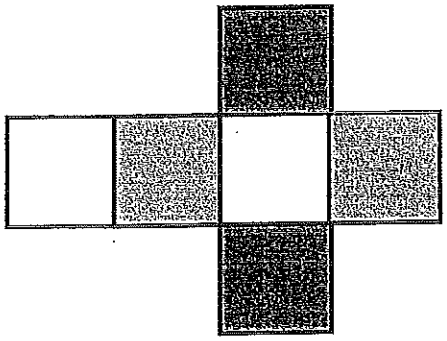
f 

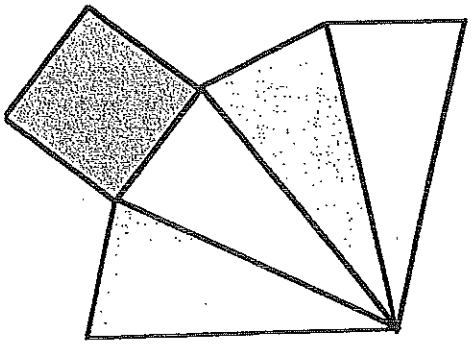
2. List the three dimensional shapes that make up each picture :-

a 

b 

3. Which three dimensional figures would each of these shapes make when folded up :-

a 

b 

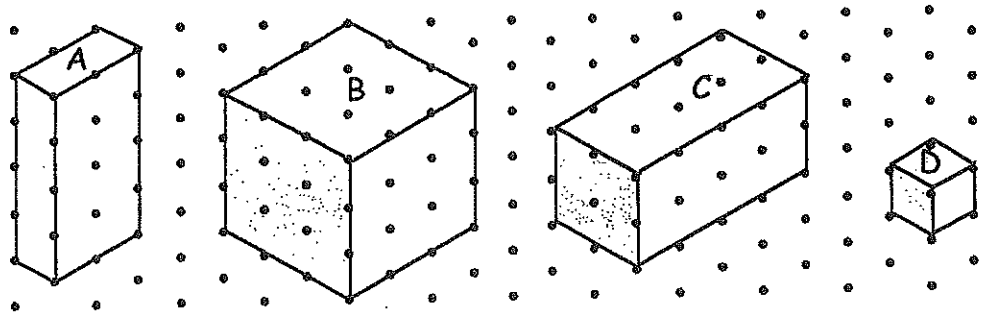
4. Which **three dimensional** figures could you make with these shapes :-

   a six identical squares ?

   b two identical triangles and three identical rectangles ?

Exercise 2 (You need to take triangular dotty paper home with you)

1. Copy each of these cuboids onto your dotty paper :-



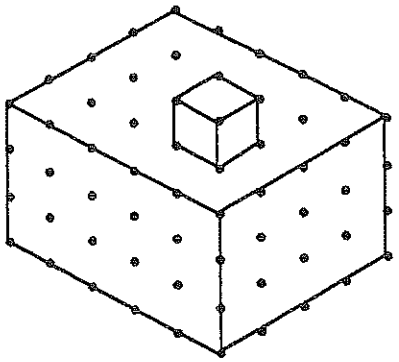
2. Draw on your dotty paper a cuboid which is :-

   a 1 box long by 2 boxes wide by 2 boxes high.

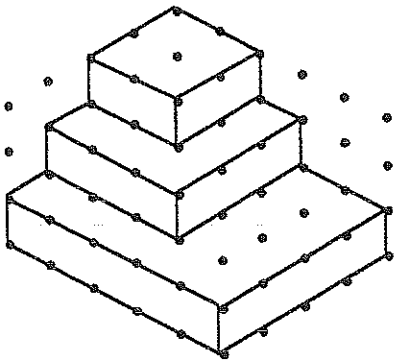
   b 5 boxes long by 3 boxes wide by 1 box high.

3. Try to draw each of these figures on your dotty paper :-

   a

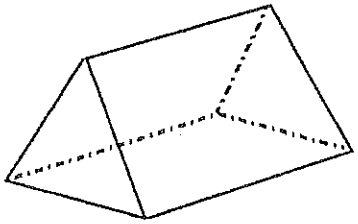


   b



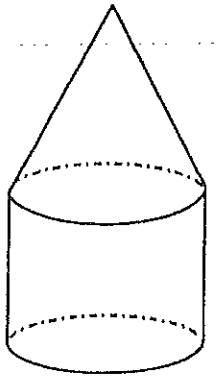
Revision Exercise

1. Name this three dimensional shape :-



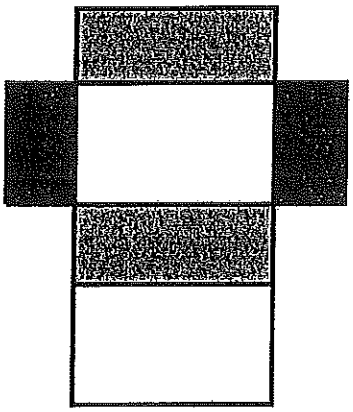
2. Name **five** other types of three dimensional shapes.

3. List the three dimensional shapes that make up this picture :-

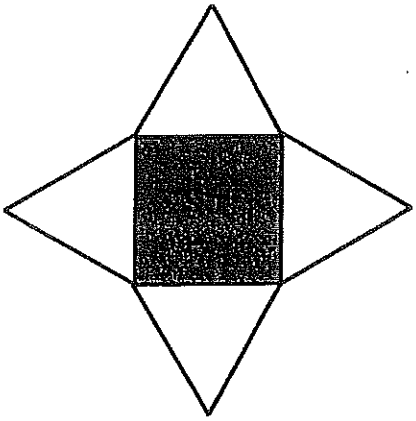


4. Which three dimensional figures would each of these shapes make when folded :-

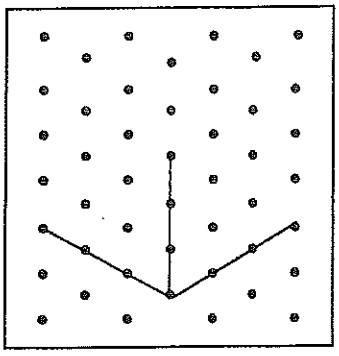
a



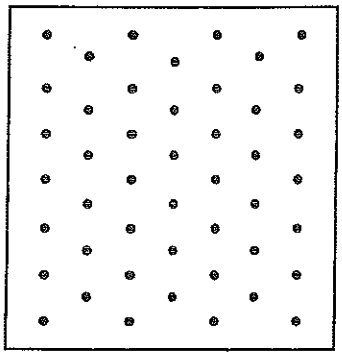
b



5. Use dotty paper to draw a cube which is 3 boxes long by 3 boxes wide by 3 boxes high.



6.



Use another piece of dotty paper to draw a cuboid which is 5 boxes long by 1 box wide by 2 boxes high.

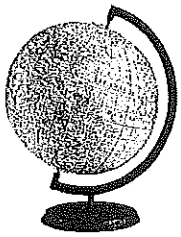
Chapter 16

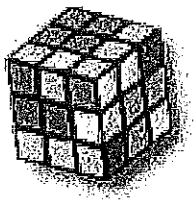
3 Dimensions

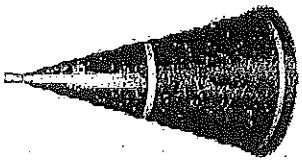
Exercise 1

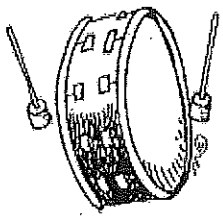
1. Name the mathematical shapes in the following figures :-

(a) 

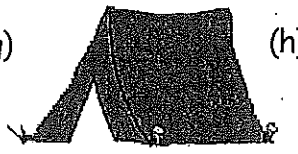
(b) 

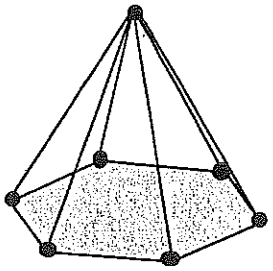
(c) 

(d) 

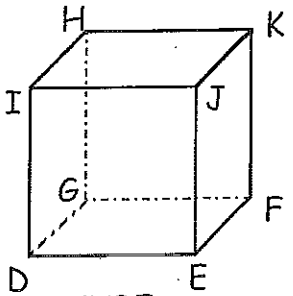
(e) 

(f) 

(g) 

(h) 

2. Look at this 3-dimensional shape — the **CUBE**.



CUBE

(a) How many faces does it have ?

(b) What shape is each of its faces ?

(c) How many vertices (corners) does it have ?

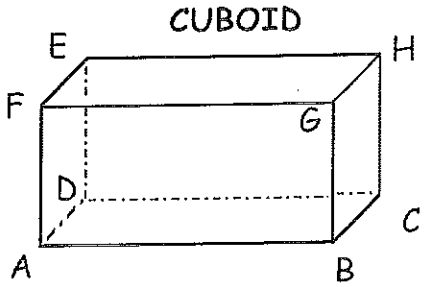
(d) How many edges does it have ?

(e) Look at the edge, ID.
Is the edge ID lying "horizontal" or "vertical" ?

(f) DE is parallel to GF.
Use 2 letters to name another side which is parallel to IJ.

(g) Name 3 sides which are parallel to side ID.

3. Here is a **CUBOID**.



(a) How many faces does it have ?

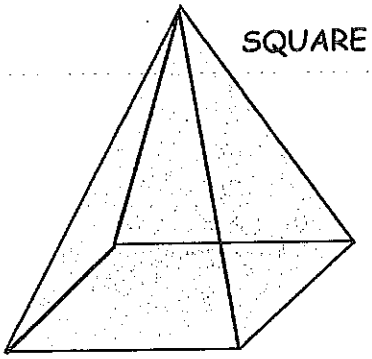
(b) What shape is each face ?

(c) How many vertices does it have ?

(d) How many edges does it have ?

(e) There are 3 sets of four parallel edges. Name them.

4. For the **SQUARE BASED PYRAMID**.



SQUARE BASED PYRAMID

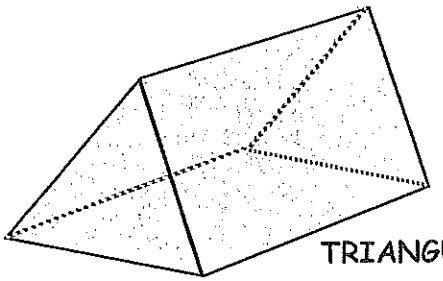
(a) How many faces does it have ?

(b) What shapes are the faces ?

(c) How many vertices does it have ?

(d) How many edges does it have ?

5. The **TRIANGULAR PRISM**.



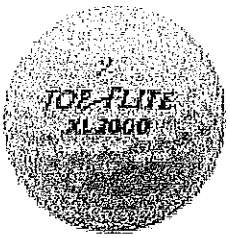
TRIANGULAR PRISM

(a) How many faces does it have ?

(b) What shapes are the faces ?

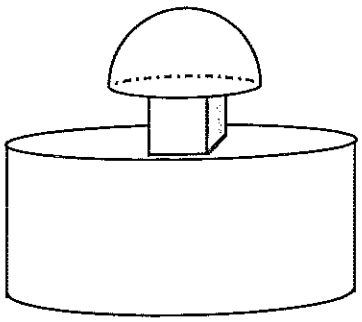
(c) How many vertices does it have ?

(d) How many edges does it have ?

6. 

How many faces, edges and vertices does a **SPHERE** have ?

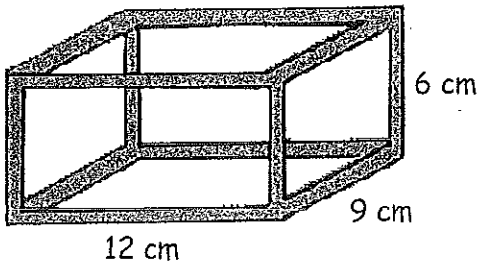
7. Which mathematical shapes can you see here ?



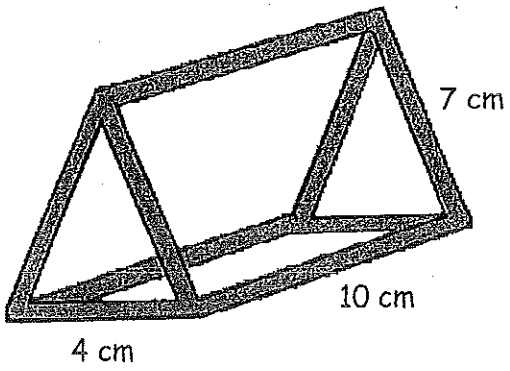
Exercise 2

1. What is the TOTAL LENGTH of straw required to make each of these shapes ?

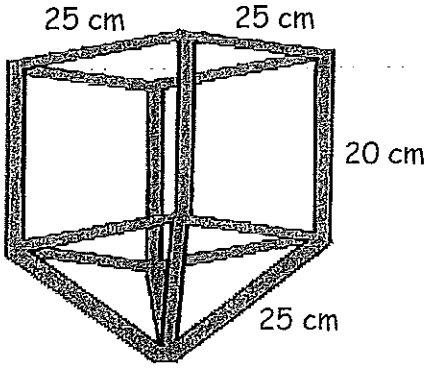
(a)



(b)

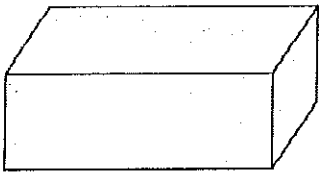


2. What is the TOTAL LENGTH of metal needed to make the surrounds of this lantern ?

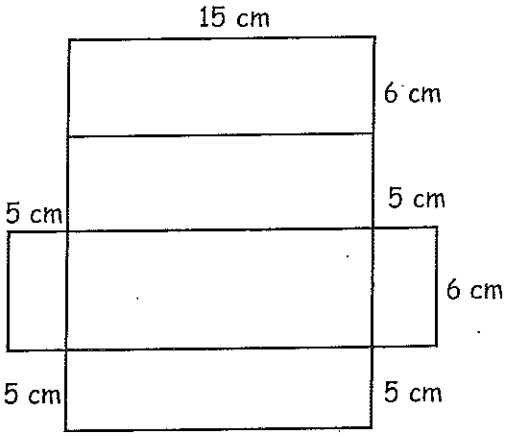


Exercise 3

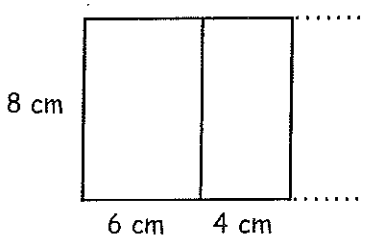
1. Shown opposite is a net of this box.

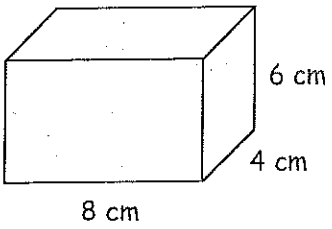


Make a sketch of the box and fill in the dimensions (length, breadth and height) of the box using the net to help.



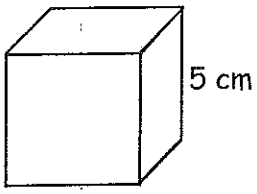
2. Part of a net of the cuboid opposite is shown below.





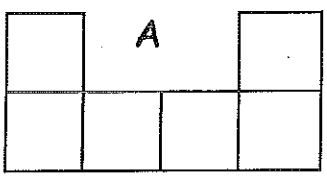
Copy and complete the net showing all 6 faces.

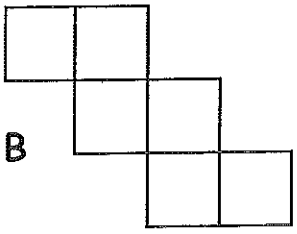
3. (a) Draw the net of this cube.



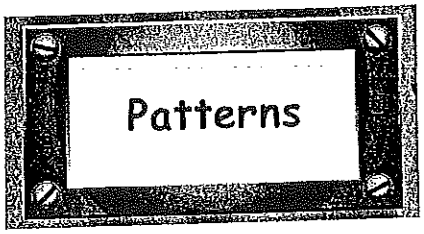
(b) If possible, cut it out and fold it to form the cube.

4. Which of these 2 figures show(s) the net of a cube ?



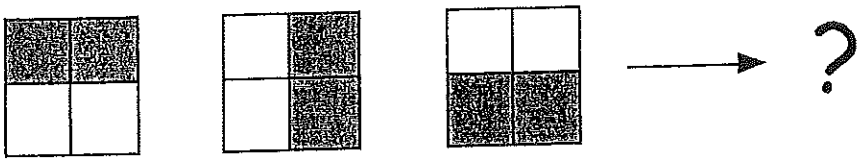


Chapter 13

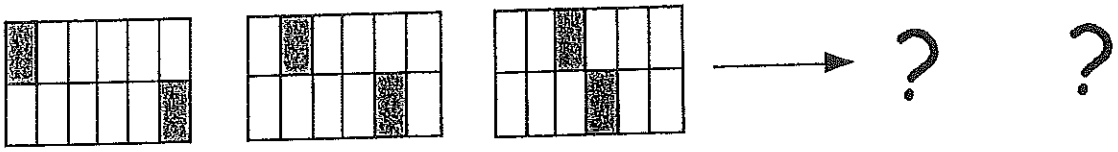


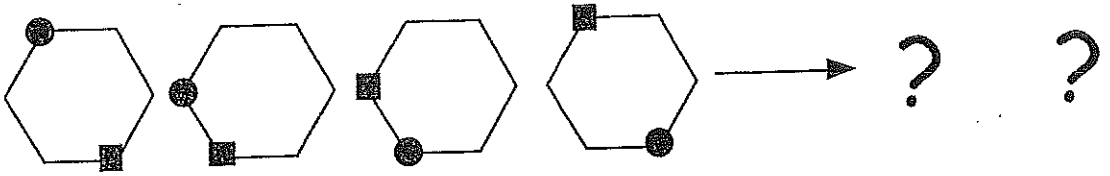
Exercise 1

1. In your jotter, show the next drawing in the pattern below :-



2. Show the next two drawings in each pattern below :-

a 

b 

3. Write down the missing letters in these patterns :-

a A, C, E, G, I, ?, ?

b S, R, Q, P, O, N, ?, ?

c C, F, I, ?, O, ?, U

d A, B, D, G, K, ?, ?

4. Write down the missing numbers in these patterns :-

a 11, 21, 31, 41, ?, ?

b 3, 7, ?, 15, 19, 23, ?

c 35, 32, 29, ?, 23, ?

d ?, ?, 12, 24, 48, 96

e 135797?3135?75312579

f 123, 234, 345, ?, ?, 678

5. Write down the missing letters or numbers in these **harder** patterns :-

a BA, DC, FE, HG, ??, ??

b AZC, EYG, IXK, MWO, ???

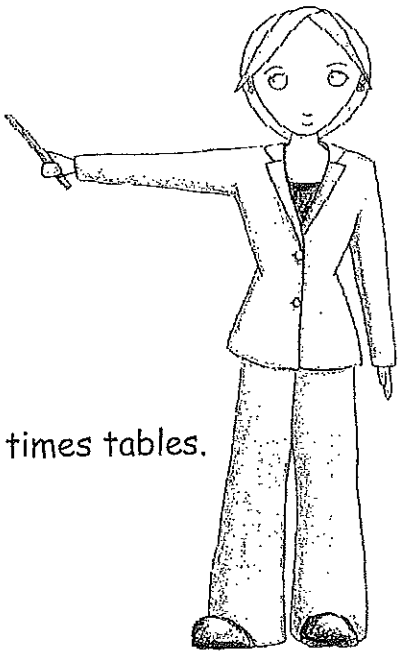
c 1, 4, 9, 16, 25, 36, ??, ??

d 160, 80, 40, 20, ?, ?

e 60, 50, 41, 33, 26, 20, ?, ?

f 2, 3, 5, 8, 13, 21, ?, ?

Exercise 2



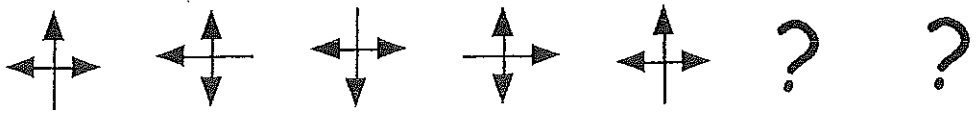
1. a Write out the **three** times table (up to 3 x 10 = 30).
   b Write out the **six** times table (up to 6 x 10 = 60).
   c Explain in your own words a connection between the three and the six times tables.

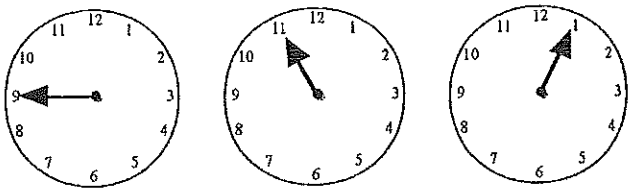
2. a Write out the **five** times table.
   b Write out the **ten** times table.
   c What is the connection between the five and the ten times tables.

3. Explain a link between the :-
   a two and the four times tables.
   b four and the twelve times tables.
   c four and the twenty times tables.

Revision Exercise

1. In your jotter show the next two drawings in each pattern :-

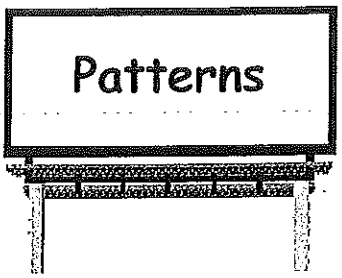
a 

b 

c 

2. Write down the missing letters or numbers in these patterns :-
   a Z, ?, X, W, ?, U
   b 5, 10, 15, ? 25, ?
   c 96, 48, 24, ?, ?, 3
   d CAB, FDE, IGH, ???, ???
   e ?, 17, 13, 10, 8, ?
   f 64, 32, ?, 8, ?, 2, 1

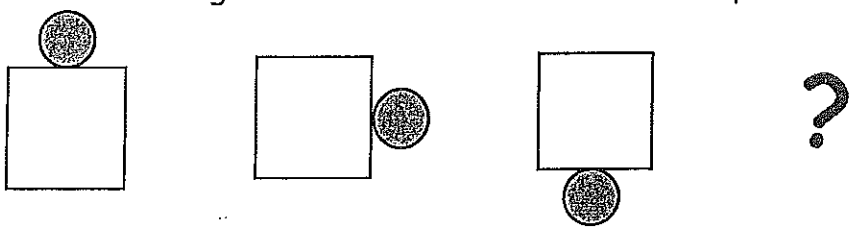
Chapter 15



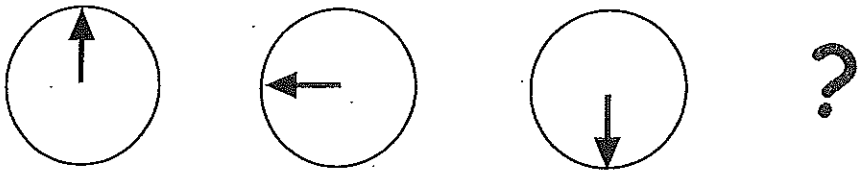
Exercise 1

1. For each of the drawings below draw the next "bit" of the pattern.

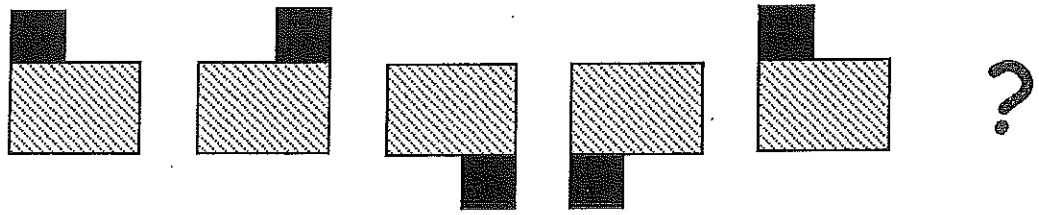
(a)



(b)

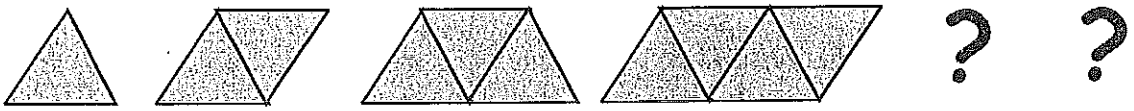


(c)

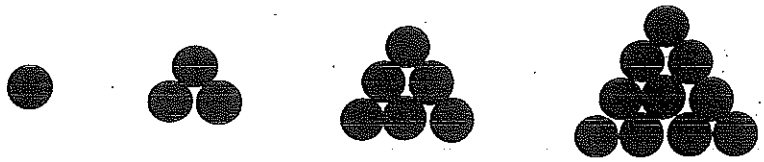


2. Show (neatly) the next 2 drawings in each of the following patterns.

(a)



(b)



(c)

(d)

3. Copy each pattern of letters and find the next letter in the pattern :-

(a) A, C, E, G, I, ...

(b) T, S, R, Q, ...

(c) Y, V, S, P, M, ...

(d) A, B, D, G, K, P, ...

(e) A, Z, B, Y, C, X, D, ...

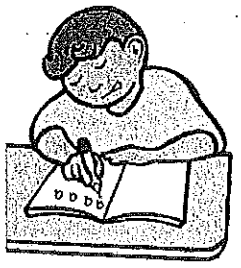
(f) L, N, K, O, J, P, I, Q, ...

Exercise 2

1. Describe each of the following sequences by saying :-

   "Begin at the number "...." and go up (down) by "...." each time.

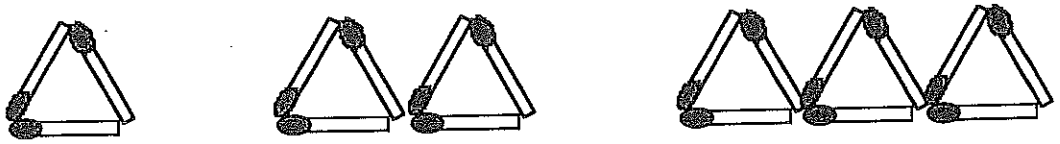
   (a) 4, 6, 8, 10, 12, ...
   (b) 1, 5, 9, 13, 17, ...
   (c) 42, 38, 34, 30, 26, ...
   (d) 1, 102, 203, 304, 405, ...
   (e) 5·7, 6·6, 7·5, 8·4, 9·3, ...
   (f) 8·5, 8·25, 8, 7·75, 7·5, ...



2. Write down the next two numbers in each sequence :-

   (a) 4, 6, 8, 10, 12, ...
   (b) 5, 10, 15, 20, 25, ...
   (c) 53, 47, 41, 35, ...
   (d) 12, 43, 74, 105, 136, ...
   (e) 1·4, 3·5, 5·6, 7·7, ...
   (f) 7·9, 6·7, 5·5, 4·3, 3·1, ...

3. Look at the pattern made with matches.



   (a) Draw the pattern showing the matches needed for 4 triangles.
   (b) The pattern for the number of matches needed is 3, 6, 9, 12.
   Copy this sequence and fill in the next 3 numbers.
   (c) Copy the following and complete :-

   "Start with 3 matches for 1 triangle and
   add on ... matches for each extra triangle".

   (d) How many matches are needed for 10 triangles ?

4. Copy each Fibonacci sequence below and continue the pattern to 8 terms :-

   (a) 1, 1, 2, 3, 5, 8, ...
   (b) 4, 5, 9, 14, 23, ...
   (c) 10, 20, 30, 50, ...
   (d) 5, 6, ...

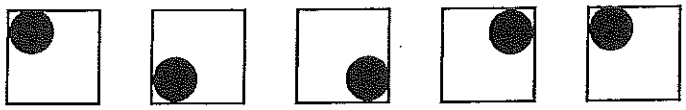
5. The sequence 3, 8, 15, 24, 35, ... can be written as

   (1 x 3), (2 x 4), (3 x 5), (4 x 6), ...

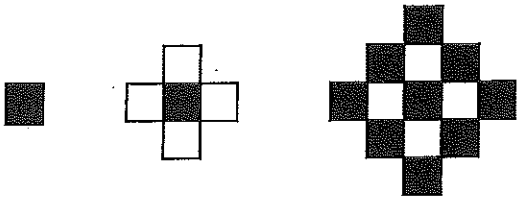
   (a) Write down the the next five numbers in this pattern.
   (b) Write down the calculation for the 100th term.
   (c) Write down the calculation for the 1432nd term.

Revision Exercise

1. Copy (neatly) each of these drawings and sketch the next pattern :-

(a)  .....

(b)  .....

(c)  .....

2. Find the next three letters in each pattern :-

(a) B, E, H, K, N, ...

(b) z, x, v, t, r, ...

3. Describe each of the following pattern of numbers and write down the next two numbers each time :-

(a) 1, 3, 5, 7, ...

(b) 2, 4, 8, 16, 32, ...

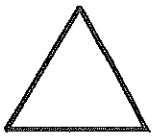
(c) 6, 9, 12, 15, 18, ...

(d) 128, 64, 32, 16, ...

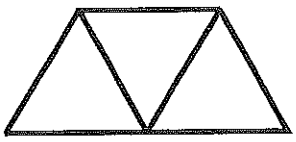
(e) 27, 24, 21, 18, ...

(f) 1, 1, 2, 3, 5, 8, 13, ...

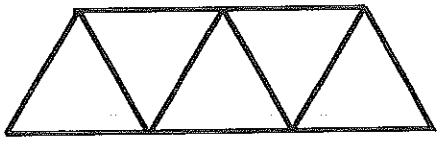
4. A metal bridge has one of its sides built with steel beams as follows :-



1 section
3 beams



2 section
7 beams



3 section
11 beams

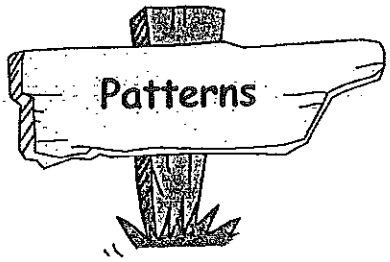
(a) How many beams would be needed for 4 sections ?

(b) Copy and complete this table :-

No. sections	1	2	3	4	5	6
beams needed	3	...	...	...	...	...

(c) Describe carefully how the pattern is formed.

(d) Use your description to find how many beams are needed for 20 sections.



Homework Chapter 17

Exercise 1

1. A pattern is made using counters :-

1 stack
6 counters

2 stacks
12 counters

3 stacks
18 counters

4 stacks
? counters

(a) How many counters are needed for 4 stacks ?

(b) Draw the next pattern of counters using 5 stacks.

(c) Copy the following table and complete it :-

No. of stacks (S)	1	2	3	4	5	6
No. of counters (C)	6	12	?	?	?	?
			?	?	?	

(d) For every extra stack, how many extra counters are needed ?

(e) Write down the formula for calculating the number of counters needed assuming you know the number of stacks :-

copy this :- **number of counters = ? × number of stacks**

(f) Now write down the formula in **symbols** $C = ? \times S$.

(g) Use your formula to decide how many counters are needed to make 20 stacks.

2. Look at these trays of seedlings :-

1 tray
24 seedlings

2 trays
48 seedlings

3 trays
? seedlings

(a) How many seedlings will there be in (i) 3 trays ? (ii) 4 trays ?

cont'd .....

(b) Copy the following table and complete it :-

No. of trays (T)	1	2	3	4	5	6
No. of seedlings (S)	24	?	?	?	?	?
		?	?	?		

(c) For every extra tray, how many extra seedlings were planted ?

(d) Write down the formula for calculating the number of seedlings planted assuming you know the number of trays :-

copy this :- **number of seedlings = ? × number of trays**

(e) Now write down the formula in **symbols** $S = ? \times ?$.

(f) Use your formula to decide how many seedlings are planted in 15 trays.

3. For each of these tables, find a formula or rule connecting the two letters :-

(a)

No. of trays (T)	1	2	3	4	5	6
No. of eggs (E)	5	10	15	20	?	?
		?	?	?		

$E = ? \times T$

(b)

No. of packets (N)	1	2	3	4	5	6
Weight in grams (W)	25	50	75	100	?	?
		?	?	?		

$W = ? \times N$

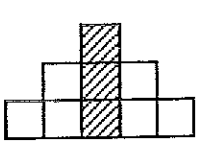
(c)

No. of minutes (M)	1	2	3	4	5	6
Number of seconds (S)	60	120	180	?	?	?
		?	?	?		

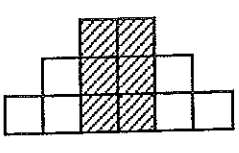
$S = ? \times ?$

Exercise 2

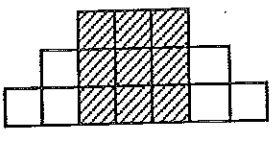
1. A pattern is made using squares as seen below :-



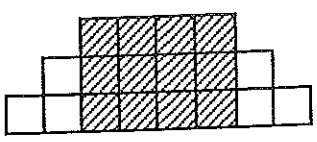
Pattern 1
9 squares



Pattern 2
12 squares



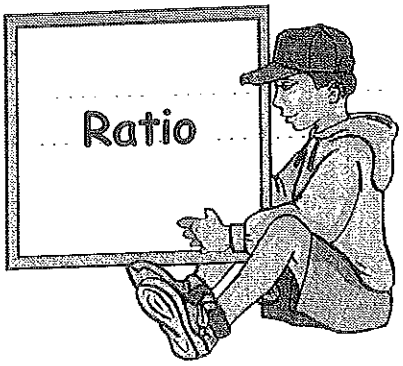
Pattern 3
15 squares



Pattern 4
? squares

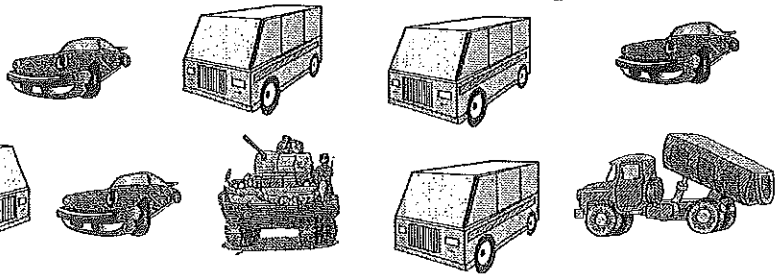
cont'd ....

CHAPTER 11



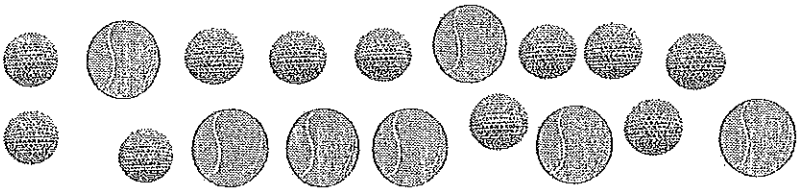
Exercise 1 Understanding Ratio

1. Write down the ratio of :-



   a cars : buses
   b buses : cars
   c buses : vehicles.

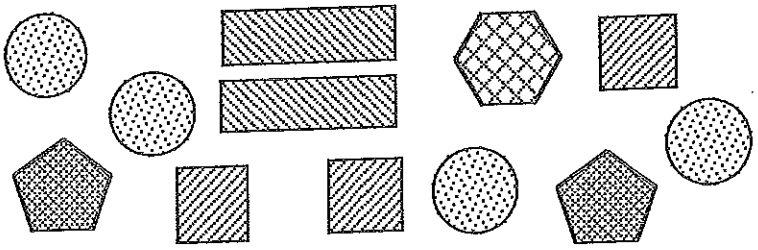
2. Write down the ratio of :-



   a golf : tennis balls
   b tennis : golf balls.

3. Using the word **ALGORITHMIC**, write down the ratio of :-
   a vowels : consonants
   b letters : vowels.

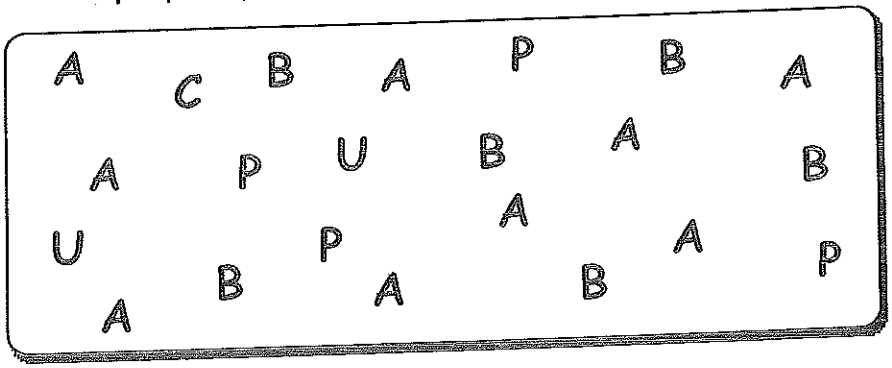
4. Write down the ratio of :-



   a circles : squares
   b rectangles : hexagons
   c pentagons to quadrilaterals.

Exercise 2 Simplifying Ratio

1. Write down each ratio and simplify fully where possible :-
   a B : P
   b P : B
   c U : B
   d A : P
   e B : A
   f P : vowels.



2. Copy each of the following ratios and simplify fully where possible :-

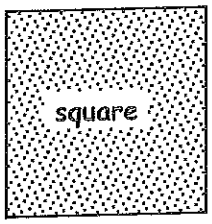
a 8 : 12	b 40 : 70	c 33 : 36	d 24 : 60
e 6 : 39	f 36 : 45	g 110 : 330	h 17 : 340
i 48 : 9	j 18 : 3600	k 17 : 51	l 73 : 75
m 121 : 11	n 173 : 173	o 39 : 21	p ten : one million.

3. A square has side length 10 centimetres.

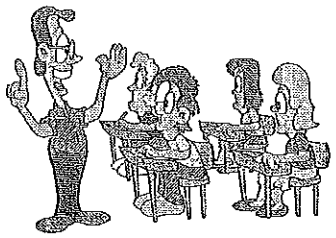
Write down the ratio, in simplest form, of the numerical values of :-

a the perimeter : the area

b a side length : the perimeter.



Exercise 3 Ratio Calculations



1. In a class, the ratio of girls to boys is 1 : 3.

If there are 18 boys in the class how many :-

a girls are in the class b pupils are in the class ?

2. The ratio of new cars to used cars for sale in a garage is 3 : 2.

There are 21 new cars for sale. How many :-

a used cars are for sale b cars are for sale ?

3. Different shades of pink paint are made by using differing ratios.

Which type of pink do you get by mixing :-

a 9 litres of red and 6 litres of white

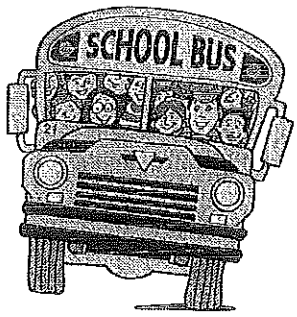
b 14 litres of red and 28 litres of white

c 6 litres of white and 24 litres of red ?

	red	white
Deep Pink	4	1
Heavy Pink	3	2
Baby Pink	1	1
Light Pink	1	2

4. A school trip can only happen if the ratio of teachers to pupils is at least 2 : 15.
There are 60 pupils going on the trip.
There are nine teachers.

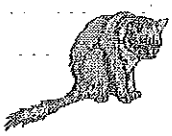
Can the trip go ahead ? Explain.



Revisit - Review - Revise Exercise 11

1. Write down the ratio of :-







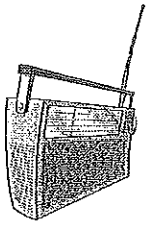
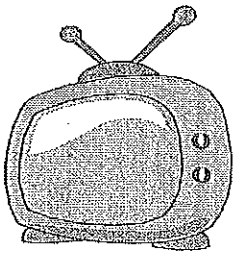

   a cats : dogs

   b dogs : cats

   c cats : animals.

2. In an electrical shop there are 17 TV's, 12 radios, 11 fridges and 7 freezers.

   Write down the ratio of :-

   a TV's : freezers

   b freezers : radios

   c radios : electrical items.

3. Write down each ratio and simplify fully where possible :-

a	15 : 20	b	40 : 50	c	33 : 99	d	18 : 28
e	13 : 43	f	42 : 35	g	480 : 120	h	175 : 50
i	64 : 164	j	2·5 : 10	k	1·5 : 18	l	165 : 55.

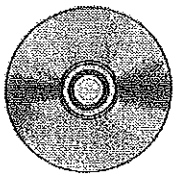
4. The ratio of action DVD's to drama DVD's in a market stall is 5 : 2.

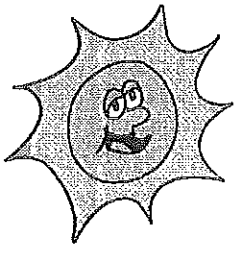
   How many :-

   a action DVD's, if there are 24 drama DVD's

   b drama DVD's, if there are 65 action DVD's

   c DVD's are there, if there are 32 drama DVD's ?



5. 

   Last June, the ratio of sunny to dull days was 2 : 3.

   A newspaper stated there were 21 dull days.

   Why do you think the newspaper was wrong ?

6. Simplify each ratio fully :-

   a $\frac{1}{2} : 5$ b $7 : 1\frac{1}{2}$ c $1\frac{2}{3} : 2$ d $4\frac{5}{7} : 1.$

Ratio and Proportion

Exercise 1

1. The cost of 4 sweets is 80p. Find the cost of one sweet.

2. A car took 5 trips to move 20 bags of soil. How many bags did it move in one trip?

3. Find the cost of one item :-

   a) 3 sweets costing 39p
   b) 9 ties costing £45
   c) 7 CDs costing £42
   d) 8 pillows costing £64
   e) 10 bottles of cola costing £20
   f) 5 cakes costing £1.20

4. A man can walk 15 miles in 5 hours. How far does he walk in one hou?

5. A 3kg bag of potatoes costs £3.36. Calculate the cost of one kg.

6. 10 maths books cost £130. How much will one cost?

7. Over 4 days Jane travelled 460 miles. How far did she travel in one day?

8. If 100 dollars is worth £150, what is £1 worh in dollars?

9. A 10 cm candle will burn for 4 hours. How much of the candle burns every hour?

Exercise 2

1. A car travels 60 miles in one hour. How far will it travel in 4 hours?

2. One bar of chocolate costs 20p. How much will 3 cost?

3. An apple pie costs £1.20. What will 6 cost?

4. To print one photograph it costs 6p. How much will 10 cost?

5. A computer coder can code 30 lines of code in one hour. How many lineswill he code in 8 hours?

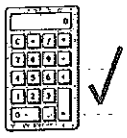
6. 5 books cost £40.
   a) What will one book cost?
   b) Find the cost of 3 books.

7. 6 lollies cost 72p.
   a) How much will it cost to buy one lolly?
   b) Calculate the cost of 5 lollies.

8. A machine makes 450 paper clips in 3 seconds.
   a) How many will it make in 1 second?
   b) How many clips will be made in 7 seconds?

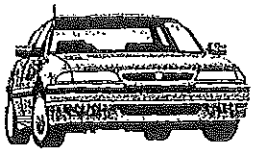
Chapter 2
Proportion

Exercise 1



*You may use a calculator but you **must** show your working.*

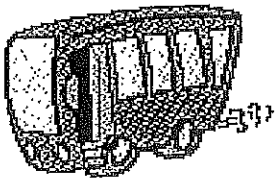
1. A car travelled a distance of 200 miles on 10 gallons of petrol.
Calculate the rate in "miles per gallon".

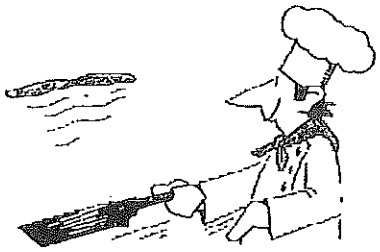


Copy and complete :-

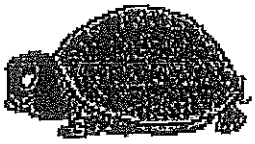
10 gallons	⟶	200 miles
1 gallon	⟶	200 ÷ 10
		= ..... miles per gallon.

2. A bus travels 450 kilometres on 50 litres of petrol.
Calculate the rate in "kilometres per litre."



3. 
A chef makes 39 pancakes in 13 minutes.
Calculate the rate of pancakes/minute.

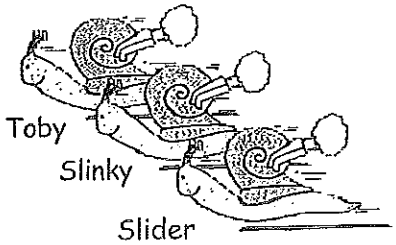
4. It takes a tortoise 4 minutes to travel 240 centimetres.
Calculate the rate in centimetres/minute.



5. Eight bags of sweets contain 96 sweets. Calculate the rate of sweets per bag.

6. £10 can be exchanged for 25 Australian dollars.
Calculate the rate of dollars per £.

7. In the slug race final,



Toby travelled 100 centimetres in 5 minutes,
Slinky travelled 66 centimetres in 3 minutes,
Slider travelled 70 centimetres in $3\frac{1}{2}$ minutes.

(a) For each slug, find the speed in centimetres/minute.
(b) Who was the fastest slug ?

8. In his essay, George wrote 2800 words and used 8 pages.
Write the rate of words per page.

9. Listening to a 5 minute speech, Lucy wrote it down using shorthand and found she had written 600 words. What is her "shorthand" rate ?

Exercise 2

1. 7 Mars bars cost £3·15.

   What would 3 cost ?

   (set down like this :-)

Mars bars		Cost (£)
7	→	3·15
1	→	3·15 ÷ 7 = ...
3	→	.....

(*Set each of the following down using three lines similar to those shown above*)

2. 5 comics cost £6·25. What would 4 cost ?

3. 8 litres of petrol cost £5·68. What would 9 litres cost ?

4. 15 cm^3 of gold weighs 285 grams. What would 16 cm^3 weigh ?

5. A three kilogram roast of beef takes $2\frac{1}{2}$ hours to cook.
   How long would it take a four kilogram roast. (hint: *change time to minutes*).

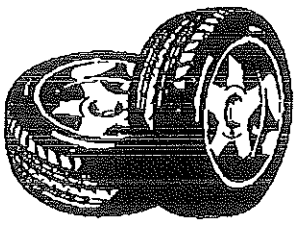
6. In <u>one year</u> poison ivy can grow 6 metres. (*change to centimetres*)
   How long would you expect it to grow on average in <u>7 months</u> ?

Exercise 3 Revision exercise

1. Calculate the rate of each of the following :-
   (a) A car travelling 60 kilometres in 2 hours. Find the rate in km/hr.
   (b) Twelve boxes of toy soldiers contain 600 soldiers. Find the rate of soldiers per box.
   (c) A fireman uses 4000 litres of water in 50 minutes. Find the usage rate in litres per minute.

2. Find the cost of **four** of each the following items :-
   (a) 3 sweets cost 90p.
   (b) 5 computer games cost £40.
   (c) 11 magazines cost £11·11.
   (d) 5 ice-lollies cost £2.

3. I was quoted a total price of £72 for 3 new tyres by "Slowfit".
   I actually bought 4 tyres. What should I expect to pay ?



4. Water poured into an empty barrel at a steady rate.
   In 10 minutes the water level had risen by 3 centimetres.
   (a) How deep should the water level be after 25 minutes ?
   (b) Hard !! How long should the barrel take to fill if it is 120 centimetres tall ?