

Dumfries and Galloway Council

# Added Value Revision pack

Name.....

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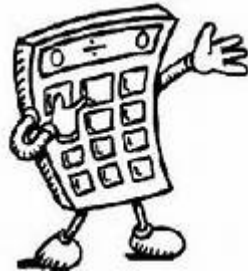
National 4

## Self Assessment Summary- Part one – Non Calculator



Assessment standard	Traffic Lights			Pupils Signature	Parents Signature
Use of whole number percentages					
Calculation of the mean of a data set; the mean should require division of a whole number by a single-digit whole number and rounding of the answer to two decimal places					
Calculating a non-unitary fraction of a quantity					
Adding two decimal numbers and then subtracting from the result					
Multiplying a decimal number by a whole number					

## Self Assessment Summary- Part Two –Calculator



Assessment standard	Traffic Lights			Pupils Signature	Parents Signature
Solving a linear equation requiring simplification					
Solving a problem using area or volume					
Creating and then using a formula					
Using the relationship involving speed, distance and time, where the time is given or calculated as hours and minutes					
Use of Pythagoras' theorem in a problem					
Use of trigonometry to calculate a side or angle of a right-angled triangle					
Solving a problem involving shape and coordinates					

## Mathematics - Part 1- Non Calculator

### Use of whole number percentages

- 1) A driver uses 70% of his full tank of petrol driving to Strannraer. If his car holds 60 litres of petrol. How much petrol is left in his tank?
- 2) Of 220 pupils in first year, 45% of them are boys. How many boys are in first year?
- 3) 90% of the human body is made up of water. If Emma weighs 65kg, how much of her is water?
- 4) Neil sold his bike for 60% of what he paid for it. Last year Neil bought the bike for £350. How much did he get paid when he sold it?

### Calculation of the mean of a data set; the mean should require division of a whole number by a single-digit whole number and rounding of the answer to two decimal places

- 1) A survey was carried out to calculate the average amount paid per month on a contract phone. Here are the results:

£26.73      £15              £45.30              £53.15              £30.50              £46

Calculate the mean cost.  
Round your answer to 2 decimal places.

- 2) Lynsey has been trying to lose weight and has kept track of how many kilograms she has lost each month. Here are her results:

3.51kg      2.6kg              1.3kg              6.1kg              3.7kg              2.4kg

Calculate the mean weight loss.  
Round your answer to 2 decimal places.

- 3) The speed (mph) of six cars was taken as they passed the school gates. Here are the results:

28              30              24              18              19.4              22.1

Calculate the mean speed.  
Round your answer to 2 decimal places.

- 4) In a call centre team there are eight people. Their ages are as follows

17 25 18 38 18 21 28 16

Calculate the mean age

Round your answer to 2 decimal places.

### Calculating a non-unitary fraction of a quantity

- 1) A school has 850 pupils.  $\frac{3}{5}$  of them are girls. How many of them are girls?
- 2) I earn £256 a week and I spend  $\frac{3}{8}$  of it on food. How much do I spend on food?
- 3) Of the 96 mental questions Christina got  $\frac{7}{8}$  of them correct. How many did she get correct?
- 4) The William Wallace centre can accommodate 360 people. On the last bank holiday it was  $\frac{7}{9}$  full. How many people visited the centre on the last bank holiday?

### Adding two decimal numbers and then subtracting from the result

- 1) To make fizzy orange Alan mixes 2.35 litres of lemonade with 1.34 litres of fresh orange juice.  
At a party 3.12 litres of the fizzy orange is drunk, how much is left over?
- 2) To make mix the perfect fudge mixture you need to mix 6.52kg of sugar with 5.87kg of butter.  
If Scott uses 7.4kg of this mixture how much is left?
- 3) Lucy buys a top for £45.78 and a pair of trousers for £34.99.  
If she took £150 shopping how much does she have left to buy shoes?
- 4) To make pink paint, the art teacher mixes 3.54 litres of red paint with 2.78 litres of white paint.  
In a term they use 5.83 litres. How much paint is left?

**Multiplying a decimal number by a whole number**

- 1) If one book weighs 0.64kg calculate the weight of seven books?
- 2) One litre of petrol costs £1.46 calculate the cost of eight litres of petrol?
- 3) The height of a billboard is 2.35m calculate the height of four billboards place on top of each other?
- 4) A pair of football boots cost £25.94 how much would it cost for six pairs of these boots?

## Mathematics - Part 2- Calculator

### Solving a linear equation requiring simplification

1) Solve:

a)  $8x + 1 = 5x + 7$

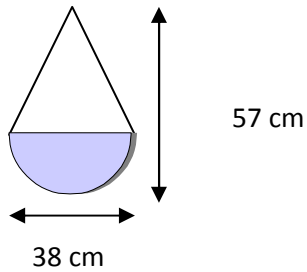
b)  $7x - 3 = 2x + 32$

c)  $2(x+3) = x+16$

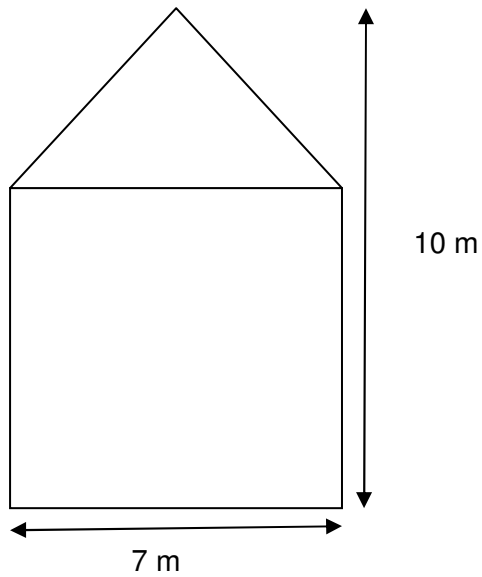
d)  $4(x+6) = x + 36$

### Solving a problem using area or volume

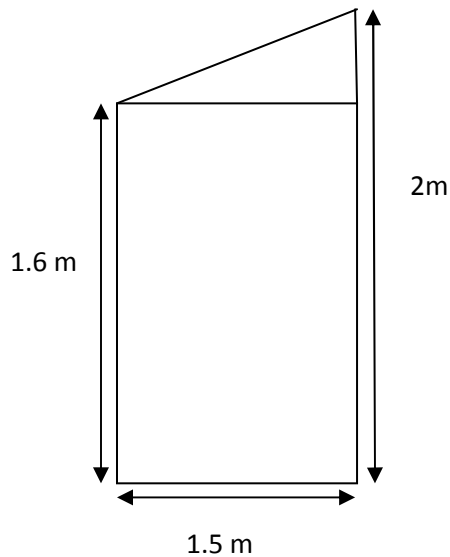
1) Miss Jamieson is painting a pixie on the wall of nursery class. The face of the pixie is a semi circle and the hat is a triangle. Calculate the area of the painting.



- 2) Ben is building a new shed. The side of the shed is made up of a square and an isosceles triangle. The dimensions are shown below:



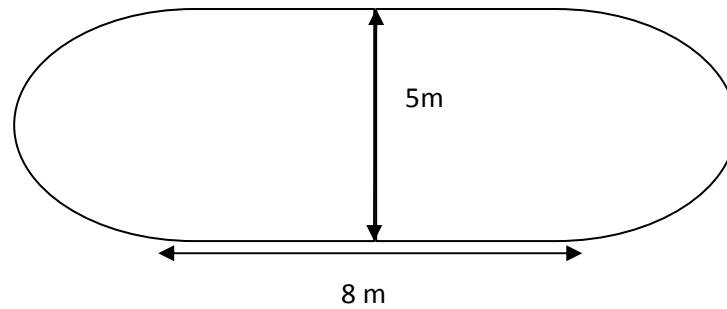
- 3) The door in to Kenny's loft is made up of a rectangle and a right angled triangle to avoid being blocked by the ceiling, see the diagram below for the dimensions



Calculate the area of the door.



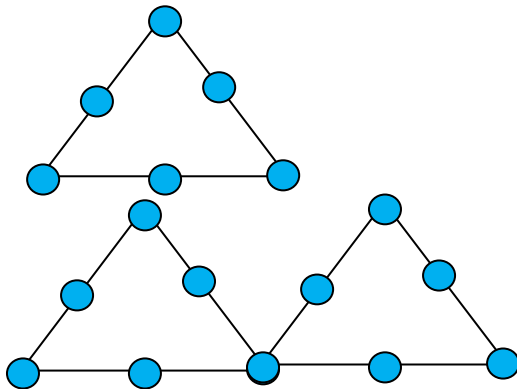
- 4) A running track is made up of a rectangle and two semi circles at either end.



Calculate the area of the running track.

**Creating and then using a formula**

- 1) An amusement arcade has a lighting effect in the shape of triangles with coloured lights attached. The lighting effect can be assembled in sections as shown below.

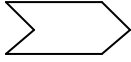


- a) Complete the table below

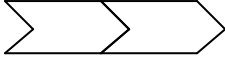
Number of sections (s)	1	2	3	4		12
Number of coloured lights (c)	6	11				

- b) Write down a formula for calculating the number of coloured lights (c) when you know the number of sections (s).
- c) The amusement arcade's lighting effect uses a total of 116 coloured lights.  
How many sections are in the lighting effect?

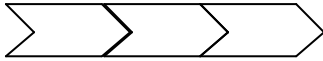
- 2) Margaret is working on the design for a gold bracelet.  
She is using gold lengths to make each section.



1 section 6 lengths



2 sections 10 lengths



3 sections

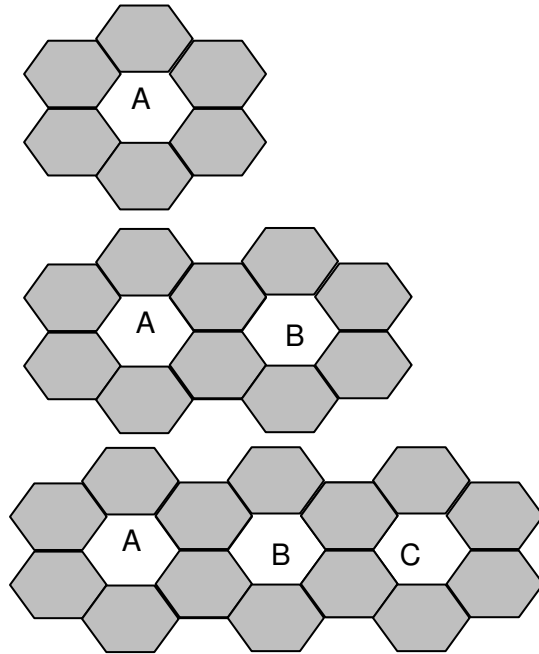
- (a) Complete the table below.

No of sections (s)	1	2	3	4		10
No of lengths (g)	6	10				

- (b) Write down a formula for calculating the number of gold lengths, ( $g$ ),  
when you know the number of sections ( $s$ ).

- (c) Margaret uses 66 gold lengths to make a bracelet.  
How many sections does this bracelet contain?

- 3) Carla is laying a path in a nursery school.  
She is using a mixture of alphabet tiles and coloured tiles.



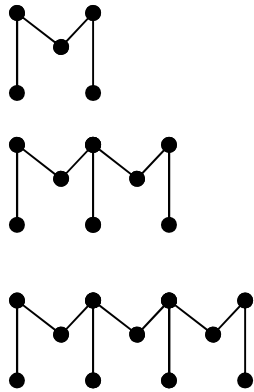
- (a) Complete the table below.

No of alphabet tiles (a)	1	2	3	4		12
No of coloured tiles (c)	6	10				

- (b) Write down a formula for calculating the number of coloured tiles (c) when you know the number of alphabet tiles (a)

- (c) Carla uses 86 coloured tiles to make the path.  
How many alphabet tiles will be in the path?

4) Mhairi makes necklaces in M-shapes using silver bars.



(a) Complete the table below.

No of M shapes ( $m$ )	1	2	3	4		15
No of bars	4	7				

(b) Write down a formula for calculating the number of bars ( $b$ ) when you know the number of M-shapes ( $m$ ).

(c) Mhairi has 76 silver bars.  
How many M-shapes can she make?

**Using the relationship involving speed, distance and time, where the time is given or calculated as hours and minutes**

- 1) A bus leaves Dalry and travels 5hrs at an average speed of 46 m.p.h. How far will the bus travel?
- 2) Kai travels the 40 miles from Gretna to Dalbeattie. He covers the journey in just half an hour. Did Kai stick to the 60 m.p.h speed limit?
- 3) A message in a bottle floats harmlessly on the surface of the ocean at a steady speed of 0.4 kilometres per hour. It floated for 130 hours before being picked up by a boy on the beach. How far will it have floated?
- 4) David flew for 1120 miles at an average speed of 320 m.p.h. How long did the flight take? (in hours in minutes)

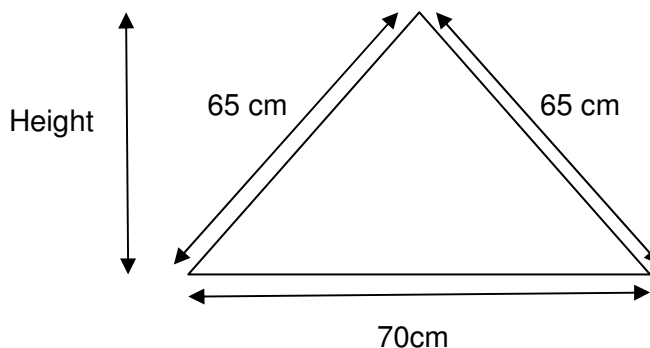
**Use of Pythagoras' theorem in a problem**

- 1) The local Scotland Rugby Supporters Club has ordered a new flag.



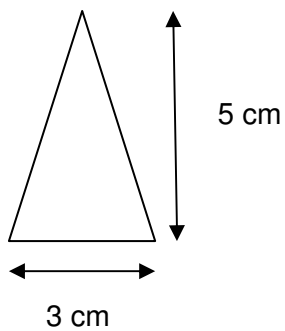
Calculate the length of one of the white diagonals.

- 2) A warning sign is in the shape of an isosceles triangle.



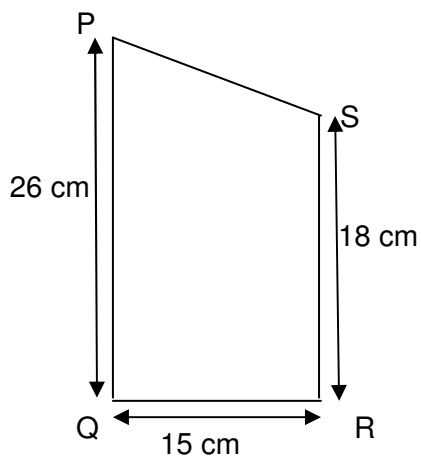
Calculate the height of the sign.

- 3) An earring in the shape of an isosceles triangle is made from silver wire. The dimensions of the earring are shown on the diagram below.



Calculate the length of silver wire needed to make a **pair** of earrings.  
**Do not use a scale drawing.**

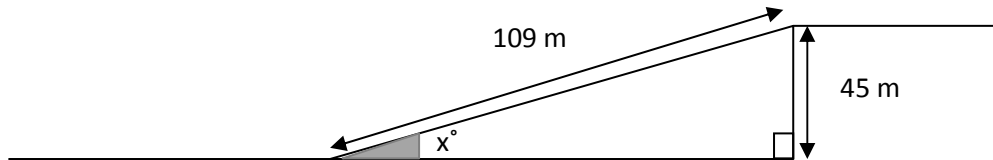
- 4) Lewis is designing a bird box for his garden. The dimensions for the side of the box are shown in the diagram below.



Calculate the length of side PS.  
**Do not use a scale drawing.**

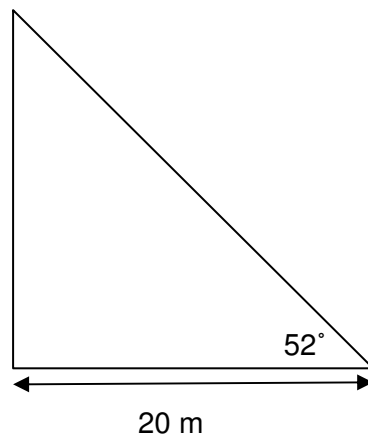
**Use of trigonometry to calculate a side or angle of a right-angled triangle**

- 1) A boat elevator is used to take a boat from the lower canal to the upper canal.  
The boat elevator is in the shape of a triangle.  
The length of the hypotenuse is 109 metres.  
The height of the triangle is 45 metres.



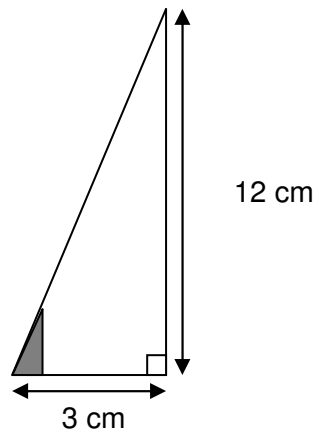
Calculate the size of the shaded angle  $x^\circ$ .

- 2) A surveyor has to calculate the height of a mobile phone mast.  
From a point 20 metres from the base of the mast, the angle of elevation to the top is  $52^\circ$ .



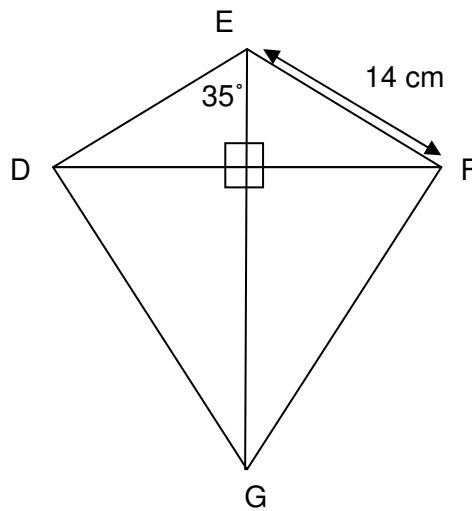
Calculate the height of the mobile phone mast.  
Round your answer to 1 decimal place.  
**Do not use a scale drawing.**

- 3) Larry has invented a device for checking that ladders are positioned at the correct angle. His design for the device is given below.



Calculate the size of the shaded angle.

- 4) DEFG is a kite:
- angle DEG =  $35^\circ$
  - EF = 14 centimetres.

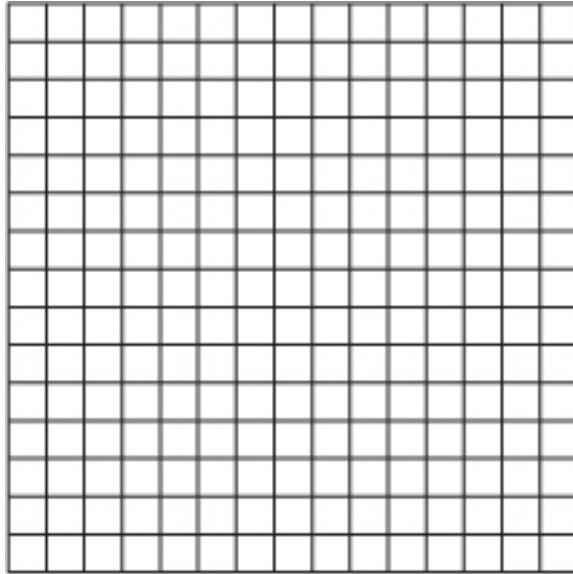


Calculate the length of DF



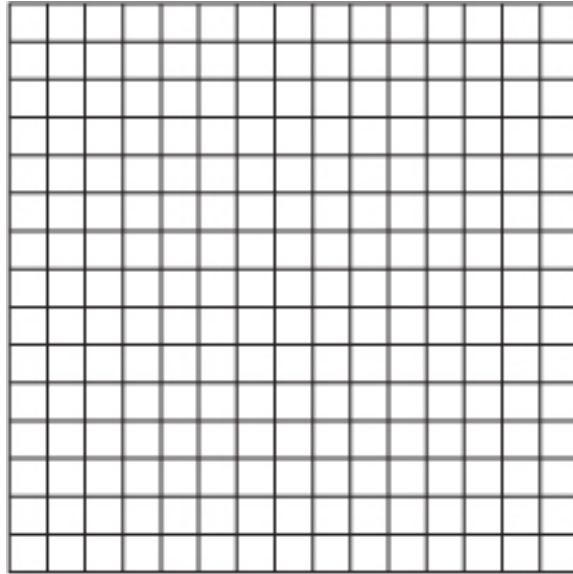
**Solving a problem involving shape and coordinates**

- 1) a) Draw coordinate axes on the grid below, plot the points  $A(2, 6)$ ,  $B(8, 2)$  and  $C(6, -1)$ .



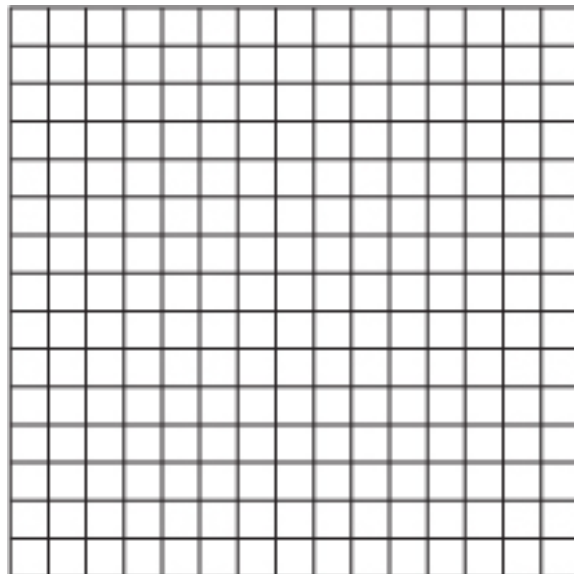
- b) Plot a fourth point  $D$  so that  $ABCD$  is a rectangle.
- c) Write down the coordinates of  $D$ .

- 2) a) Draw coordinate axes on the grid below, plot the points P (5, 6) and Q (-7, -3), R (-5,-5)



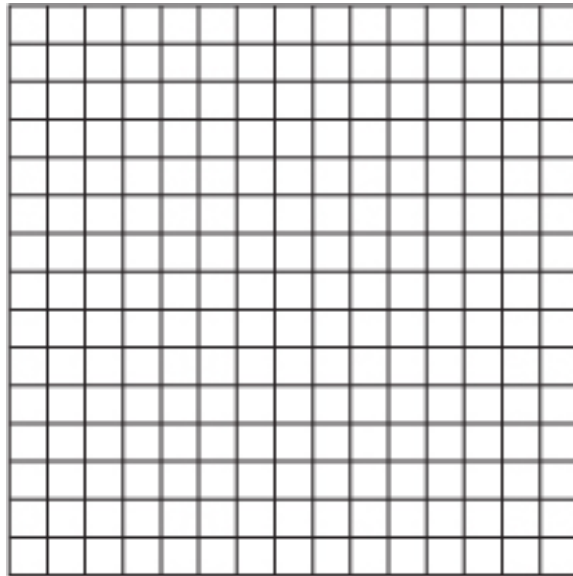
- b) Plot the point S such that PQRS is a rectangle  
c) Write down the coordinates of S

- 3) a) Draw coordinate axes on the grid below.  
Plot the points A(2, -3), B(2, 5) and C(-3, 7).



- b) Plot the point D such that ABCD is a symmetrical trapezium and write down the coordinates of the point D.

- 4) a) Draw coordinate axes on the grid below.  
Plot the points  $M(-4, 6)$ ,  $N(0, 1)$  and  $P(4, -4)$



- b) Plot a fourth point  $Q$  to form a parallelogram  $MNPQ$   
c) Write down the coordinates of the point  $Q$

## Mathematics - Part 1- Non Calculator Answers

### Use of whole number percentages

- 1) 18 litres                      2) 99                      3) 58.5 kg                      4) £210

### Calculation of the mean of a data set; the mean should require division of a whole number by a single-digit whole number and rounding of the answer to two decimal places

- 1) £36.11                      2) 3.27 kg                      3) 23.58 mph                      4) 22.63 years

### Calculating a non-unitary fraction of a quantity

- 1) 510                      2) £96                      3) 84                      4) 280

### Adding two decimal numbers and then subtracting from the result

- 1) 0.57 litres                      2) 4.99 kg                      3) £69.23                      4) 0.49 litres

### Multiplying a decimal number by a whole number

- 1) 4.48kg                      2) £11.68                      3) 9.4m                      4) £155.64

## Mathematics - Part 2- Calculator

### Solving a linear equation requiring simplification

- 1)  $x=2$                                       2)  $x=7$                                       3)  $x=10$                                       5)  $x=4$

### Solving a problem using area or volume

- 1)  $128.77\text{cm}^2$                                       2)  $59.5\text{m}^2$                                       3)  $2.7\text{m}^2$                                       4)  $59.63\text{ m}^2$

### Creating and then using a formula

- |                  |             |                        |
|------------------|-------------|------------------------|
| 1) a) 16, 21, 61 | b) $b=5s+1$ | c) 23 sections         |
| 2) a) 14, 18, 42 | b) $g=4s+2$ | c) 16 lengths          |
| 3) a) 14, 18, 50 | b) $c=4a+2$ | c) 21 alphabet letters |
| 4) a) 10, 13, 46 | b) $b=3m+1$ | c) 25 M shapes         |

### Using the relationship involving speed, distance and time, where the time is given or calculated as hours and minutes

- 1) 230 miles                                      2) No as ~~80mph~~ > ~~60mph~~  
 3) 52 km    4) 3hrs 30min

### Use of Pythagoras' theorem in a problem

- 1)  $187.77\text{cm}$                                       2)  $73.822\text{cm}$                                       3)  $26.88\text{cm}$                                       4)  $17\text{cm}$

### Use of trigonometry to calculate a side or angle of a right-angled triangle

- 1)  $24.38^\circ$                                       2)  $25.6\text{m}$                                       3)  $75.96^\circ$                                       4)  $16.06\text{cm}$

### Solving a problem involving shape and coordinates

Only answers to part (c) are available here if you have any problems seek advice from your teacher.

- 1)                      c) (0,3)                                      2) c) (8,4)                                      3) c) (-3,-5)                                      4)  
                             c) (-8,-1)