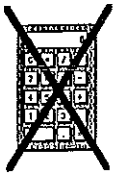
Cumbernauld Academy

Mathematics Department

3rd/4th Level

Block 3 - homework booklet

Exercise 1



1. Calculate each of these using the method shown below :-
(*show the two steps of working each time*)

(a) 13 x 40 [Find 10 x 13 first = 130 and then find 130 x 4]

(b) 18 x 30 (c) 25 x 50 (d) 42 x 60

(e) 28 x 20 (f) 110 x 70 (g) 125 x 80

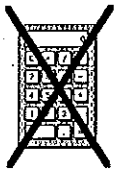
2. Work out each of these using the 2 steps shown :-

(a) 35 x 200 [Find 35 x 100 first = 35<u>00</u> and then find 3500 x 2]

(b) 24 x 400 (c) 18 x 200 (d) 12 x 600

(e) 34 x 500 (f) 54 x 300 (g) 200 x 58

Exercise 2



1. Divide the following using the method shown below :-

(a) 420 ÷ 20 [Find 420 ÷ 10 = 42 and then find 42 ÷ 2]

(b) 120 ÷ 40 (c) 2250 ÷ 50 (d) 3600 ÷ 60

(e) 9600 ÷ 30 (f) 3150 ÷ 70 (g) 32000 ÷ 80

2. Divide the following :-

(a) 12400 ÷ 400 [Find 12400 ÷ 100 = 124 and then find 124 ÷ 4]

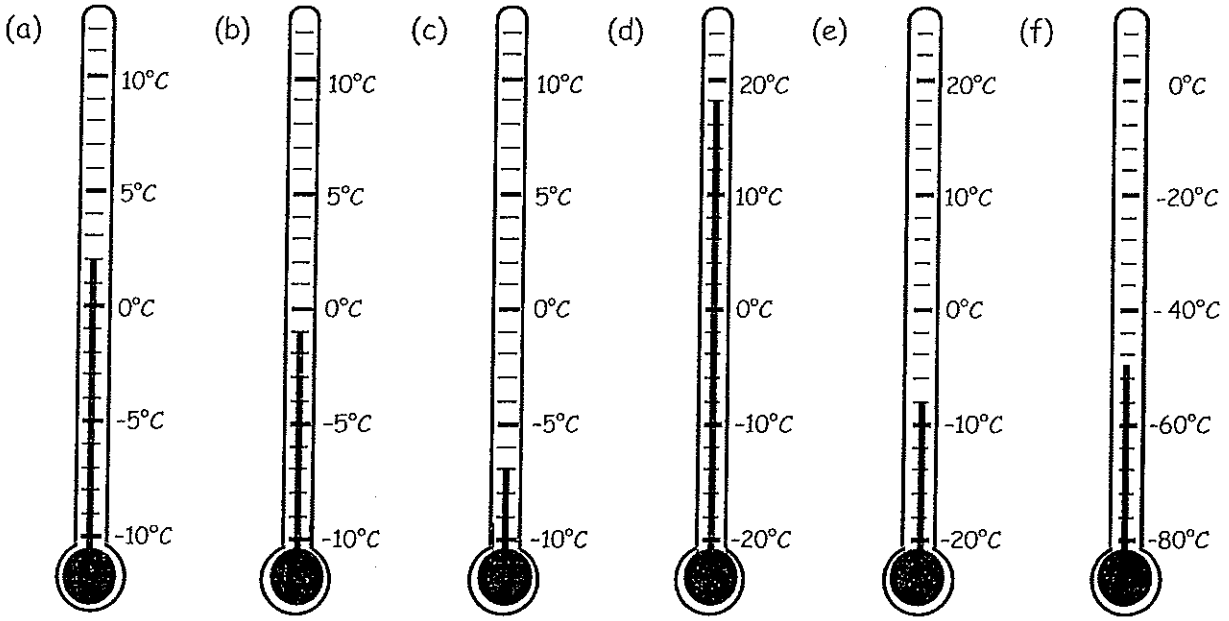
(b) 36000 ÷ 300 (c) 48200 ÷ 200 (d) 52500 ÷ 500

(e) 18000 ÷ 200 (f) 42000 ÷ 600 (g) 424000 ÷ 800

Chapter 1
Integers

Exercise 1

1. Write the temperatures shown by each thermometer.



2. (a) I had £20 in my bank account. I withdrew £35. What was my new bank balance ?

   (b) Susie had £30 in her bank account. After withdrawing some money, her balance was then (-£40). How much money had she withdrawn ?

3. (a) Write the heights (in metres) of the following, (*use + or -*).

   (i) the 5th floor (ii) the 8th floor

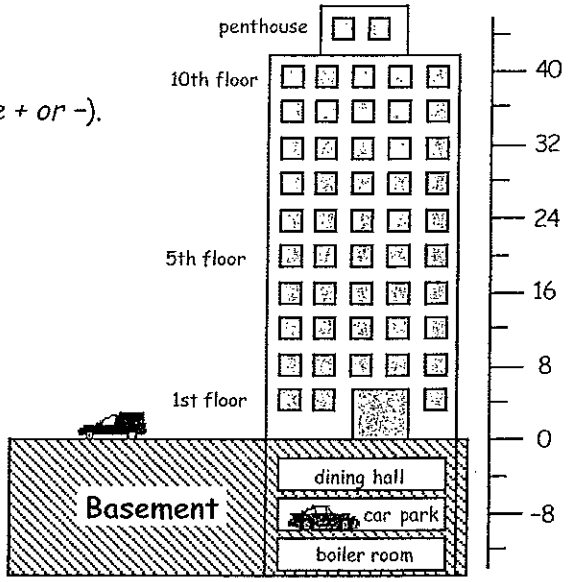
   (iii) the penthouse (iv) the car park

   (v) the boiler room (vi) the wheel of the van.

   (b) How high is the ground above the dining hall ?

   (c) How high is the penthouse above the car park ?

   (d) How high is the dining hall above the boiler room ?



4. Write the ages of these Romans when they died :-

   (a) Bigus Thickus born in 80 B.C. and died in 4 A.D.

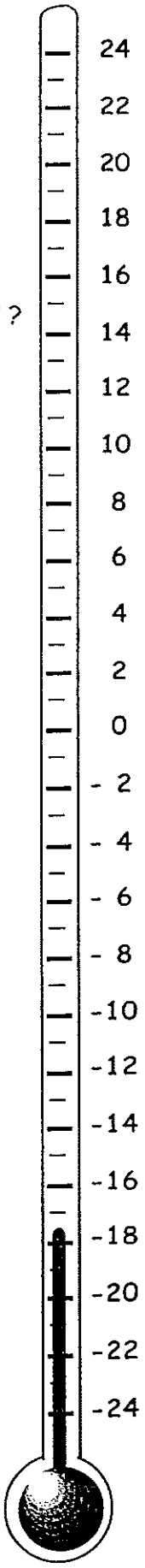
   (b) Uglis Puglis born in 12 B.C. and died in 37 A.D.

   (c) Maximus Bumus born in 53 B.C. and died in 7 A.D.

   (d) Pukus Mucus died in 47 A.D. and was born in 54 B.C.

Exercise 2

DO NOT MARK THE THERMOMETER SCALE.
Use the thermometer scale to help with these questions.



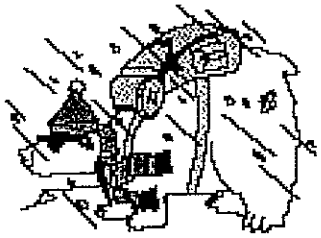
1. What is the temperature that is :-

(a) 5°C up from 3°C ? (b) 7°C up from 5°C ? (c) 12°C up from 0°C ?
(d) 4°C down from 10°C ? (e) 11°C down from 20°C ? (f) 5°C down from 0°C ?
(g) 6°C up from -1°C ? (h) 9°C up from 4°C ? (i) 4°C up from -7°C ?
(j) 7°C down from 2°C ? (k) 2°C down from -8°C ? (l) 20°C down from -20°C ?

2. Copy and complete using the words ".....°C **up**" or "..... °C **down**" :-

(a) 15°C is **4°C down** from 19°C. (b) -10°C is..... from 9°C.
(c) 8°C is ..... from -1°C. (d) 3°C is..... from -5°C.
(e) 7°C is..... from -8°C. (f) -15°C is..... from 7°C.

3. The temperature in Glasgow on Christmas day was 2°C.
On Boxing Day the temperature had dropped by 6°C.
What was the temperature on Boxing Day ?



4. The temperature in Moscow yesterday changed as follows :-

Noon		3 p.m.		6 p.m.		9 p.m.		Midnight
1°C	→	down by 4°C	→	up by 2°C	→	down by 5°C	→	down by 7°C

What was the temperature at (a) 3 p.m. (b) 6 p.m. (c) Midnight ?

Exercise 3

1. Copy and find :-

(a) 6 + 2 (b) 7 + (-1) (c) 3 + (-2) (d) 7 + (-7)
(e) (-1) + 3 (f) (-5) + 3 (g) (-3) + 3 (h) (-8) + 5
(i) 7 + (-9) (j) (-10) + 12 (k) 11 + (-14) (l) (-7) + 9
(m) (-1) + (-1) (n) (-4) + (-2) (o) (-8) + (-4) (p) (-9) + (-9)

2. Find :-

(a) 6 - 2 (b) 7 - 9 (c) 3 - 7 (d) 7 - 12
(e) (-1) - 3 (f) (-5) - 3 (g) (-3) - 3 (h) (-8) - 5
(i) (-1) - 1 (j) (-4) - 2 (k) (-8) - 4 (l) (-9) - 9

cont'd .....

3. Copy and find :-

(a) 5 + 8 (b) 7 - 10 (c) 3 + (-7) (d) (-7) + 12

(e) (-4) - 3 (f) (-5) + 3 (g) (-5) + 5 (h) (-5) - 5

(i) (-5) + (-5) (j) (-7) - 5 (k) (-6) + 5 (l) (-97) + 97

Exercise 4

1. Copy and complete :-

(a) 3 x (-2) (b) 5 x (-4) (c) 3 x (-7) (d) (-7) x 2

(e) (-4) x 3 (f) (-5) x 3 (g) (-5) x 5 (h) (-8) x 7

(i) 7 x (-5) (j) (-7) x 5 (k) (-6) x 9 (l) (-9) x 6

2. Copy and find :-

(a) (-6) ÷ 2 (b) (-4) ÷ 2 (c) (-35) ÷ 7 (d) (-16) ÷ 4

(e) (-40) ÷ 5 (f) (-51) ÷ 3 (g) (-55) ÷ 5 (h) (-56) ÷ 7

(i) (-70) ÷ 5 (j) (-74) ÷ 2 (k) (-108) ÷ 9 (l) (-290) ÷ 10

3. Copy and find :-

(a) (4 x 3) ÷ 2 (b) (7 x 4) ÷ 2 (c) (3 x (-10)) ÷ 6

(d) (6 x (-4)) ÷ 8 (e) ((-4) x 9) ÷ 6 (f) ((-15) x 3) ÷ 5

4. Copy and find :- *(remember to do the brackets first)*

(a) (6 + (-2)) ÷ 2 (b) (4 + (-10)) ÷ 2 (c) (3 + (-6)) ÷ 3

(d) ((-1) + 9) ÷ 4 (e) ((-4) - 6) x 5 (f) ((-5) - 3) ÷ 2

(g) (5 + (-5)) ÷ 7 (h) ((-5) + 6) ÷ 1 (i) ((-16) + 7) x 3

(j) 6 x (4 + 3) (k) 18 ÷ ((-5) + 8) (l) (-3) x (8 + (-3))

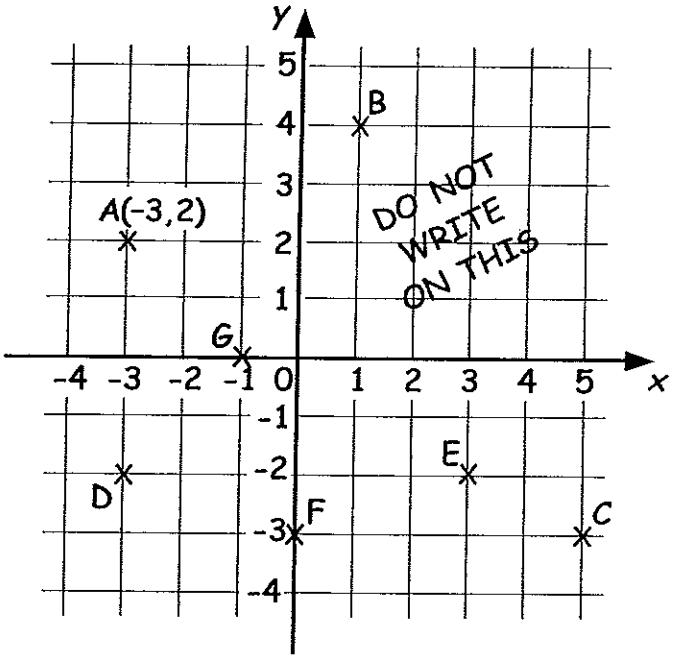
5. Find :-

(a) ((-5) + (-2)) x 3 (b) (-36) ÷ ((-4) + 5)

(c) ((-2) + (-1)) x (4 + (-2)) (d) 8 + (-10) ÷ 2 - 3

(e) (8 + (-10)) ÷ 2 - 3 (f) (6 x (-6)) ÷ (9 x 4)

Exercise 5



1. The coordinates of A are (-3,2).
   Write the coordinates of the other points.

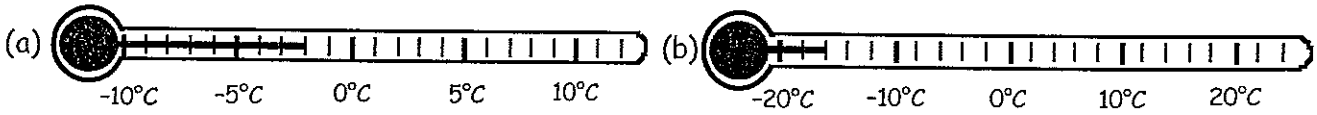
2. (a) Copy the set of axes from question 1.
   (b) Plot the following six points :-
   P(2, 3), Q(-1, 5), R(-4, 3), S(-4, -1), T(-1, -3) and U(2, -1).
   (c) Name the shape formed when the six points are joined up in order.

3. (a) Draw a set of axes from -5 to 5 on both axes.
   (b) Plot the points A(3, 2), B(3, -3) and C(-2, -3).
   (c) Find and plot a fourth point (call it D), such that ABCD is a square.

4. (a) Draw a set of axes from -5 to 5 on both axes.
   (b) Plot the points J(2, 1), K(4, 1) and L(3, 4).
   (c) Join the three points and write the name of the shape formed.
   (d) Reflect this shape over the x-axis.
   (e) Write the coordinates of the vertices of the new shape found.

Exercise 6 - Revision Exercise

1. Write the temperature shown by each thermometer.



2. Yesterday the temperature was 8°C.
   Last night the temperature dropped by 11°C. What was the new temperature ?

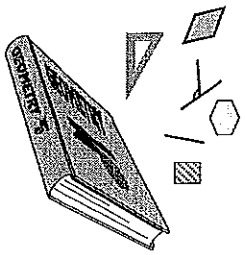
3. Find (a) 6 + (-4) (b) (-4) + 7 (c) (-2) + (-3) (d) (-5) - 1 (e) (-12) - 4

4. Find (a) 4 x (-2) (b) (-7) x 3 (c) (-15) ÷ 3 (d) (-32) ÷ 4 (e) 20 ÷ ((-3) + 5)

5. (a) Draw a set of axes from -5 to 5 on both axes.
   (b) Plot the points J(2, 1), K(-4, 1) and L(-4,-2).
   (c) Plot and write the coordinate of a 4th point (call it M), such that JKLM is a rectangle.
   (d) Reflect the rectangle over the y axis and write down the coordinates of its vertices.

Shapes and Coordinates

You need a ruler for this worksheet.



1. (a) Plot the points A(2,2) , B(7,2) and C(7,7) on a coordinate diagram.

   (b) Given that ABCD is a ***square*** , complete the diagram and write down the coordinates of the point D.

2. (a) On a coordinate diagram plot the points P(1,3) , Q(8,3) and R(8,6).

   (b) Given that PQRS is a ***rectangle*** , complete the diagram and write down the coordinates of the point S.

3. (a) On a coordinate diagram plot the points E(2,4) , F(4,1) and G(10,5).

   (b) Given that EFGH is a ***rectangle*** , complete the diagram and write down the coordinates of the point H.

4. (a) On a coordinate diagram plot the points T(4,2) , U(7,3) and V(6,6).

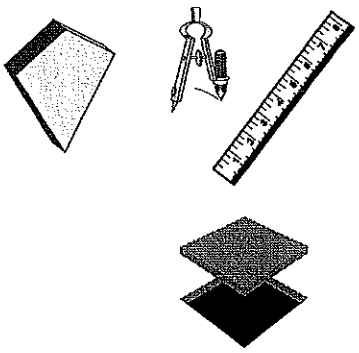
   (b) Given that TUVW is a ***square*** , complete the diagram and write down the coordinates of the point W.

5. (a) Plot on a coordinate diagram the points A(2,5) , B(-3,5) and C(-3,-2).

   (b) Given that ABCD is a ***rectangle*** , complete the shape and write down the coordinates of D .

6. (a) Plot on a coordinate diagram the points A(6,3) , B(3,5) and C(-3,3).

   (b) Given that ABCD is a ***kite*** , complete the shape and write down the coordinates of the point D.



7. Repeat question 6. for the following sets of points :

   (a) A(-1,5) , B(2,3) and C(-1,-6).

   (b) A(2,5) , B(6,3) and C(2,-5).

   (c) A(-2,-4) , B(1,3) and C(5,3).

8. (a) Plot on a coordinate diagram the points P(3,5) , Q(5,2) and R(3,-1).

   (b) Given that PQRS is a ***rhombus*** , complete the shape and write down the coordinates of the point S.

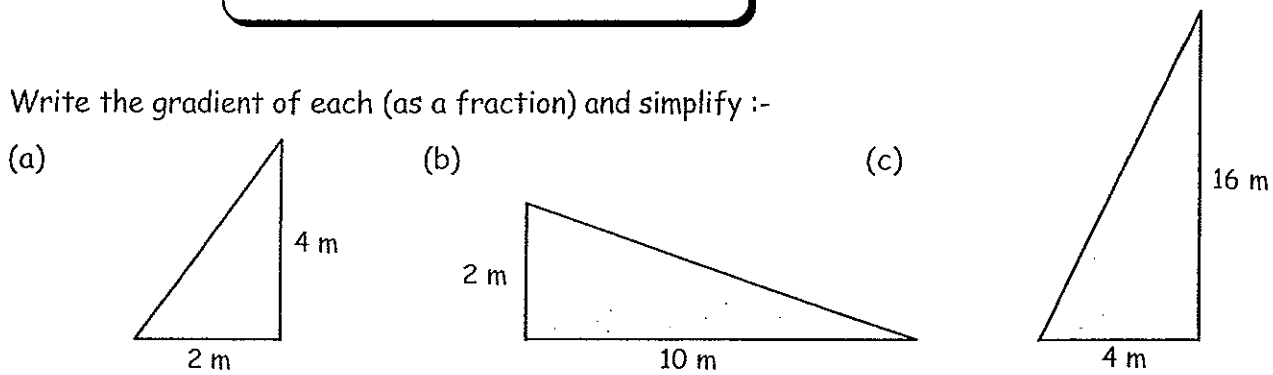
Exercise 1

Chapter 6
Gradients and Lines

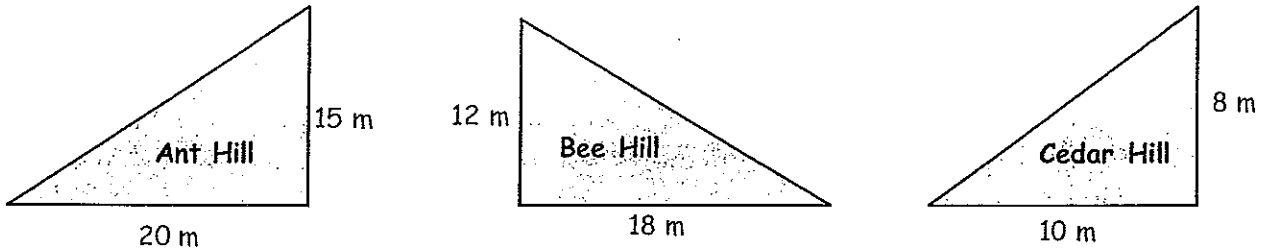
1. Copy and complete the formula -

$$\text{gradient} = \frac{\text{ver..... distance}}{\text{..... distance}}$$

2. Write the gradient of each (as a fraction) and simplify :-



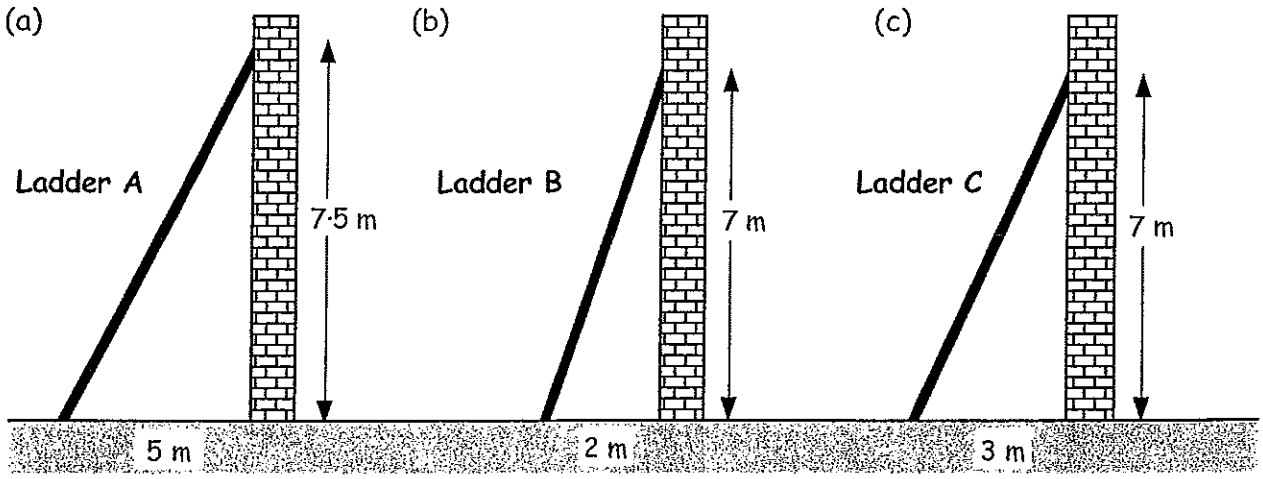
3. (a) Write the gradients of each of the following hills :-



(b) Change each of your fractional answers to part (a) to a decimal.

(c) List the gradients in order (steepest first).

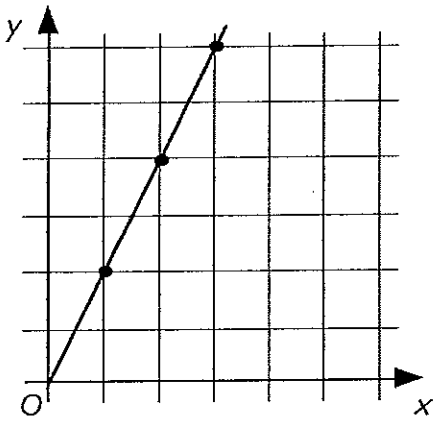
4. Find the gradient of each of these ladders:



5. A ladder is "SAFE" if it has a gradient with a value between 3 and 4.
Which of the above three ladders is safe and which is unsafe ?

Exercise 2

Diagram 1



1. (a) Find the gradient of the line in diagram 1.

   (b) Copy and complete :-

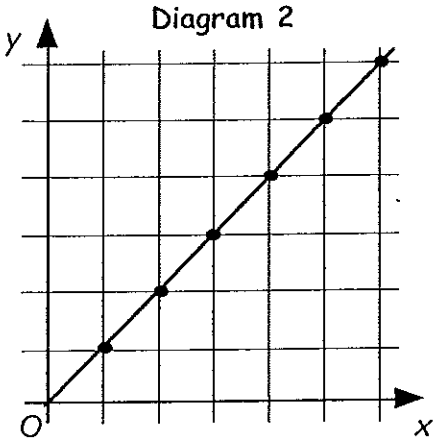
   For every point on the line,

   "the y - coordinate = ..?.. x the x - coordinate".

   (c) The equation of the line is :-

   $y =$ x

Diagram 2



2. (a) Find the gradient of the line in diagram 2.

   (b) Copy and complete :-

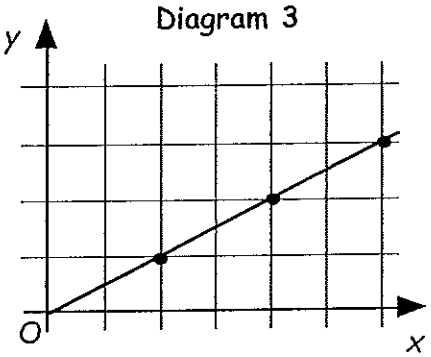
   For every point on the line,

   "the y - coordinate = ..?.. x the x - coordinate".

   (c) The equation of the line is :-

   $y =$ x

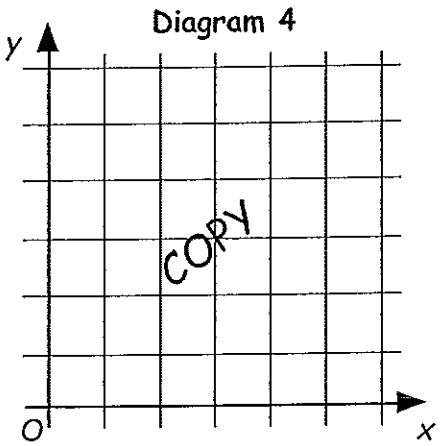
Diagram 3



3. (a) Find the gradient of the line in diagram 3.

   (b) Write the equation of the line.

Diagram 4



4. Draw a coordinate diagram like diagram 4.

   (a) Plot these points on your diagram.

   (0, 0), (1, 3), (2, 6).

   (b) Draw a line through the points and calculate the gradient of the line.

   (c) Now write the equation of this line.

5. (a) Draw another set of axes and plot these points.

   (0, 0), (3, 1), (6,2).

   (b) Draw the line through the points, calculate the gradient of the line and write down the equation of the line.

Exercise 3

1. (a) Look at the table for the line $y = 2x$.

x	0	1	2	3	4
$y = 2x$	0	2	4	...	...

(b) Copy and complete the list of coordinates: (0, 0), (1, 2), (2, 4), (.....), (.....).

(c) Draw a coordinate diagram, plot the 5 points and complete the line.

2. (a) Look at the table for the line $y = 3x$.

x	0	1	2	3	4
$y = 3x$	0	3	6	...	...

(b) Copy and complete the list of coordinates: (0, 0), (.....), (.....), (.....), (.....).

(c) Draw a coordinate diagram, plot the 5 points and show the line.

3. (a) Look at the table for the line $y = \frac{1}{2}x$.

x	0	2	4	6	8
$y = \frac{1}{2}x$	0	1	2	...	...

(b) List the coordinates of the 5 points.

(c) Draw a coordinate diagram, plot the points and show the line.

4. Make a table, list and plot the coordinates on a diagram and draw the line $y = 4x$.

5. Draw the line $y = \frac{1}{3}x$.

Exercise 4

1. Draw the line $y = 2x + 1$ as follows:

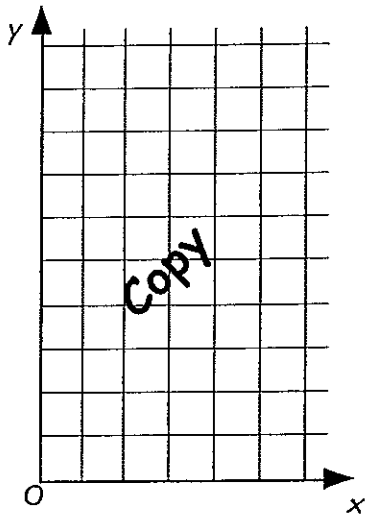
(a) Copy and complete this table:

x	0	1	2	3	4
$y = 2x + 1$	$2 \times 0 + 1$	$2 \times 1 + 1$	$2 \times 2 + 1$	....	.....

(b) Copy and complete the list of coordinates:

(0, 1), (1, 3), (2, 5), (3,....), (..., ...).

(c) Copy the coordinate diagram, plot the points and draw the line. Label the line $y = 2x + 1$ on your diagram.



2. Draw the following lines by repeating the process from question 1.

(a) $y = 3x + 1$

x	0	1	2	3	4
$y = 3x + 1$	$3 \times 0 + 1$	$3 \times 1 + 1$	$3 \times 2 + 1$	....	.....

(b) $y = 2x - 1$

x	0	1	2	3	4
$y = 2x - 1$	$2 \times 0 - 1$	$2 \times 1 - 1$	$2 \times 2 - 1$	....	.....

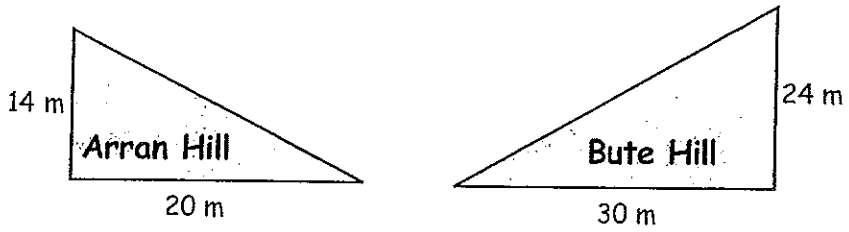
(c) $y = \frac{1}{2}x + 1$

x	0	2	4	6	8
$y = \frac{1}{2}x + 1$	$\frac{1}{2}$ of $0 + 1$	$\frac{1}{2}$ of $2 + 1$	$\frac{1}{2}$ of $4 + 1$	....	.....

3. Draw the lines: (a) $y = 2x + 2$ (b) $y = 3x - 2$ (c) $y = \frac{1}{3}x - 1$

Exercise 5 Revision exercise

1. (a) Calculate the gradients of each hill.



(b) Simplify each fraction.

(c) Change each fraction to a decimal. (d) Which of the two hills is steeper ?

2. (a) Copy and complete the table for the line $y = 4x$.

x	0	1	2	3	4
$y = 4x$	0	4	...	...	...

(b) List the coordinates of the 5 points.

(c) Draw a coordinate grid, plot the 5 points, join them up to show the line $y = 4x$.

3. Copy the table below, list the coordinates, draw a coordinate grid and show the line $y = \frac{1}{4}x$.

x	-4	0	4	8	12
$y = \frac{1}{4}x$	-1	0	1	...	...

4. Make up a table as shown above, and use the coordinates to help draw the line corresponding to :-

(a) $y = x + 3$ (b) $y = x - 4$

5. Draw the following lines by using the above process :-

(a) $y = 2x + 5$ (b) $y = 3x - 1$ (c) $y = \frac{1}{4}x + 1$

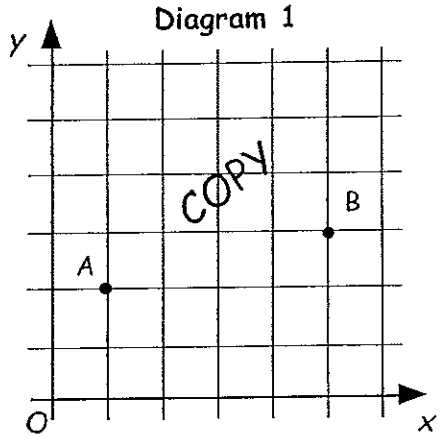
Exercise 6E

1. (a) Copy diagram 1 into your jotter.

   (b) Write the coordinates of A and B and join them with a line.

   (c) Form an appropriate right angled triangle and calculate the gradient of the line AB.

Diagram 1



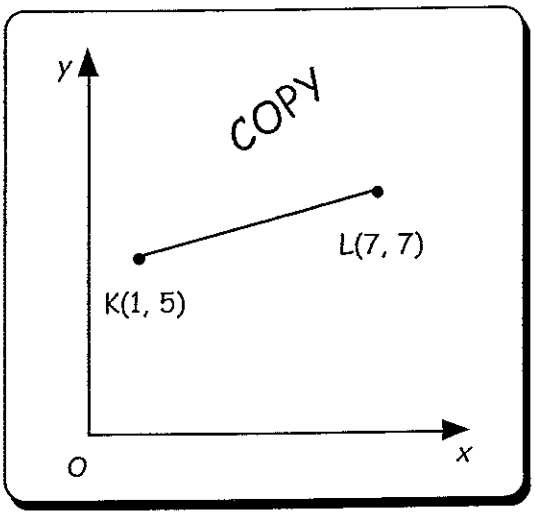
2. (a) Make a coordinate diagram and plot the points C(2, 1) and D(3, 5).

   (b) Form a right angled triangle and calculate the gradient of the line CD.

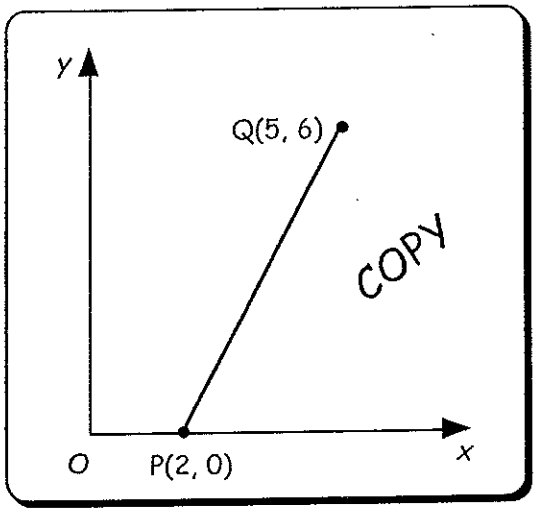
3. Make an accurate copy of each of the following diagrams into your jotter (squared paper).

   Calculate the gradient of each line :-

(a)



(b)



4. (a) Draw a set of axes and plot the two points E(0, 2) and F(5, 3).

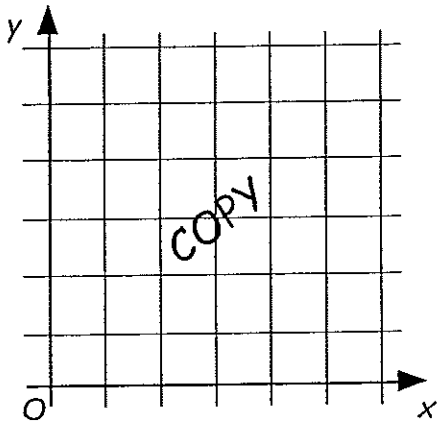
   (b) Calculate the gradient of the line EF.

5. G is the point (1, 3) and H is the point (5, 6).

   Calculate the gradient of the line GH.

6. Draw a set of axes like those shown opposite.

   A line joins the points S(1, 2) and T(?, 3).
   The gradient of ST is $\frac{1}{3}$.
   Find the value of ?.



Homework

1 Which of the following points are on the line $y = 6$?

a (3, 6) **b** (6, 2) **c** (6, –2) **d** (5, 6) **e** (–6, 6)

2 **a** State three points which lie on the line $y = 3$.

b Plot the points and draw the line.

3 Draw the following lines on the same grid.

a $y = -2$ **b** $y = 5$

4 **a** Draw the lines.

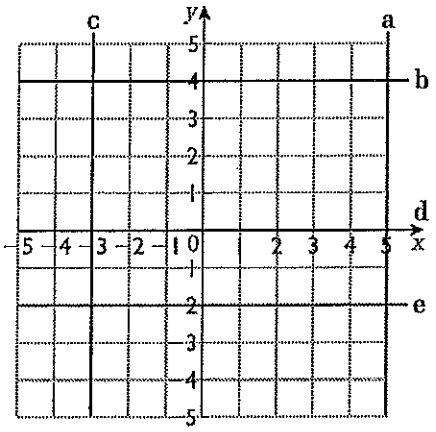
i $y = -3$ **ii** $x = 4$

b Where do the lines cross?

c By what name is the line $y = 0$ known?

d By what name is the line $x = 0$ known?

1 Give the equation of each labelled line in the diagram.



2 **a** Draw a grid like the one above and draw the lines:

i $x = 4$ **ii** $x = -1$ **iii** $y = 3$ **iv** $y = -3$

Chapter 16
Tolerence

Exercise 1

1. For each of the following tolerances, write down the minimum and maximum allowable sizes :-

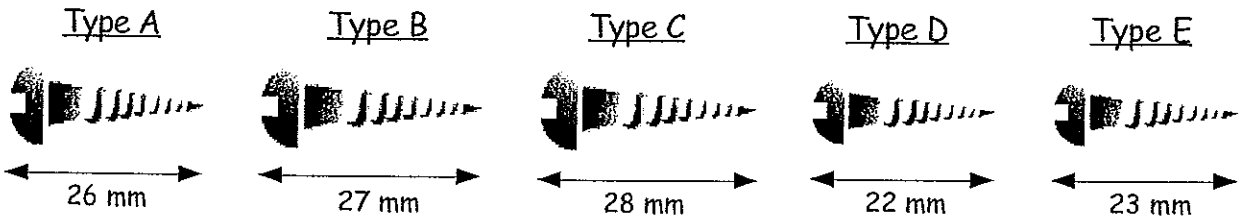
(a) (10 ± 1) cm (b) (15 ± 2) mm (c) (100 ± 4) kg (d) (250 ± 20) km

(e) (12 ± 0·2) cm (f) (3 ± 0·1) m (g) (5·5 ± 0·2) g (h) (0·5 ± 0·01) cm

2. A joiner needs a type of wood screw with length (25 ± 2) mm to complete a cabinet.

(a) Write down the min. and max. length the joiner requires.

(b) State which of these wood screws he can use for the cabinet.



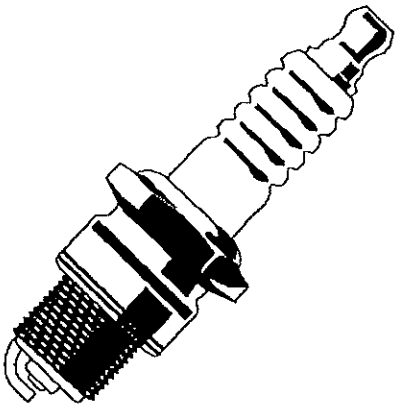
3. The spark plug gap for a Rover car is (1·00 ± 0·05) mm.

(a) Write the minimum and maximum distance for the gap.

(b) State which of these gaps is <u>not</u> acceptable.

(i) 1·03 mm (ii) 1·1 mm (iii) 1·04 mm

(iv) 0·6 mm (v) 0·9 mm (vi) 0·99 mm.



Exercise 2

1. Write each of the following in tolerance form :-

(a) min = 20 m, max = 22 m (b) min = 150 cm, max = 160 cm (c) min = 15 kg, max = 16 kg (d) min = 100 mm, max = 106 mm

(e) min = 5 g, max = 5·2 g (f) min = 0·5 ml, max = 0·7 ml (g) min = 0·1 cm, max = 0·12 cm (h) min = 10 cm, max = 10·01 cm.

2. A car has its idle speed set at a minimum of 775 revs/min and a maximum of 875 revs/min. Write this in tolerance form.

3. The dosage of a special vaccine must be between 5·3 ml and 5·4 ml.
Write this in tolerance form.

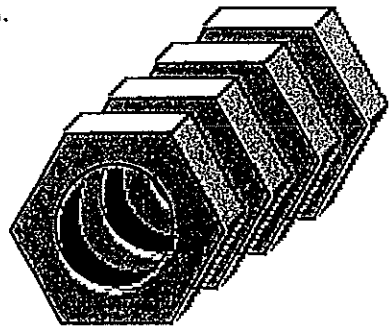
4. The temperature in Majorca one day ranged from a minimum of 68°F to a maximum of 102°F.
Write this in tolerance form.

Exercise 3 Revision exercise

1. Write down the minimum and maximum values for :-

(a) (6 ± 1) cm (b) (11 ± 2) mm (c) (100 ± 7) kg (d) (150 ± 10) km
(e) (5 ± 0·3) cm (f) (10 ± 0·2) m (g) (3·2 ± 0·3) g (h) (0·1 ± 0·01) cm.

2. A machine nut must be within the given tolerance (18 ± 0·05) mm.
(a) Write the minimum and maximum acceptable lengths.
(b) State which of the following nuts should be rejected :-
(i) 18·1 mm (ii) 17·9 mm
(iii) 17·04 mm (iv) 18·006 mm.



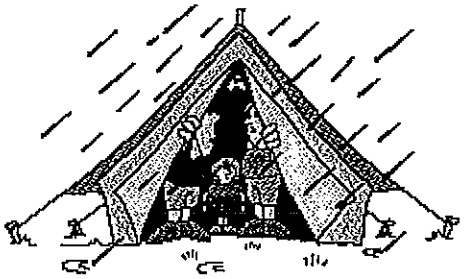
3. Put these into tolerance form :-

(a) min = 50 mm, max = 60 mm (b) min = 105 cm, max = 110 cm (c) min = 2·5 cm, max = 2·9 cm (d) min = 0·2 g, max = 0·22 g.

4. During one day in February, the maximum rainfall was 14 mm and the minimum was 0 mm.
Write this in tolerance form.

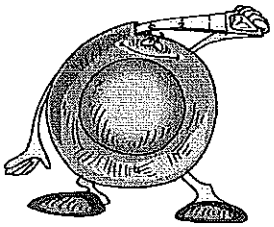
5. The temperature in Moscow, over a 24 hour period, was (4 ± 10)°C.
Write down the lowest and the highest temperatures in Moscow on that particular day.

6. The length of tent poles in a Scout's bag is (... ± 2) cm.
The smallest pole's length was 14 cm.
What was the length of the largest tent pole ?



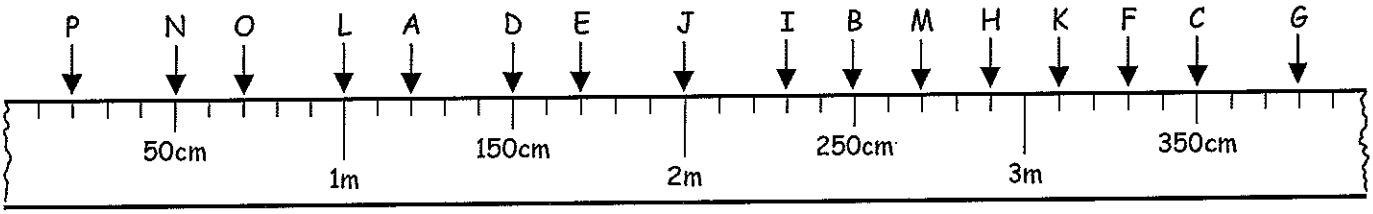
7. A tolerance is given as (.... ± 0·02) cm.
The maximum value allowed is 5·01 cm.
State the minimum value given by the tolerance.

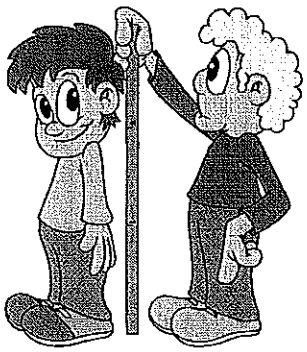
Metres and Centimetres



This is part of a tape measure (not the correct size)

1 metre = 100 centimetre





SECTION A

On the tape measure above:

A: 120cm = 1m 20cm

B: 250cm =

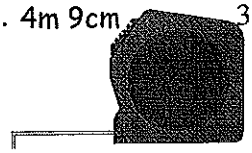
C:

Copy and complete the list above for the labels marked A – P.

SECTION B

Change the following measurements into centimetres:

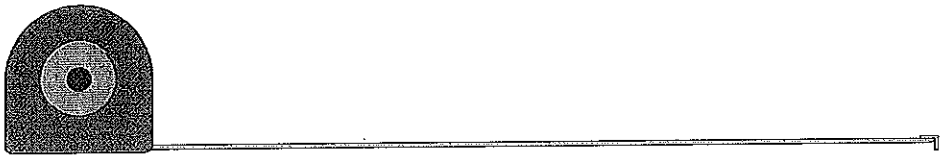
1. 1m 32cm	2. 1m 58cm	3. 1m 73cm	4. 1m 84cm	5. 1m 99cm
6. 2m 51cm	7. 2m 65cm	8. 3m 26cm	9. 3m 17cm	10. 4m 42cm
11. 4m 38cm	12. 4m 53cm	13. 5m 74cm	14. 5m 89cm	15. 5m 91cm
16. 1m 40cm	17. 1m 4cm	18. 1m 20cm	19. 1m 2cm	20. 1m 70cm
21. 1m 7cm	22. 2m 50cm	23. 2m 5cm	24. 2m 80cm	25. 2m 8cm
26. 3m 4cm	27. 4cm 1cm	28. 5m 6cm	29. 4m 9cm	30. 3m 2cm



SECTION C

Change the following measurements into metres and centimetres:

1. 141cm	2. 154cm	3. 215cm	4. 276cm	5. 331cm
6. 243cm	7. 267cm	8. 284cm	9. 295cm	10. 399cm
11. 327cm	12. 342cm	13. 463cm	14. 478cm	15. 482cm
16. 150cm	17. 130cm	18. 120cm	19. 260cm	20. 290cm
21. 340cm	22. 380cm	23. 390cm	24. 400cm	25. 200cm
26. 105cm	27. 206cm	28. 301cm	29. 409cm	30. 502cm



SECTION D

How many more centimetres are needed to make the following into 1 metre:

1. 90 cm	2. 70 cm	3. 50 cm	4. 80 cm	5. 60 cm
6. 10 cm	7. 20 cm	8. 30 cm	9. 40 cm	10. 95 cm
11. 75 cm	12. 85 cm	13. 65 cm	14. 25 cm	15. 15 cm
16. 82 cm	17. 74 cm	18. 63 cm	19. 51 cm	20. 48 cm
21. 86 cm	22. 67 cm	23. 59 cm	24. 72 cm	25. 56 cm
26. 23 cm	27. 15 cm	28. 38 cm	29. 24 cm	30. 12 cm?

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Kilometres and Metres

1 kilometre = 1000 metres

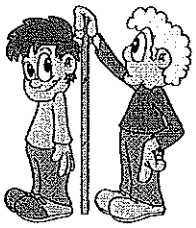
SECTION A

Change the following measurements into metres:

1. 2 km	2. 4 km	3. 3 km	4. 5 km	5. 7 km
6. 6 km	7. 9 km	8. 8 km	9. 10 km	10. 12 km
11. $1\frac{1}{2}$ km	12. $3\frac{1}{2}$ km	13. $2\frac{1}{2}$ km	14. $4\frac{1}{2}$ km	15. $\frac{1}{2}$ km
16. $\frac{1}{4}$ km	17. $1\frac{1}{4}$ km	18. $3\frac{1}{4}$ km	19. $\frac{3}{4}$ km	20. $1\frac{3}{4}$ km
21. 1.5 km	22. 2.5 km	23. 4.5 km	24. 3.5 km	25. 0.5 km
26. 1.3 km	27. 1.7 km	28. 1.2 km	29. 1.8 km	30. 1.9 km

Change the following measurements into kilometres:

31. 1000 m	32. 3000 m	33. 2000 m	34. 4000 m	35. 6000 m
36. 5000 m	37. 8000 m	38. 7000 m	39. 9000 m	40. 11000m
41. 500 m	42. 5500 m	43. 3500 m	44. 2500 m	45. 4500 m
46. 250 m	47. 1250 m	48. 4250 m	49. 750 m	50. 1750 m
51. 1500 m	52. 1300 m	53. 1200 m	54. 1100 m	55. 1400 m
56. 2600 m	57. 2700 m	58. 200 m	59. 400 m	60. 900 m



SECTION B

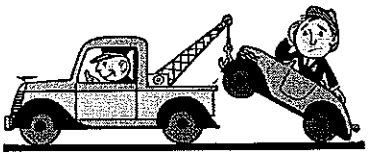
You have a ruler, tape measure and trundle wheel.
Which one would you use to measure each of the following:

1. The length of a pencil	2. The length of a road	3. The length of a room
4. The length of a table	5. The height of a chair	6. The thickness of a note book
7. The width of a blackboard	8. The length of a nail	9. The length of a river
10. The length of a piece of chalk	11. The height of a cupboard	12. The height of a ceiling
13. The height of a door	14. The height of a CD case	15. The width of a bridge?

SECTION C

Use Section B questions 1-15 to decide which unit of length you would use to measure each of them:

centimetre (cm), metre (m), kilometre (km)



SECTION D

How many more metres are needed to make the following into 1 kilometre:

1. 900 m	2. 700 m	3. 500 m	4. 800 m	5. 600 m
6. 100 m	7. 200 m	8. 300 m	9. 400 m	10. 950 m
11. 750 m	12. 650 m	13. 550 m	14. 150 m	15. 250 m
16. 820 m	17. 740 m	18. 630 m	19. 510 m	20. 480 m
21. 860 m	22. 670 m	23. 590 m	24. 720 m	25. 560 m
26. 230 m	27. 150 m	28. 380 m	29. 240 m	30. 120 m?

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1 litre = 1000 millilitres

SECTION B

Change the following measurements into millilitres:

1. 2 litres	2. 4 litres	3. 3 litres	4. 5 litres	5. 7 litres
6. 6 litres	7. 1 litre	8. 8 litres	9. 9 litres	10. 10 litres
11. $\frac{1}{2}$ litre	12. 2 $\frac{1}{2}$ litres	13. 1 $\frac{1}{2}$ litres	14. 4 $\frac{1}{2}$ litres	15. 3 $\frac{1}{2}$ litres
16. $\frac{1}{4}$ litre	17. 2 $\frac{1}{4}$ litres	18. 1 $\frac{1}{4}$ litres	19. $\frac{3}{4}$ litre	20. 1 $\frac{3}{4}$ litres
21. 1.5 litres	22. 3.5 litres	23. 4.5 litres	24. 2.5 litres	25. 0.5 litres
26. 1.3 litres	27. 1.7 litres	28. 1.2 litres	29. 1.8 litres	30. 1.6 litres

Change the following measurements into litres:

31. 1000 ml	32. 3000 ml	33. 4000 ml	34. 6000 ml	35. 8000 ml
36. 5000 ml	37. 9000 ml	38. 2000 ml	39. 10000 ml	40. 7000 ml
41. 500 ml	42. 1500 ml	43. 3500 ml	44. 2500 ml	45. 4500 ml
46. 250 ml	47. 1250 ml	48. 4250 ml	49. 750 ml	50. 2750 ml
51. 1600 ml	52. 1300 ml	53. 1200 ml	54. 1700 ml	55. 1900 ml
56. 2400 ml	57. 2800 ml	58. 300 ml	59. 700 ml	60. 800 ml

SECTION C

How many more millilitres are needed to make the following into 1 litre:

1. 900 ml	2. 700 ml	3. 500 ml	4. 800 ml	5. 600 ml
6. 200 ml	7. 100 ml	8. 300 ml	9. 400 ml	10. 950 ml
11. 50 ml	12. 750 ml	13. 650 ml	14. 850 ml	15. 350 ml
16. 250 ml	17. 150 ml	18. 975 ml	19. 875 ml	20. 925 ml
21. 625 ml	22. 525 ml	23. 775 ml	24. 325 ml	25. 125 ml
26. 978 ml	27. 863 ml	28. 754 ml	29. 689 ml	30. 596 ml?

SECTION D

Ask your teacher for the "Capacity Worksheet".

Shade the jugs to represent the quantities of water given below:

1. 900 ml	2. 500 ml	3. 300 ml	4. 1000 ml	5. 400 ml
6. 600 ml	7. $\frac{1}{2}$ litre	8. 100 ml	9. 250 ml	10. 150 ml
11. 450 ml	12. 500 ml	13. 200 ml	14. 400 ml	15. 50 ml
16. $\frac{1}{4}$ litre	17. 1000 ml	18. 700 ml	19. 1300 ml	20. 1900 ml
21. $\frac{1}{2}$ litre	22. 1.5 litres	23. 2000 ml	24. 100 ml	

SECTION E

1. Find at least 10 containers at school or home that have measurements or quantities written on them in millilitres or litres.
2. Draw a table into your book (like the one below) to list the items you have found and the quantity they have written on them.

Item	Quantity
Bottle of Shampoo	400ml

3. Write the list of items again putting them into order of size, smallest first.

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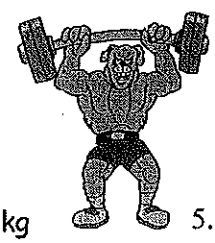
1 kilogram = 1000 grams



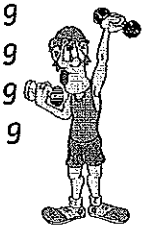
SECTION B

Change the following measurements into grams:

1. 3 kg	2. 5 kg	3. 4 kg	4. 6 kg	5. 8 kg
6. 7 kg	7. 2 kg	8. 9 kg	9. 10 kg	10. 12 kg
11. $\frac{1}{2}$ kg	12. 1 $\frac{1}{2}$ kg	13. 2 $\frac{1}{2}$ kg	14. 4 $\frac{1}{2}$ kg	15. 3 $\frac{1}{2}$ kg
16. $\frac{1}{4}$ kg	17. 1 $\frac{1}{4}$ kg	18. 3 $\frac{1}{4}$ kg	19. $\frac{3}{4}$ kg	20. 1 $\frac{3}{4}$ kg
21. 1.5 kg	22. 2.5 kg	23. 4.5 kg	24. 3.5 kg	25. 0.5 kg
26. 1.4 kg	27. 1.8 kg	28. 1.3 kg	29. 1.9 kg	30. 1.7 kg

Change the following measurements into kilograms:

31. 1000 g	32. 2000 g	33. 3000 g	34. 5000 g	35. 7000 g
36. 4000 g	37. 9000 g	38. 8000 g	39. 10000g	40. 6000 g
41. 500 g	42. 1500 g	43. 3500 g	44. 2500 g	45. 4500 g
46. 250 g	47. 1250 g	48. 4250 g	49. 750 g	50. 2750 g
51. 1200 g	52. 1400 g	53. 1300 g	54. 1600 g	55. 1800 g
56. 2300 g	57. 2900 g	58. 200 g	59. 400 g	60. 900 g



SECTION C

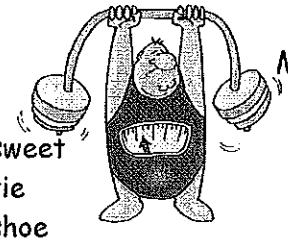
How many more grams are needed to make the following into 1 kilogram:

1. 900 g	2. 700 g	3. 500 g	4. 800 g	5. 600 g
6. 200 g	7. 100 g	8. 300 g	9. 400 g	10. 950 g
11. 50 g	12. 750 g	13. 650 g	14. 850 g	15. 350 g
16. 250 g	17. 150 g	18. 975 g	19. 875 g	20. 925 g
21. 625 g	22. 525 g	23. 775 g	24. 325 g	25. 125 g
26. 978 g	27. 863 g	28. 754 g	29. 689 g	30. 596 g?

SECTION D

A bag of sugar weighs about 1kg = 1000g

For each of the items below estimate if they are:



More than a kilogram or Less than a kilogram

1. A sweet	2. An elephant	3. A coat
4. A tie	5. A bus	6. A brick
7. A shoe	8. A robin	9. A rack of test tubes
10. A box of cornflakes	11. A bar of chocolate	12. Your school bag

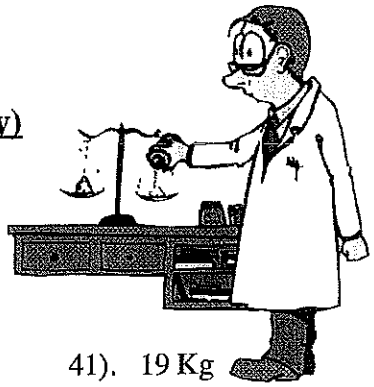
SECTION E

Use the questions from Section D above, but this time state if you would weigh them using **kilograms or grams.**

SECTION F

1. Find at least 10 items with the measurements or quantities written in kilograms or grams.
2. List the items you have found with the weights in order of size, heaviest first.

Metric Units -Weight. (S.I. Units only)



A). Change the following from kilograms (Kg) to grams (g).

1 Kg = 1000 g

1). 3 Kg	11). 1.583 Kg	21). 1.52 Kg	31). 6.7 Kg	41). 19 Kg
2). 5 Kg	12). 3.828 Kg	22). 2.66 Kg	32). 1.9 Kg	42). 4.09 Kg
3). 9 Kg	13). 4.281 Kg	23). 1.72 Kg	33). 2.7 Kg	43). 2.519 Kg
4). 2 Kg	14). 0.513 Kg	24). 0.34 Kg	34). 0.3 Kg	44). 4.9 Kg
5). 10 Kg	15). 6.381 Kg	25). 2.04 Kg	35). 5.0 Kg	45). 1.06 Kg
6). 14 Kg	16). 2.218 Kg	26). 0.96 Kg	36). 7.6 Kg	46). 0.026 Kg
7). 7 Kg	17). 0.185 Kg	27). 7.23 Kg	37). 3.9 Kg	47). 7.1 Kg
8). 20 Kg	18). 1.089 Kg	28). 3.60 Kg	38). 0.8 Kg	48). 8 Kg
9). 21 Kg	19). 0.053 Kg	29). 0.04 Kg	39). 1.9 Kg	49). 5.736 Kg
10). 54 Kg	20). 1.520 Kg	30). 6.70 Kg	40). 5.1 Kg	50). 0.003 Kg

B). Change the following from grams (g) to kilograms (Kg).

1000 g = 1 Kg

1). 5000 g	11). 5724 g	21). 672 g	31). 390 g	41). 8000 g
2). 2000 g	12). 1427 g	22). 159 g	32). 16 g	42). 2927 g
3). 7000 g	13). 8782 g	23). 633 g	33). 38 g	43). 6004 g
4). 1000 g	14). 1971 g	24). 53 g	34). 8 g	44). 720 g
5). 14000 g	15). 9352 g	25). 921 g	35). 12 g	45). 117 g
6). 11000 g	16). 2715 g	26). 712 g	36). 5 g	46). 55 g
7). 23000 g	17). 5298 g	27). 805 g	37). 1 g	47). 2089 g
8). 9000 g	18). 4028 g	28). 42 g	38). 73 g	48). 7 g
9). 28000 g	19). 8803 g	29). 21 g	39). 92 g	49). 8052 g
10). 36000 g	20). 3560 g	30). 109 g	40). 6 g	50). 342 g

C). Change the following from grams (g) to milligrams (mg).

1 g = 1000 mg

1). 6 g	5). 3.682 g	9). 2.45 g	13). 8.1 g	17). 16 g
2). 14 g	6). 1.405 g	10). 3.85 g	14). 0.5 g	18). 4.005 g
3). 22 g	7). 0.156 g	11). 0.53 g	15). 2.3 g	19). 2.3 g
4). 53 g	8). 4.190 g	12). 0.02 g	16). 7.2 g	20). 0.007g

D). Change the following from milligrams (mg) to grams (g).

1000 mg = 1g

1). 4000 mg	5). 3659 mg	9). 722 mg	13). 11 mg	17). 1700 mg
2). 13000 mg	6). 1384 mg	10). 45 mg	14). 9 mg	18). 1295 mg
3). 37000 mg	7). 8210 mg	11). 523 mg	15). 17 mg	19). 3 mg
4). 6000 mg	8). 6019 mg	12). 72 mg	16). 2 mg	20). 420 mg

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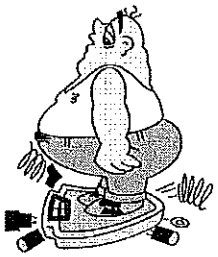

E). Change the following from tonnes (t) to Kilograms (Kg).

1 t = 1000 Kg

1). 3 t	5). 9.524 t	9). 2.82 t	13). 1.3 t	17). 5 t
2). 9 t	6). 1.894 t	10). 3.95 t	14). 0.5 t	18). 1.005 t
3). 18 t	7). 0.810 t	11). 1.03 t	15). 2.3 t	19). 0.9 t
4). 37 t	8). 7.949 t	12). 0.02 t	16). 8.2 t	20). 5.004 t

F). Change the following from Kilograms (Kg) to tonnes (t).

1000 Kg = 1 t

1). 2000 Kg	5). 9205 Kg	9). 272 Kg	13). 31 Kg	17). 305 Kg
2). 43000 Kg	6). 1480 Kg	10). 435 Kg	14). 549 Kg	18). 1295 Kg
3). 17000 Kg	7). 3093 Kg	11). 23 Kg	15). 17 Kg	19). 2973 Kg
4). 7000 Kg	8). 6952 Kg	12). 572 Kg	16). 9 Kg	20). 26 Kg

Metric Units -Capacity. (S.I. Units only)

A). Change the following from litres (*l*) to millilitres (*ml*).

1 *l* = 1000 *ml*

1). 4 *l*	11). 1.343 *l*	21). 2.56 *l*	31). 6.4 *l*	41). 13 *l*
2). 9 *l*	12). 4.878 *l*	22). 3.76 *l*	32). 1.8 *l*	42). 1.07 *l*
3). 2 *l*	13). 5.81 *l*	23). 4.72 *l*	33). 5.1 *l*	43). 2.539 *l*
4). 6 *l*	14). 0.833 *l*	24). 0.38 *l*	34). 0.4 *l*	44). 1.9 *l*
5). 18 *l*	15). 3.381 *l*	25). 1.04 *l*	35). 2.0 *l*	45). 3.02 *l*
6). 24 *l*	16). 2.898 *l*	26). 0.56 *l*	36). 7.5 *l*	46). 0.016 *l*
7). 37 *l*	17). 0.285 *l*	27). 6.23 *l*	37). 2.9 *l*	47). 5.1 *l*
8). 5 *l*	18). 3.019 *l*	28). 5.30 *l*	38). 0.6 *l*	48). 8 *l*
9). 51 *l*	19). 0.043 *l*	29). 0.08 *l*	39). 1.9 *l*	49). 5.932 *l*
10). 98 *l*	20). 2.560 *l*	30). 6.40 *l*	40). 2.1 *l*	50). 0.001 *l*

B). Change the following from millilitres (*ml*) to litres (*l*).

1000 *ml* = 1 *l*

1). 7000 *ml*	11). 4224 *ml*	21). 472 *ml*	31). 290 *ml*	41). 8000 *ml*
2). 4000 *ml*	12). 1027 *ml*	22). 259 *ml*	32). 26 *ml*	42). 2717 *ml*
3). 6000 *ml*	13). 6482 *ml*	23). 733 *ml*	33). 68 *ml*	43). 5004 *ml*
4). 12000 *ml*	14). 1954 *ml*	24). 24 *ml*	34). 4 *ml*	44). 220 *ml*
5). 34000 *ml*	15). 8752 *ml*	25). 525 *ml*	35). 15 *ml*	45). 107 *ml*
6). 11000 *ml*	16). 2305 *ml*	26). 212 *ml*	36). 5 *ml*	46). 35 *ml*
7). 3000 *ml*	17). 7098 *ml*	27). 705 *ml*	37). 1 *ml*	47). 2079 *ml*
8). 9000 *ml*	18). 4028 *ml*	28). 34 *ml*	38). 33 *ml*	48). 7 *ml*
9). 48000 *ml*	19). 2803 *ml*	29). 61 *ml*	39). 98 *ml*	49). 8092 *ml*
10). 86000 *ml*	20). 9560 *ml*	30). 103 *ml*	40). 6 *ml*	50). 942 *ml*

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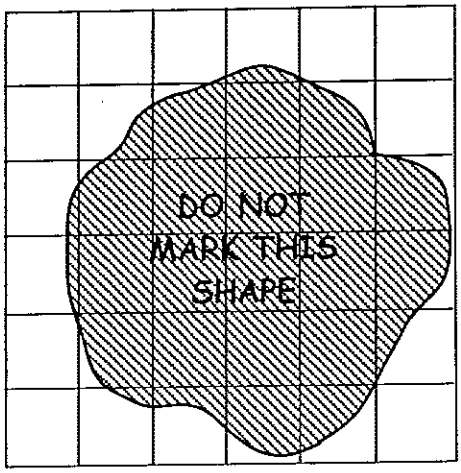
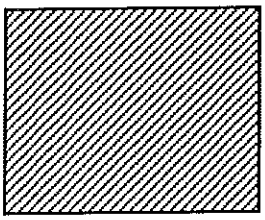
4. Estimate the area of this shape as carefully as you can in cm^2.



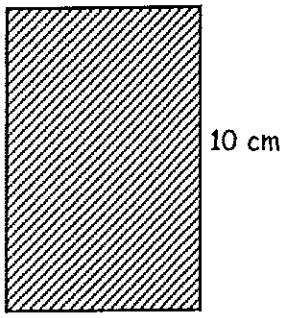
Exercise 2

1. Calculate the area of each of the following rectangles.
(in each case, make a small "sketch" of the rectangle, write down the rule "$A = l \times b$" and calculate the area in cm^2).

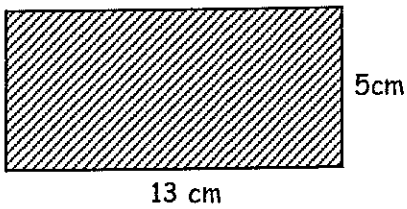
(a)



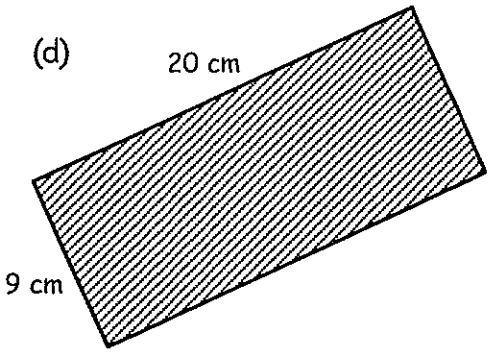
(b)



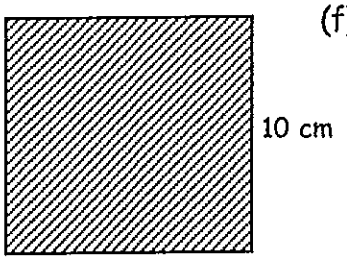
(c)



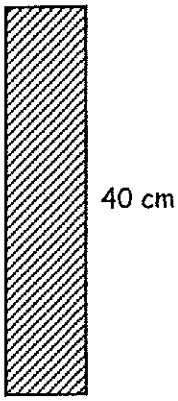
(d)



(e)

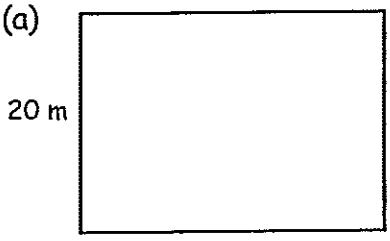


(f)

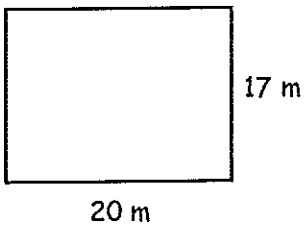


2. Calculate the area of carpet needed for each of these ballrooms :-

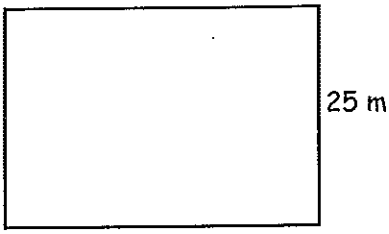
(a)



(b)

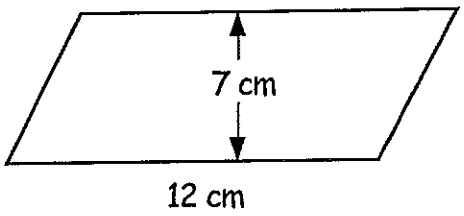


(c)



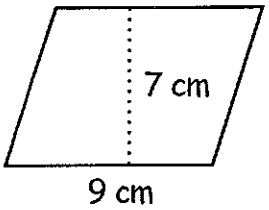
Exercise 2E (a)

1. Make a neat sketch of this parallelogram.
   Use the formula, $A = b \times h$,
   to calculate its area. (in cm^2)

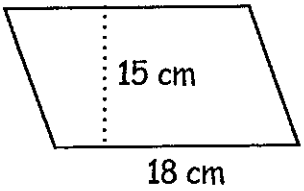


2. Make a small neat sketch of each parallelogram here and calculate each area :-
   (Does NOT have to be full size)

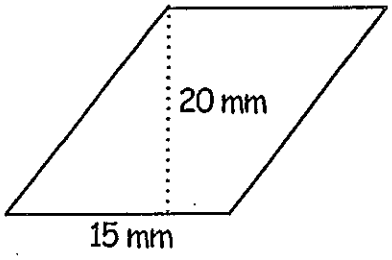
(a)



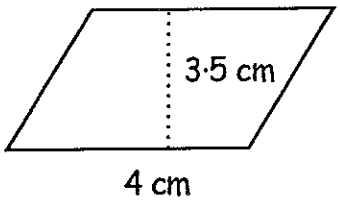
(b)



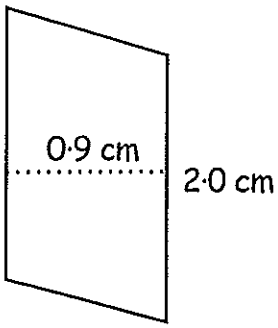
(c)



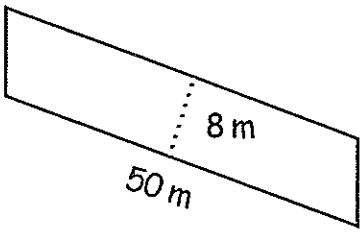
(d)



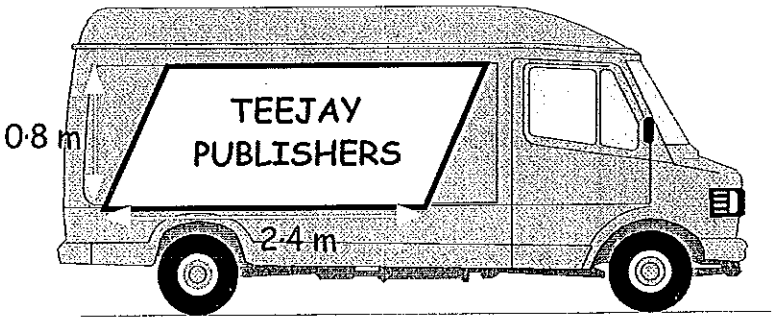
(e)



(f)

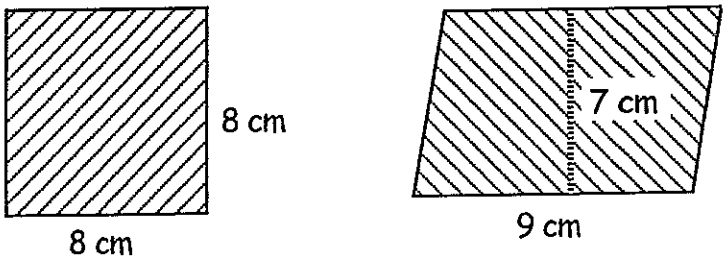


3. The sign on the side of this van is in the shape of a parallelogram.
   Calculate the area of the sign.



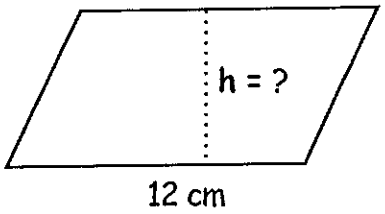
4. (a) Which has the bigger area, the square or the parallelogram ?

   (b) By how much ?



5. The AREA of this parallelogram is 84 cm^2.

   Calculate what its height must be.



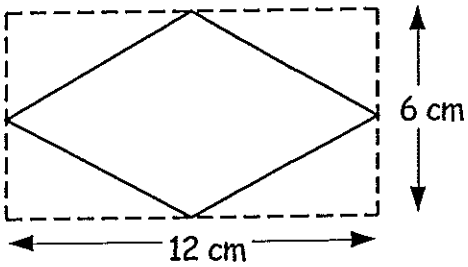
Exercise 2E (b)

1. (a) Make a small neat sketch of this rhombus.

   (b) Draw in the (dotted) surrounding rectangle.

   (c) Calculate the area of the rectangle.

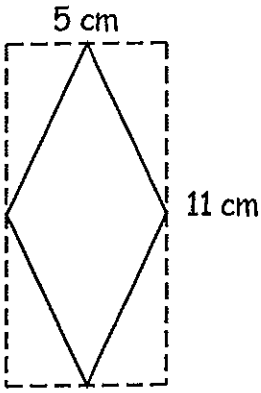
   (d) Now calculate the area of the rhombus.



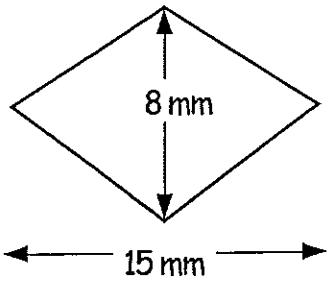
2. Make a neat sketch of each rhombus here, showing the surrounding rectangle.

   Calculate the area of the rectangle, <u>then</u> the area of the rhombus :-

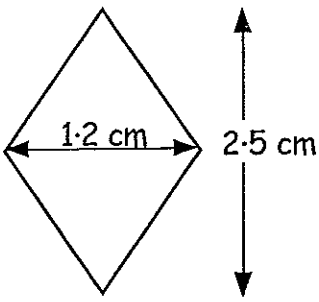
(a)



(b)



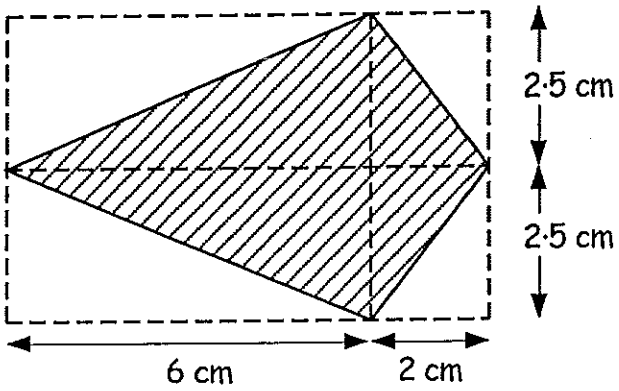
(c)



3. (a) Make an accurate drawing of this kite using a ruler.

   (b) Calculate the area of the surrounding rectangle.

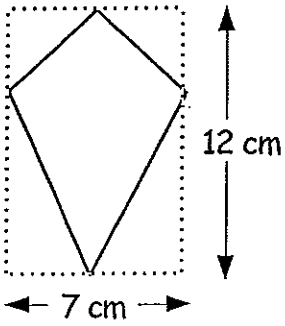
   (c) Now calculate the area of the kite.



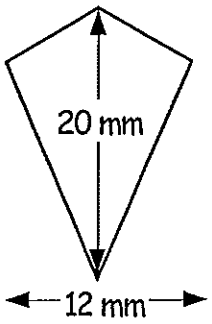
4. Make a neat sketch of each kite here, showing the surrounding rectangle.

   Calculate the area of the rectangle, <u>then</u> the area of the kite :-

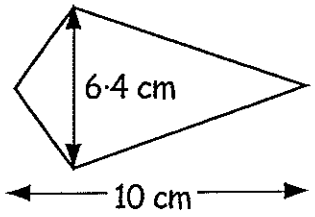
(a)



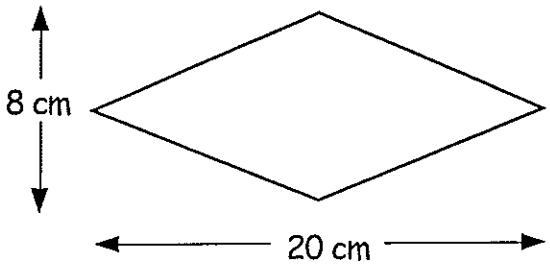
(b)

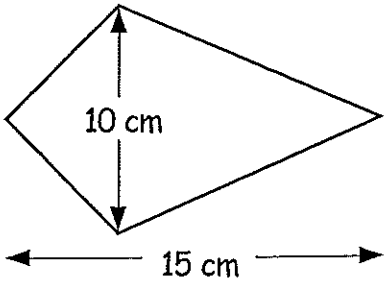


(c)



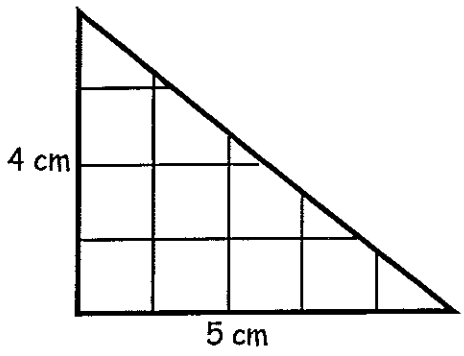
5. By how much is the area of the rhombus bigger than that of the kite ?



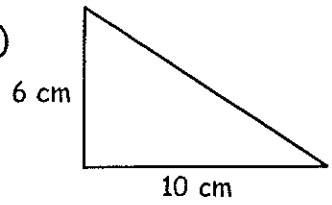


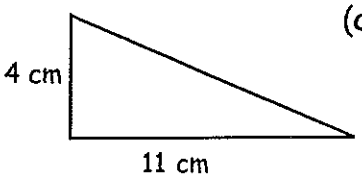
Exercise 3

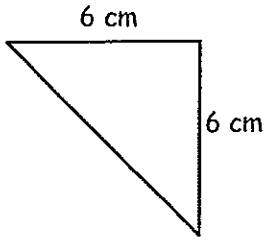
1. (a) Make an accurate drawing of this right angled triangle.
   (b) Complete the figure by drawing the surrounding rectangle.
   (c) Calculate the area of the rectangle.
   (d) Now write down the area of the triangle.



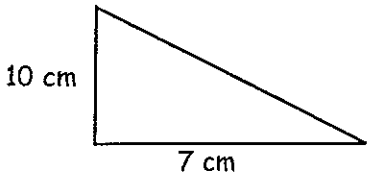
2. For the following right angled triangles :-
   (i) make a small neat sketch (ii) draw the surrounding rectangle
   (iii) find the area of the rectangle (iv) calculate the area of the triangle

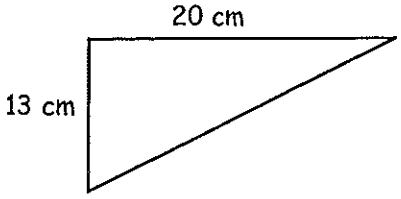
(a)


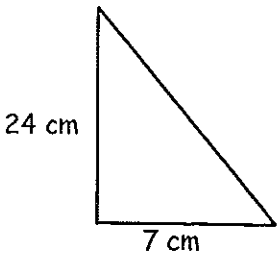
(b)


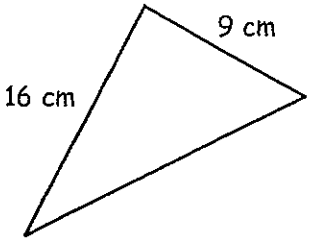
(c)


3. Sketch each right angled triangle (roughly, but using a ruler).
   Use the formula, $A = \frac{1}{2}(l \times b)$ to calculate the area each time.

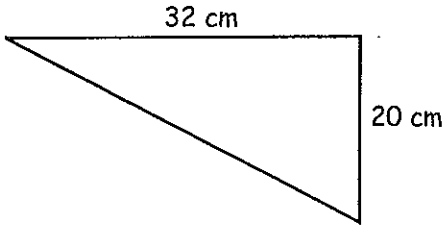
(a)


(b)


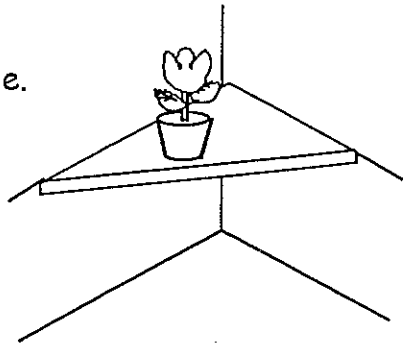
(c)


(d)


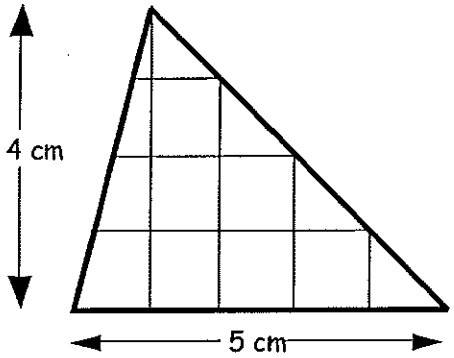
4. This corner shelf is in the shape of a right angled triangle.



Calculate the area of the triangle.



Exercise 4

1. 

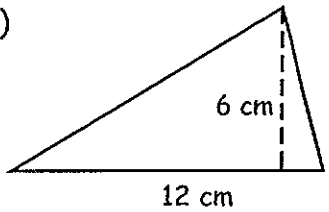
(a) Make an accurate drawing of this triangle.

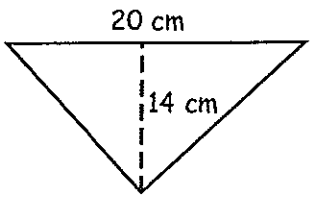
(b) Draw the **surrounding** rectangle.

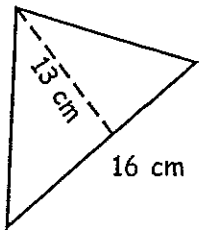
(c) Calculate the area of the rectangle.

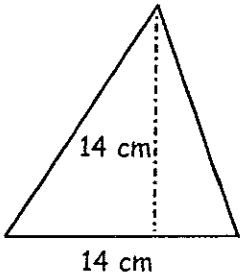
(d) Now write down the area of the triangle.

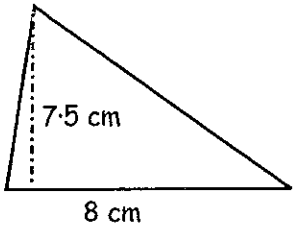
2. Use the formula Area = $\frac{1}{2}$ (l x b) each time to calculate the areas of the following triangles (make a neat sketch of each triangle) :-

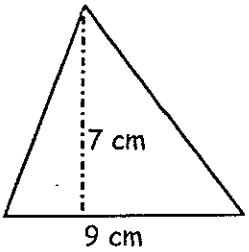
(a) 

(b) 

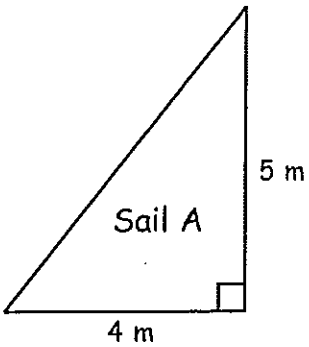
(c) 

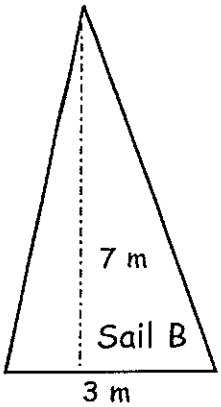
(d) 

(e) 

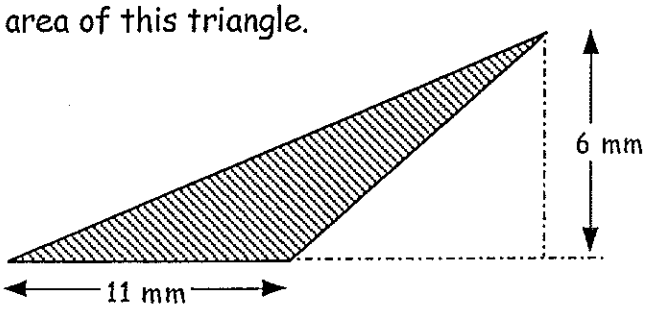
(f) 

3. Which of the two sails from the yacht has the bigger area and by how much is it bigger than the other one ?



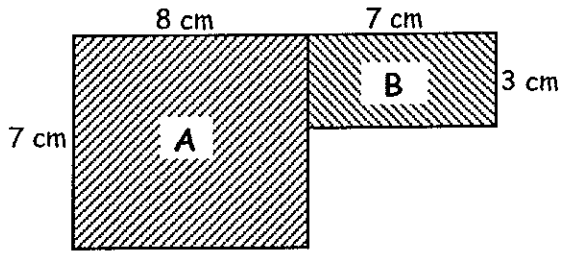


4. Calculate the shaded area of this triangle.



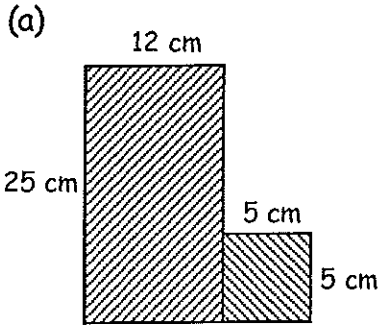
Exercise 5

1. (a) Calculate the area of the big rectangle (A).
   (b) Calculate the area of the small rectangle (B).
   (c) Calculate the **total** area of the shape.

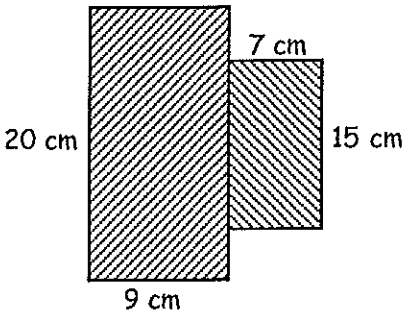


2. For each of these :-
   (i) Make a neat sketch.
   (ii) Calculate the area of each part (show working).
   (iii) Calculate the area of the whole shape.

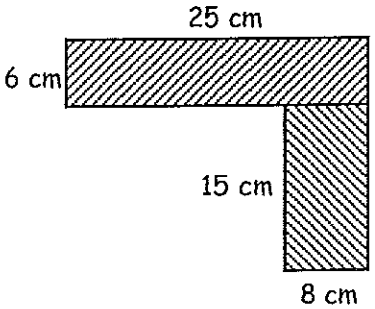
(a)



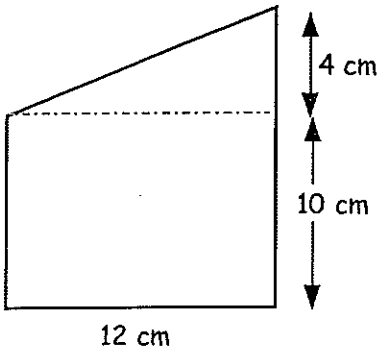
(b)



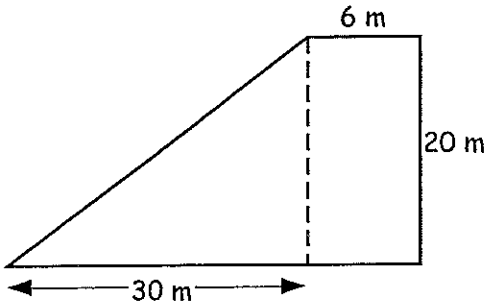
(c)



(d)



(e)



Chapter 10
Area of a Circle

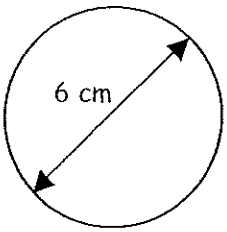
Exercise 1

1. Copy and complete:-

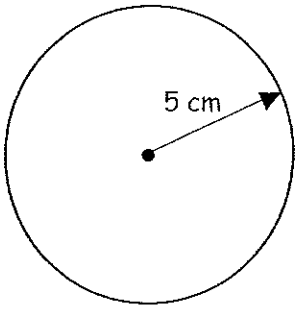
   The formula for the circumference of a circle is:- C = ...

2. Calculate the circumference of these circles :-

   (a)

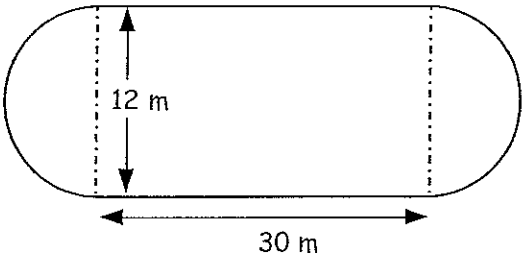


   (b)

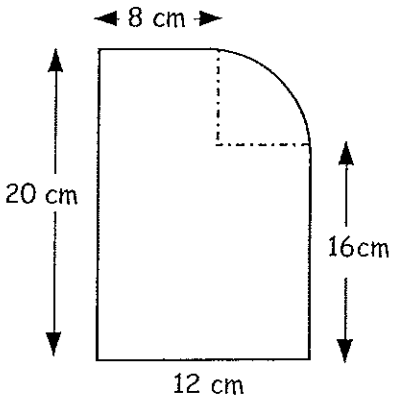


3. Calculate the perimeter of the following shapes :-

   (a)



   (b)



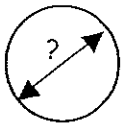
Exercise 2

1. The formula for calculating the circumference of a circle, knowing its diameter, is $C = \pi D$.

   Write down the reverse formula used to calculate the diameter, knowing the circumference.

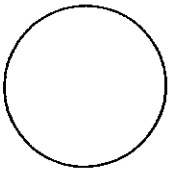
2. Find the diameter of these circles (to one decimal place).

   (a)



   C = 200 cm

   (b)



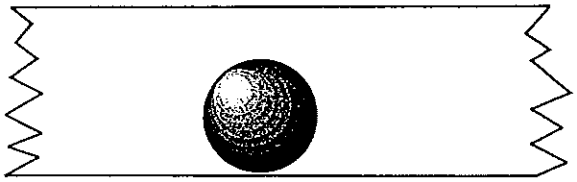
   circumference = 47 m

3. Use your formula to calculate the diameter (D) of the circles with circumference :-

   (a) 628 cm (b) 34·54 cm

4. This circular mouse-hole has a circumference of 25 centimetres.

   Calculate the size of its **radius**.



Exercise 3

1. Copy and complete :-

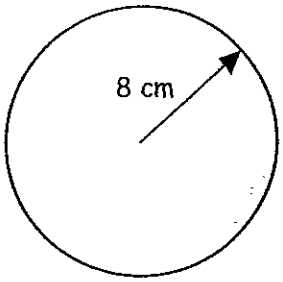
   The formula for the area of a circle is $A = \pi....^2$

2. Calculate the area of this circle with a 2 centimetre radius.

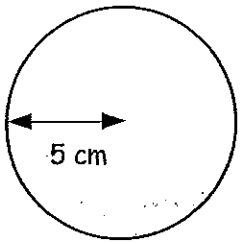
3. Calculate the area of each of the following circles.

   (Remember to set down the 3 lines of working.)

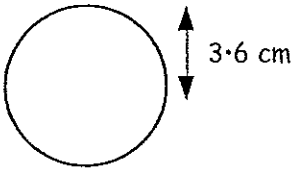
(a)



(b)



(c)

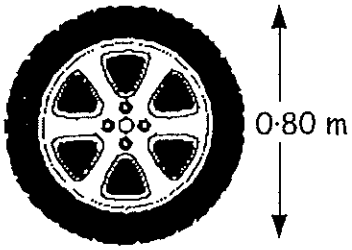


4.

Calculate the area of the sign given that its radius is 25 centimetres.

5. A wheel with **diameter** 0·80 metres is to be used as a shop sign.

   Calculate the area of the sign.

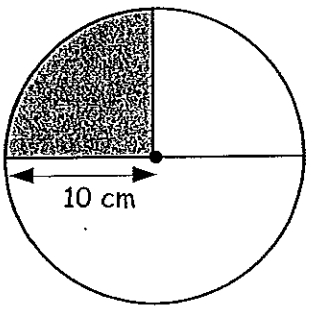


CARLAW CARS

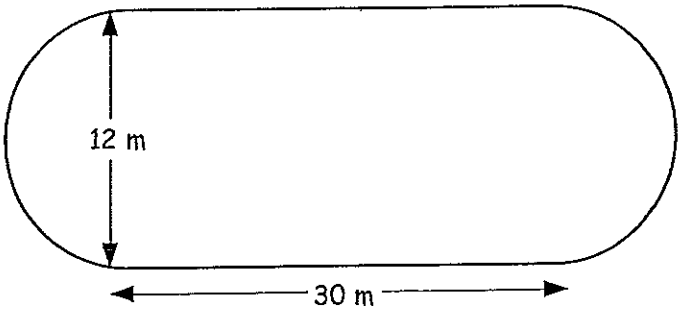
Exercise 4

1. (a) Calculate the area of the whole circle shown.

   (b) Calculate the shaded area. (quarter of the circle).



2. Calculate the area of this racetrack.



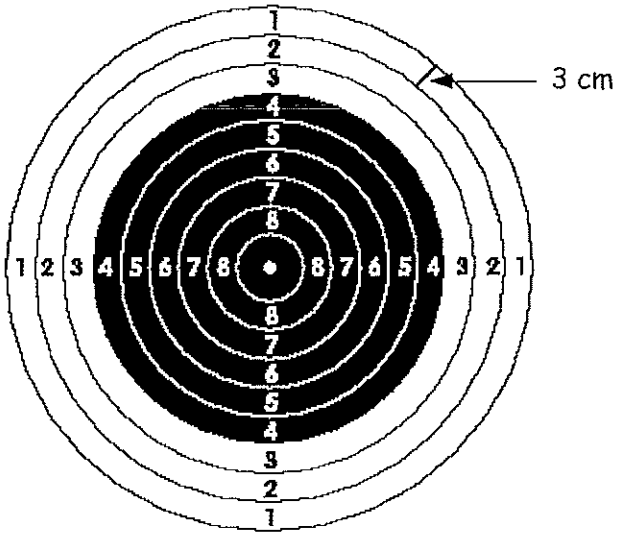
3. At a rifle range, a special target is used where there are nine sections.

   The width of each small ring is 3 centimetres.

   (a) Calculate the area of the whole target.

   (b) Calculate the area of the black part of the target.

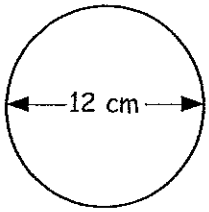
   (c) Find the area of the white part of the target.



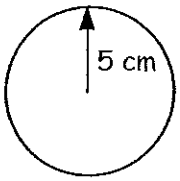
Exercise 5 Revision exercise

1. Calculate the circumference of the following circles :-

   (a)



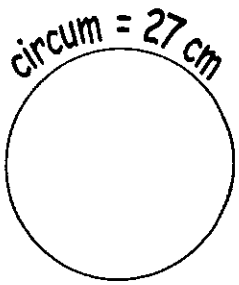
   (b)



2. A circle has a circumference of 27 centimetres. Find :-

   (a) its diameter

   (b) its radius.



3. Calculate the area of a circle with :-

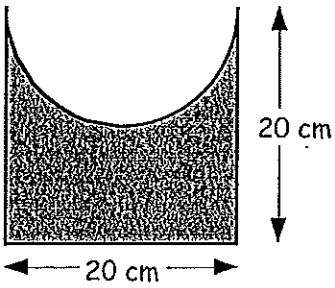
   (a) radius 4 cm (b) diameter 6 cm.

4. This small garden fence consists of 6 identical pieces of wrought iron.

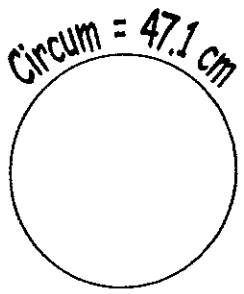
   Find the total length of the wrought iron required to make it.

5. A semi-circle is cut from a square metal plate.

   Calculate the shaded area.

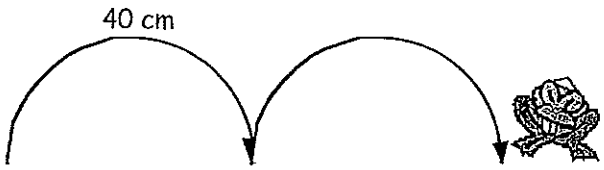


Exercise 6E



1. Find the radius of a circle with circumference 47·1 cm long.

2. A robot frog jumps in semi-circular arcs. Each arc is 40 cm long.

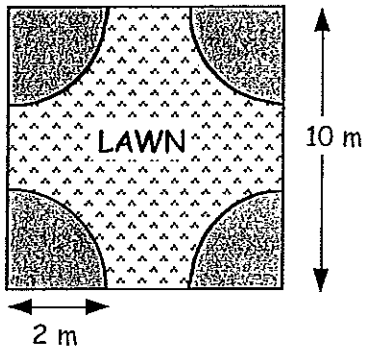


(a) Find the diameter of each semi-circular jump,

(b) How many jumps would the frog have to make to cover a length of at least 2 metres ?

3. A square lawn of side 10 metres had 4 quarter circles of radius 2 metres cut from each of its corners to be used for planting.

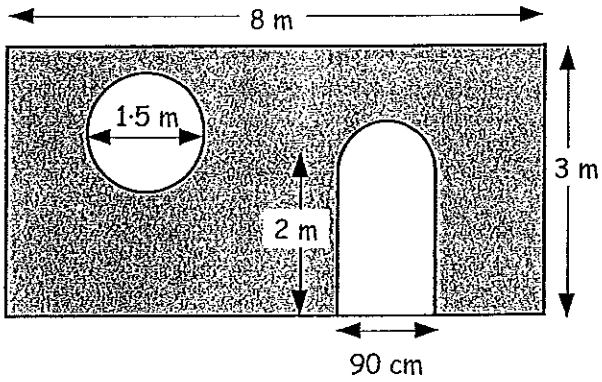
Find the area of the lawn remaining.



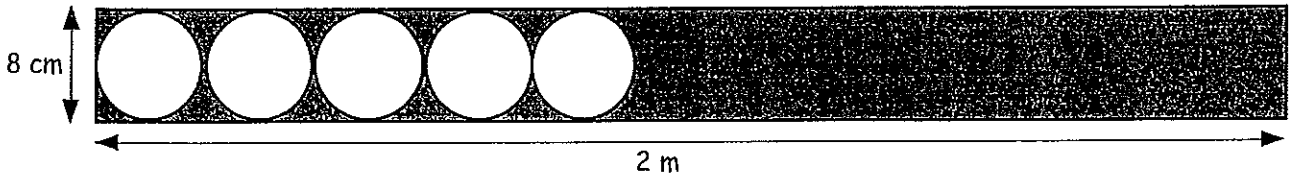
4. Paul is required to paint a rectangular wall 8 metres long and 3 metres high. The wall has a circular window (with a 1·5 m diameter) and a doorway with a semi-circular top.

(a) Calculate the shaded area.

(b) If a 1 litre tin of paint covers an area of 3·6 m^2, how many tins of paint does Paul need ?



5. Circular aluminium yogurt tops are stamped out of a long strip of aluminium foil.



The diameter of each circle is 8 cm and the strip is 2 metres long.

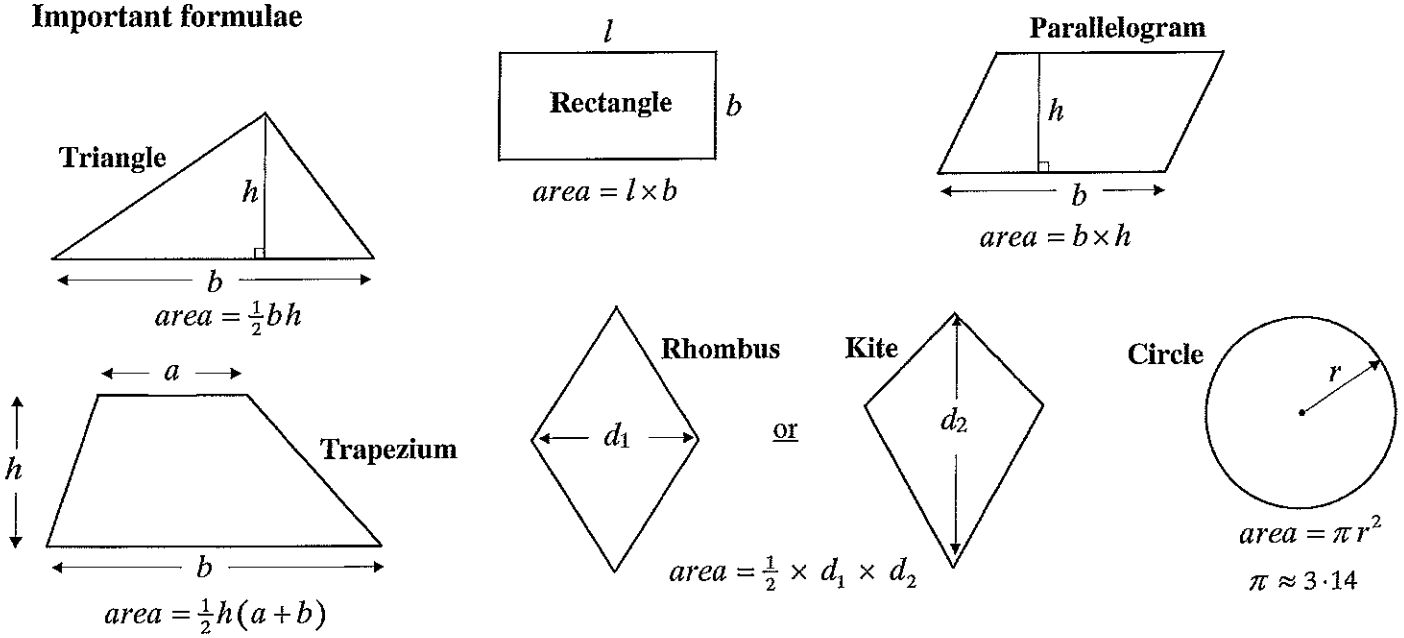
(a) How many 8 cm circles can be cut from the 2 metre strip ?

(b) Calculate the area of one circular top.

(c) Calculate the (shaded) area representing the waste material.

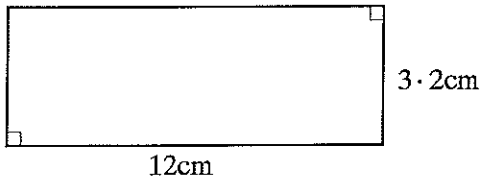
Area (1)

Important formulae

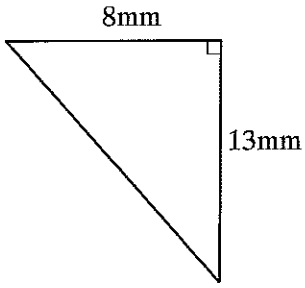


Calculate the area of each shape below:

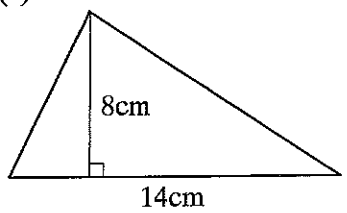
(a)



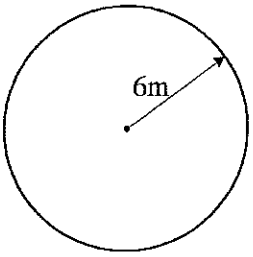
(b)



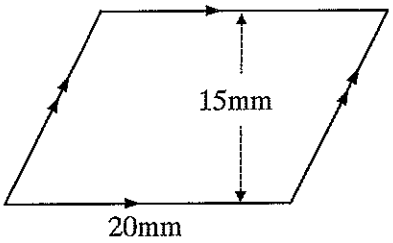
(c)



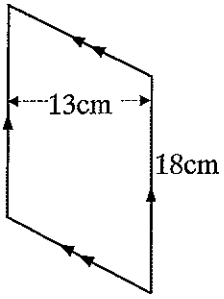
(d)



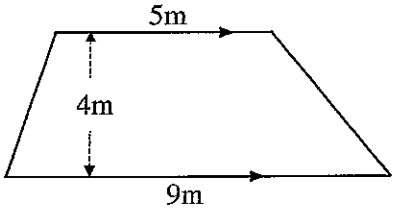
(e)



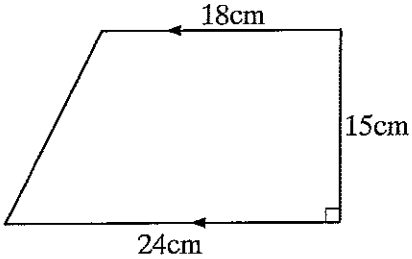
(f)



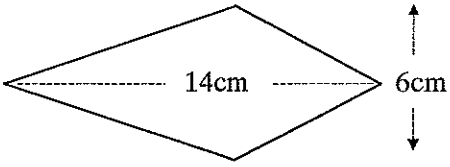
(g)



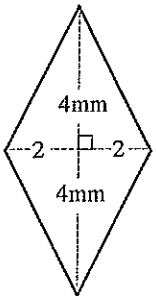
(h)



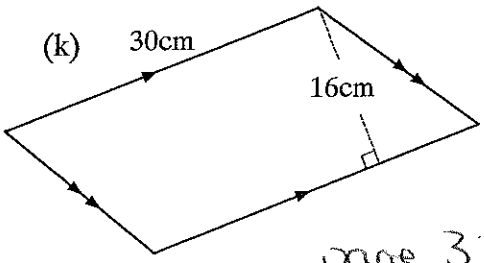
(i)



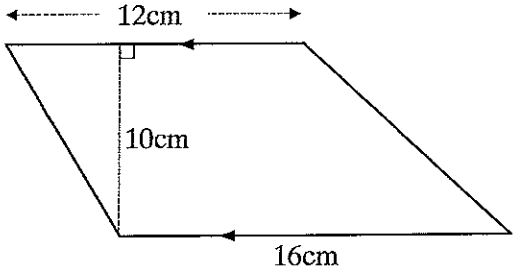
(j)



(k)



(l)



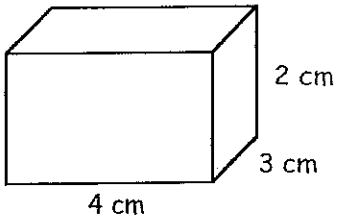
Chapter 7
Surface Area

Remember : To calculate the **surface area**, you find the area of each face and add them together.

Exercise 1

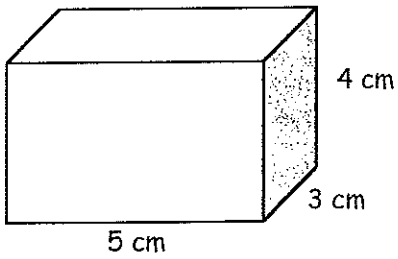
1. Copy and complete to find the total **surface area** of this cuboid.

Area of front	= $l \times b$	= 4 cm x 2 cm	= 8 cm^2
Area of back		= same	= 8 cm^2
Area of top	= $l \times b$	= 4 cm x 3 cm	= 12 cm^2
Area of bottom		= same	= .... cm^2
Area right side	= $l \times b$	= ... cm x ... cm	= .... cm^2
Area left side		= same	= .... cm^2
		Total Surface Area	= ....cm^2

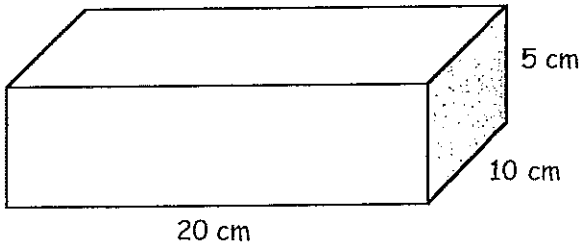


2. Find the total surface area of these cuboids. (*Show your working*).

(a)

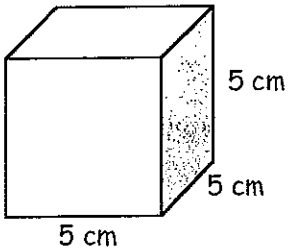


(b)

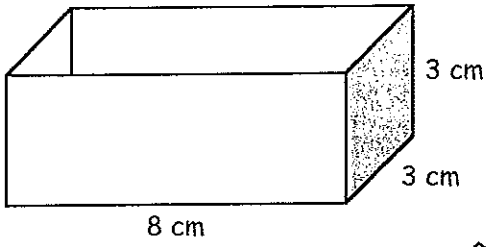


3. A cube has side 5 centimetres.

Find the total surface area of the cube.

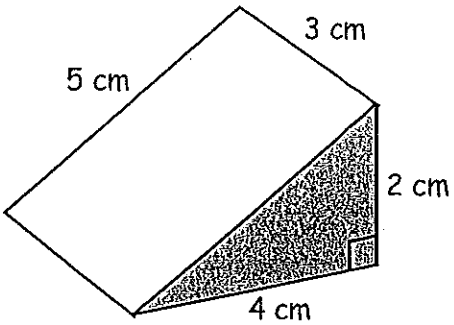


4. This carton has no lid.
Find the surface area of the outside of the carton.



5. Calculate the total surface area of this triangular prism.

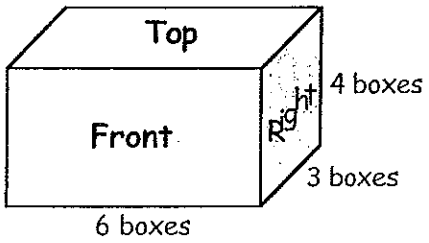
(*Show all working clearly*).

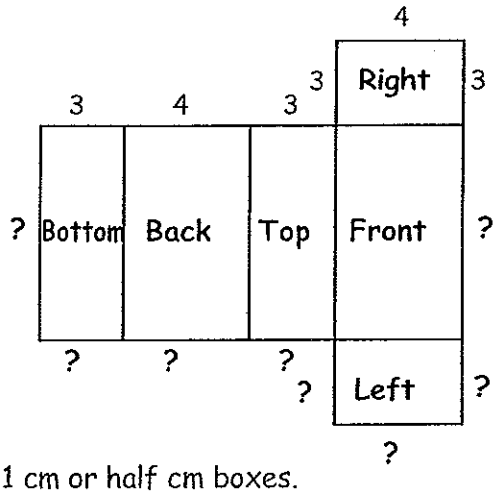


Exercise 2

1. Shown is a net of a cuboid.

   Copy the net and complete the unknown lengths.

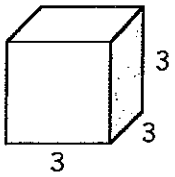




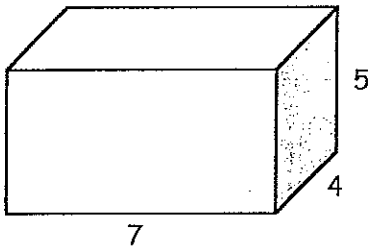
2. For each of the following : (i) draw a net using 1 cm or half cm boxes.

   (ii) calculate the surface area using the net to help you.

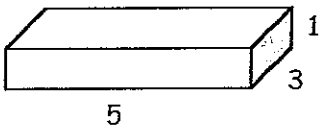
(a)



(b)



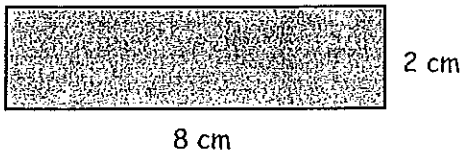
(c)



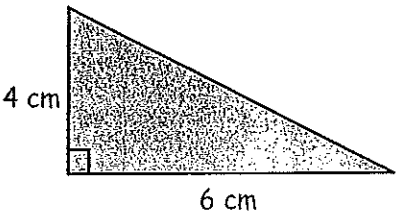
Exercise 3 Revision exercise

1. Calculate the area of each shape : -

(a)

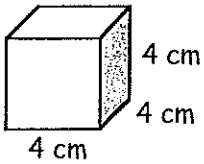


(b)

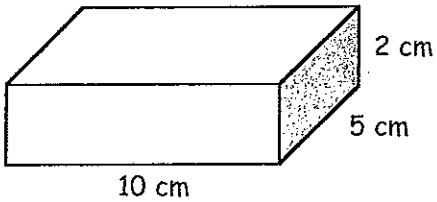


2. Calculate the surface area of each box :-

(a)



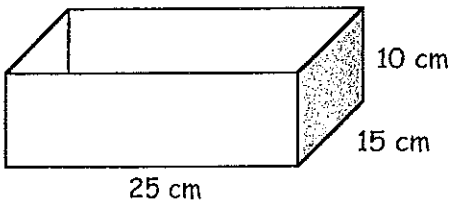
(b)



3. Draw a net of each of the boxes shown above. *(Use 1 box to represent 1 cm)*

4. A cardboard box which has no lid has dimensions 25 cm by 15 cm by 10 cm.

   Find the area of card needed to make this box.



Exercise 2

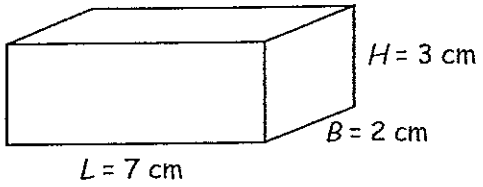
Remember : Volume = $L \times B \times H$

1. Copy and complete for this cuboid :-

$V = L \times B \times H$

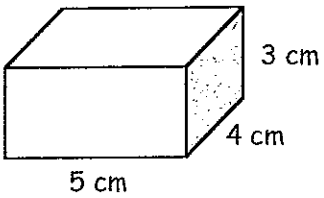
$V = 7 \times 2 \times 3$

$V = \ldots\ldots\ldots\ \text{cm}^3$

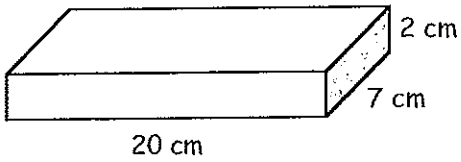


2. Calculate the volumes of each of the cuboids (show all your working) :-

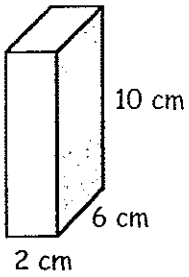
(a)



(b)

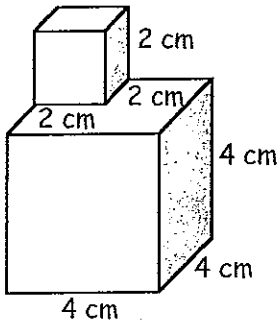


(c)

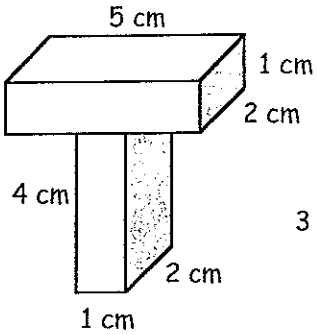


3. Find the total volume of each shape ;-

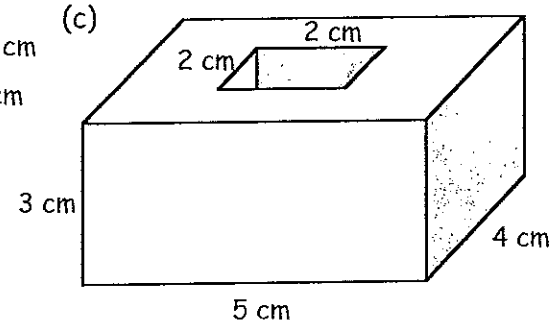
(a)



(b)

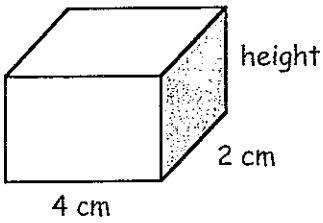


(c)

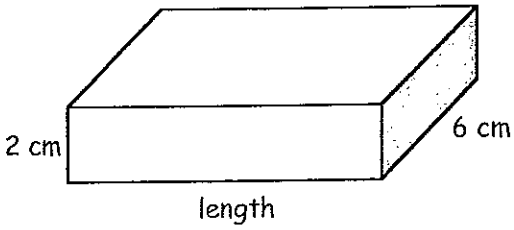


4. Calculate the missing edge in each of the cuboids :-

(a) Volume is 24 cm^3



(b) Volume is 96 cm^3



Exercise 3

Remember :

$1\ \text{cm}^3 = 1\ \text{ml}$

$1000\ \text{cm}^3 = 1000\ \text{ml} = 1\ \text{litre}$

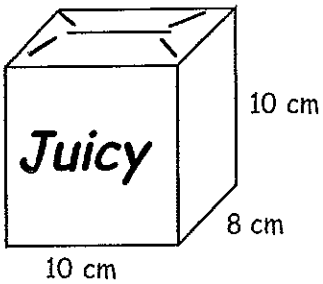
1. A carton of Juicy measures

10 cm by 8 cm by 10 cm

(a) Calculate its volume in cm^3. (Show your working).

(b) Write the volume in millilitres.

(c) How many litres is this ?



2. Change each of the following to litres :-

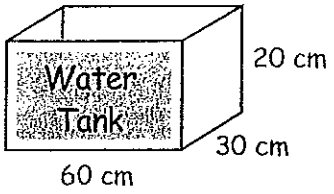
(a) 4000 ml (b) 8000 ml (c) 20 000 ml (d) 500 ml (e) 150 ml

3. Change each of the following to millilitres :-

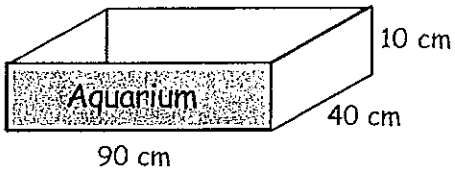
(a) 4 litres (b) 80 litres (c) 200 litres (d) 0·4 litres (e) 1·8 litres

4. Calculate the volume of each container in **litres**.
(Hint : first find the volume in cm^3, then change to millilitres, then change to litres).

(a)

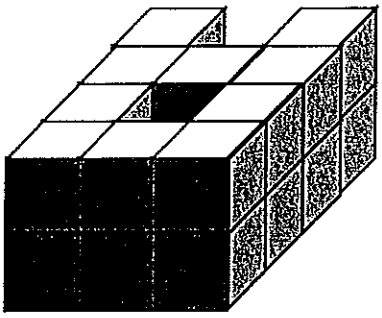


(b)



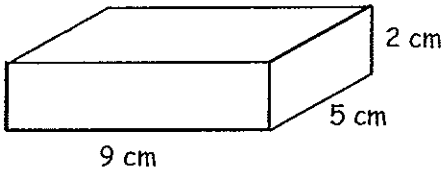
Exercise 4 Revision exercise

1. Write the volume of this shape in cubic centimetres.

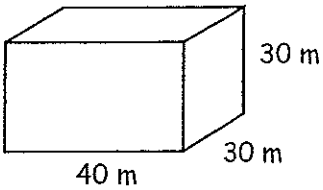


2. Use the formula to calculate the volume of these cuboids :-

(a)



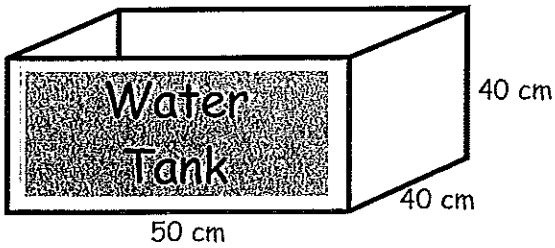
(b)



3. A cuboid has length 5 cm and breadth 4 cm. Its volume is 40 cm^3. Find its height.

4. Change to litres :- (a) 5000 ml (b) 8500 ml (c) 250 ml (d) 20 ml

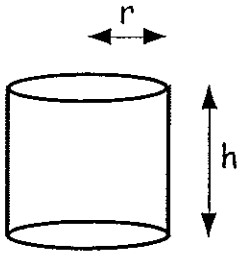
5. Calculate the volume of the tank in **litres**.



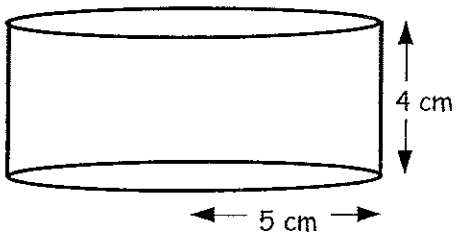
Exercise 5E

1. Copy and complete :-

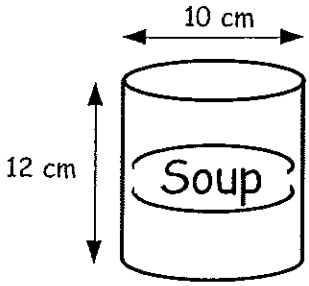
"The volume of a cylinder is $V = \pi$ ....."



2. Find the volume of the cylinder shown.



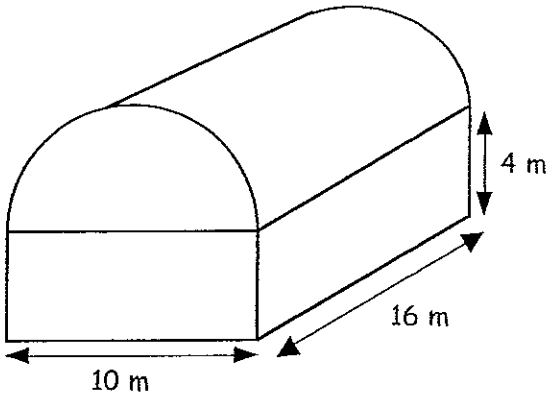
3.



Find the volume of the tin of soup.

4. Farmer Giles has a barn which has a cuboid as its base and a half cylinder on top.

Find the volume of the barn in m^3.



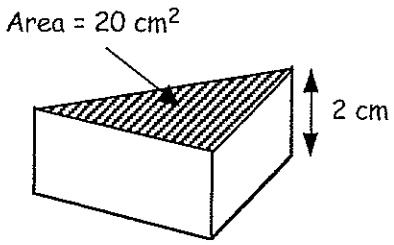
Exercise 6E

1. Copy and complete :- "The volume of a triangular prism is

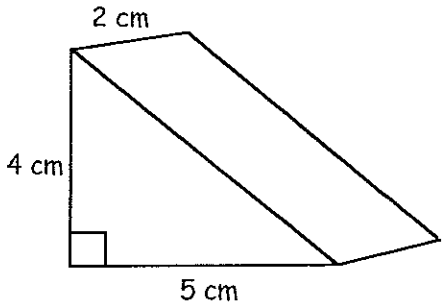
V = area of the base x ..... "

2. Calculate the volume of the following triangular prisms.

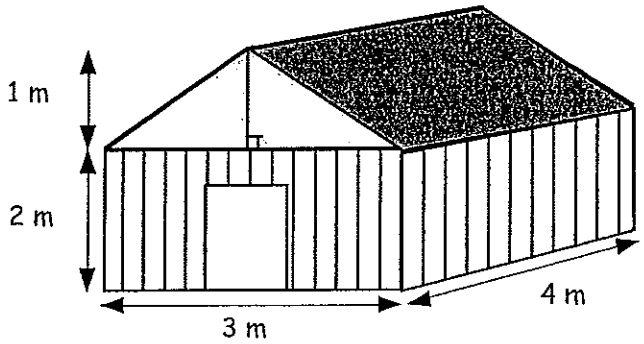
(a)



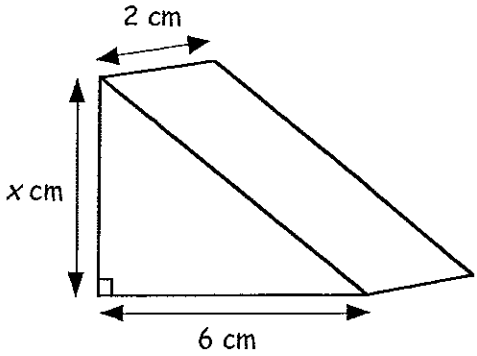
(b)



3. Find the volume of the garden shed.



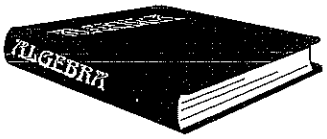
4.



The volume of this wedge is 30 cm^3.

Calculate x, the height.

Simplifying Expressions



1. Write each of the following in a shorter form :

a)	$3x+2x$	*b)*	$4p+2p+6p$	*c)*	$8a-3$
d)	$5m+3m-2m$	*e)*	$3v+v$	*f)*	$4y+6y-y$
g)	$5a+4b+3a$	*h)*	$9f-4f+6$	*i)*	$8x+3+2x$
j)	$4c+6+3$	*k)*	$5m+3+4m$	*l)*	$4y+5+2y$
m)	$8+3x-4$	*n)*	$7d+6-3d$	*o)*	$5y+6z+y$
p)	$6a+5b-2a$	*q)*	$12+7x-7$	*r)*	$5g+6h+4g$
s)	$5r+8-2$	*t)*	$6x+3+3x$	*u)*	$8y-4+y$

2. Remove the brackets and simplify where possible :

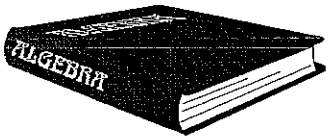
a)	$3(c+2)+7$	*b)*	$2(e+4)-5$	*c)*	$6(f-6)+2f$	*d)*	$4(t+8)-7$
e)	$7(g-3)+5g$	*f)*	$8(w-1)-3w$	*g)*	$6(h+2)+9$	*h)*	$9(p+3)+5p$
i)	$3(2+f)-4$	*j)*	$5(1+k)+4k$	*k)*	$5(5+p)-2z$	*l)*	$4(7-u)-15$
m)	$6(1+e)+e$	*n)*	$3(6+w)+w$	*o)*	$8(11+q)-4r$	*p)*	$19(7+k)-60$

3. Expand and simplify :

a)	$6(3g+2)+7$	*b)*	$2(2e+4)-3$	*c)*	$7(4c+5)-20c$	*d)*	$3(2t+8)-t$
e)	$3(8f+3)-4$	*f)*	$3(4a+1)-4$	*g)*	$2(5k+6)+24k$	*h)*	$8(3h+2)-24h$
i)	$5(2+2t)+3t$	*j)*	$4(1+9u)+2u$	*k)*	$6(4+10z)-16$	*l)*	$5(7+7u)-28$
m)	$9(1+3e)+7e$	*n)*	$3(2+6w)+4$	*o)*	$3(10+2d)+5d$	*p)*	$5(6+5x)+x$

Formulae (2)

All working must be shown.



1. A formula is given as $E = 3p + q$.

   Find the value of E when .... i) $p = 4$ and $q = 2$ ii) $p = 6$ and $q = 3$ iii) $p = 5$ and $q = 1$ iv) $p = 3$ and $q = -6$

2. A formula is given as $T = 2d - 3e$.

   Find the value of T when .... i) $d = 5$ and $e = 2$ ii) $d = 6$ and $e = 3$ iii) $d = 8$ and $e = 5$ iv) $d = 12$ and $e = 8$

3. A formula is given as $F = 7r - 2s$.

   Find the value of F when .... i) $r = 2$ and $s = 5$ ii) $r = 3$ and $s = 10$ iii) $r = 4$ and $s = 4$ iv) $r = 6$ and $s = 20$

4. A formula is given as $V = u + at$.

   Find the value of V when .... *i)* $u = 3$, $a = 2$ *and* $t = 4$ *ii)* $u = 6$, $a = 3$ *and* $t = 7$ *iii)* $u = 2$, $a = 8$ *and* $t = 10$

5. A formula is given as $C = 20 + 4pt$.

   Find the value of C when .... *i)* $p = 4$ *and* $t = 3$ *ii)* $p = 5$ *and* $t = 2$ *iii)* $p = 8$ *and* $t = 0 \cdot 5$

6. A formula is given as $W = ab - 3c$.

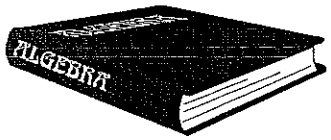
   Find the value of W when .... *i)* $a = 4$, $b = 6$ *and* $c = 4$ *ii)* $a = 5$, $b = 2$ *and* $c = 3$ *iii)* $a = 6$, $b = 4$ *and* $c = 8$

7. A formula is given as $A = 2lh + 2lb + 2bh$.

   Find the value of A when .... *i)* $l = 6$, $b = 3$ *and* $h = 2$ *ii)* $l = 5$, $b = 4$ *and* $h = 6$ *iii)* $l = 8$, $b = 7$ *and* $h = 4$

Formulae (1)

All working must be shown.



1. A formula is given as $E = p^2 + 2$.

   Find the value of E when .... i) $p = 2$ ii) $p = 3$ iii) $p = 6$ iv) $p = 1$.

2. A formula is given as $T = e^2 + 6$.

   Find the value of T when .... i) $e = 3$ ii) $e = 4$ iii) $e = 8$ iv) $e = 2$.

3. A formula is given as $Q = 36 - r^2$.

   Find the value of Q when .... i) $r = 3$ ii) $r = 4$ iii) $r = 6$ iv) $r = 1$.

4. A formula is given as $G = 45 - h^2$.

   Find the value of G when .... i) $h = 4$ ii) $h = 6$ iii) $h = 2$ iv) $h = 7$?

5. A formula is given as $T = 2(s^2) + 4$.

   Find the value of T when .... i) $s = 3$ ii) $s = 5$ iii) $s = 10$ iv) $s = 1$.

6. A formula is given as $W = 25 + 3(x^2)$.

   Find the value of W when .... i) $x = 2$ ii) $x = 6$ iii) $x = 8$ iv) $x = 7$.

7. A formula is given as $L = 2p^2 - 6$.

   Find the value of L when .... i) $p = 2$ ii) $p = 3$ iii) $p = 5$ iv) $p = 10$.

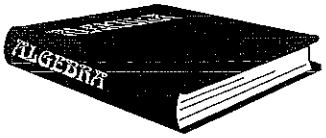
8. A formula is given as $H = t^2 + 2t + 1$.

   Find the value of H when .... i) $t = 2$ ii) $t = 4$ iii) $t = 3$ iv) $t = 10$.

9. A formula is given as $T = k^2 + 3k - 6$.

   Find the value of T when .... i) $k = 3$ ii) $k = 6$ iii) $k = 2$ iv) $k = 1$?

Removing Brackets



1. Remove the brackets. For example $3(x+4) = 3x+12$

$a)$	$4(c+2)$	$b)$	$2(e+4)$	$c)$	$5(f+6)$	$d)$	$3(t+8)$
$e)$	$7(g+3)$	$f)$	$9(w+1)$	$g)$	$6(h+6)$	$h)$	$8(p+2)$
$i)$	$3(2+y)$	$j)$	$7(1+k)$	$k)$	$5(5+z)$	$l)$	$4(7+u)$
$m)$	$9(1+e)$	$n)$	$3(2+w)$	$o)$	$8(12+r)$	$p)$	$10(7+m)$

2. Remove the brackets :

$a)$	$5(3c+2)$	$b)$	$2(2e+4)$	$c)$	$6(4f+6)$	$d)$	$3(2t+8)$
$e)$	$2(8g+3)$	$f)$	$6(4w+1)$	$g)$	$7(5h+6)$	$h)$	$8(3p+2)$
$i)$	$3(2+2y)$	$j)$	$7(1+9k)$	$k)$	$5(5+10z)$	$l)$	$4(7+7u)$
$m)$	$9(1+3e)$	$n)$	$3(2+6w)$	$o)$	$3(12+2r)$	$p)$	$4(7+5m)$

3. Expand these brackets :

$a)$	$c(c+5)$	$b)$	$e(e+2)$	$c)$	$f(f+4)$	$d)$	$t(t+7)$
$e)$	$e(g+3)$	$f)$	$p(w+1)$	$g)$	$a(h+6)$	$h)$	$r(p+2)$
$i)$	$y(2+y)$	$j)$	$c(1+k)$	$k)$	$z(5+z)$	$l)$	$h(7+u)$
$m)$	$e(1+e)$	$n)$	$p(2+w)$	$o)$	$x(12+x)$	$p)$	$m(7+m)$

4. Expand each of the following brackets :

$a)$	$3(c-2)$	$b)$	$5(e-4)$	$c)$	$5(f+4)$	$d)$	$2(t-7)$
$e)$	$g(g-3)$	$f)$	$v(w+1)$	$g)$	$h(h-6)$	$h)$	$p(4-p)$
$i)$	$3(2-y)$	$j)$	$p(1-k)$	$k)$	$a(b+c)$	$l)$	$x(x-y)$

Solving Equations (1)

1. Solve each of the following equations :

(a)	$5x+8=18$	(b)	$2t+3=11$	(c)	$4m+1=13$
(d)	$3y+4=22$	(e)	$6a+5=17$	(f)	$7d+3=31$
(g)	$6h+1=25$	(h)	$2p+6=20$	(i)	$3x+2=26$
(j)	$8a+5=21$	(k)	$9x+2=38$	(l)	$10y+7=37$

2. Solve each of the following equations :

(a)	$5x=3x+12$	(b)	$6t=3t+15$	(c)	$4m=2m+16$
(d)	$7y=3y+20$	(e)	$6a=a+30$	(f)	$7d=2d+35$
(g)	$6h=2h+24$	(h)	$9p=3p+18$	(i)	$8x=5x+27$
(j)	$12a=4a+16$	(k)	$9x=6x+33$	(l)	$10y=y+36$

3. Solve each of the following equations :

(a)	$5x+2=3x+8$	(b)	$6t+3=3t+15$	(c)	$8m+1=3m+21$
(d)	$7y+4=5y+12$	(e)	$6a+5=2a+29$	(f)	$7d+1=2d+16$
(g)	$6h+4=4h+30$	(h)	$10p+6=4p+24$	(i)	$8x+2=x+16$
(j)	$8a+5=a+26$	(k)	$9x+2=6x+32$	(l)	$10y+7=6y+35$
(m)	$12p+3=2p+43$	(n)	$11h+1=2h+19$	(o)	$15x+3=3x+51$
(p)	$16y+7=8y+23$	(q)	$7d+12=4d+36$	(r)	$11a+4=5a+40$
(s)	$8m+9=m+51$	(t)	$9x+4=7x+40$	(u)	$6x+8=4x+11$

Exercise 8E

1. Copy the following and enter a "<" sign, a ">" sign or an "=" sign in the correct place :-

(a) 5 .... 3 (b) -2 .... 1 (c) 0 .... -4

(d) 2·1 .... 1·9 (e) 64 .... (9 x 7) (f) -11 .... -12

2. In this question, you can choose x from the numbers 0, 1, 2, 3, 4, 5, 6, 7, 8 :-

Solve

(a) $x > 5$, —> (so $x = ...$) (b) $x \leq 3$ (c) $x > 7$

(d) $x \leq 8$ (e) $x < 4{\cdot}3$ (f) $x \geq 3\frac{1}{2}$

3. Solve these inequalities, leaving your answers like :- $x > 3$.
(*Show all your working carefully*)

(a) $x + 2 > 7$ (b) $x + 5 > 12$ (c) $x + 3 \leq 9$

(d) $4x < 24$ (e) $5x > 45$ (f) $2x \leq 11$

(g) $2x + 3 > 13$ (h) $3x - 5 < 10$ (i) $4x + 7 \geq 17$