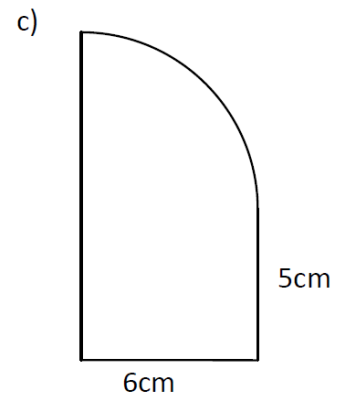
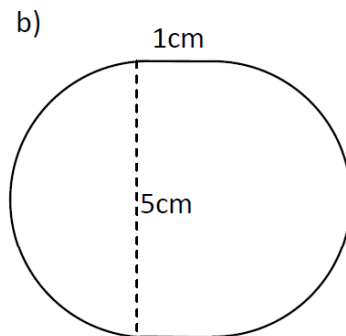
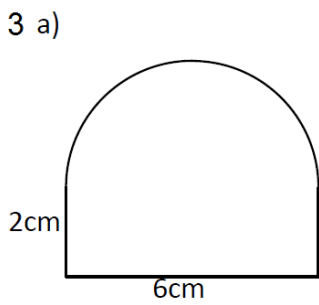
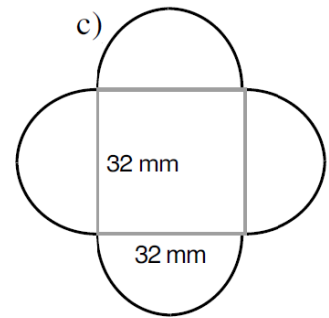
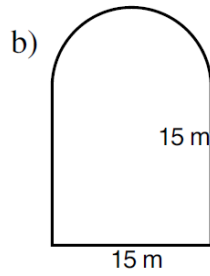
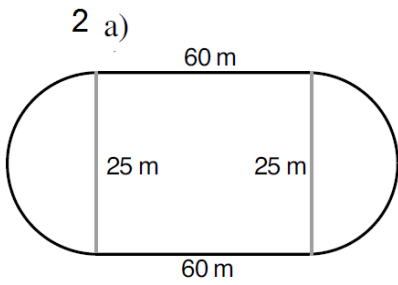
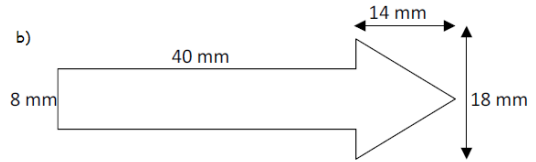
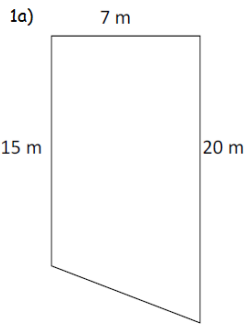


## Solving Equations

1) $7n + 3 = 3n + 27$	2) $7n + 5 = 5n + 25$	3) $10n + 2 = 7n + 14$
4) $5n + 4 = 2n + 22$	5) $6n + 8 = 2n + 36$	6) $7n - 3 = 4n + 12$
7) $5n - 2 = n + 10$	8) $9n - 7 = 5n + 13$	9) $11n - 9 = 5n + 27$
10) $5n - 10 = 3n + 50$	11) $8n - 3 = 2n + 39$	12) $9n + 14 = 6n + 29$
13) $10n + 17 = 3n + 52$	14) $5n - 16 = n + 20$	15) $3n + 3 = 2n + 8$
16) $6n + 5 = 4n + 18$	17) $9n + 1 = 6n + 9$	18) $5n - 5 = n + 10$

# Area of Composite Shapes

Find the area of each of the following shapes.



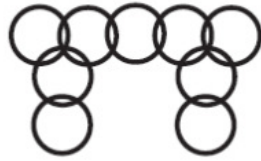
# Linear Patterns

1. Samira is designing a chain belt.

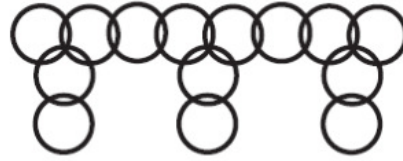
Each section of the belt is made from metal rings as shown below.



1 section, 4 rings



2 sections, 9 rings



3 sections

(a) Complete the table

Number of sections ( $s$ )	1	2	3	4	5		11
Number of metal rings ( $r$ )	4	9					

(b) Write down a formula for calculating the number of rings ( $r$ ), when you know the number of sections ( $s$ ).

(c) Samira uses 79 rings to make her belt.  
How many sections does her belt have?

2. Art students at college were asked to design a bracelet. Julie made up this design from bars and chains.

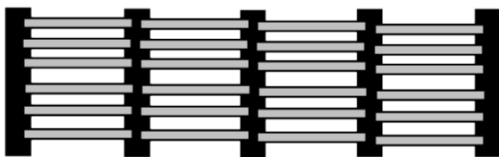
(a) Complete this table for the above pattern.

Number of bars ( $b$ )	2	3	4		8
Number of chains ( $c$ )					

(b) Write down a formula for calculating the number of chains ( $c$ ) when you know the number of bars ( $b$ ).

(c) Julie has 57 pieces of chain. How many bars will she need if she wants to use all the pieces of chain?

3. Scott is constructing a fence with posts and rails as shown below.



2 posts    3 posts  
6 rails    12 rails

(a) Copy and complete the following table.

Number of posts ( $p$ )	2	3	4	5	6
Number of rails ( $r$ )	6	12			

(b) Create a formula to calculate the number of rails ( $r$ ) if you know the number of posts ( $p$ ).

(c) Use the formula to calculate how many posts there would be between 54 rails.

## Speed, Distance, Time

### Distance = Speed × Time

1. How far, in kilometers, can you travel:

(a) walking at 5km/hr for 3 hours 20 minutes?

(b) running at 6km/hr for 2 hours 10 minutes?

(c) cycling at 12km/hr for 6 hours 45 minutes?

(d) driving at 50km/hr for 8 hours 40 minutes?

2. What distances are covered by the following:

(a) a van, travelling for 1 hour 30 minutes at an average speed of 40m.p.h?

(b) a runner, runs for 1 hour 24 minutes, at an average speed of 6m.p.h?

(c) a speed boat ride lasts 2 hours 35 minutes, at an average speed of 80m.p.h?

(d) a plane journey of 4 hours 32 minutes, at an average speed 500m.p.h?

## Speed = Distance ÷ Time

1. Find the average speed of:

(a) a runner who averages 5 km in 1 hour 15 minutes?

(b) a plane flying at 1000 miles in 2 hours 40 minutes?

(c) a motor cyclist covers 90 km in 1 hour 25 minutes?

2. Calculate the average speed in miles per hour of a plane flying from:

(a) London to Milan, 2000 miles in 4 hours 10 mins.

(b) Edinburgh to Belfast, 560 miles in 2 hours 20 mins.

Time = Distance ÷ Speed

1. Using the formula above calculate the time for each journey:

(a) Katie cycles 30 km at 15 km/h

(b) Ben cycles 40 km at 20 km/h

(c) Emma runs 20 km at 10 km/h

(d) Mark runs 20 km at 12 km/h

2. Calculate the times for these journeys:

(a) walking 18 km at 6 km/h.

(b) driving 120 miles at 70 m.p.h.

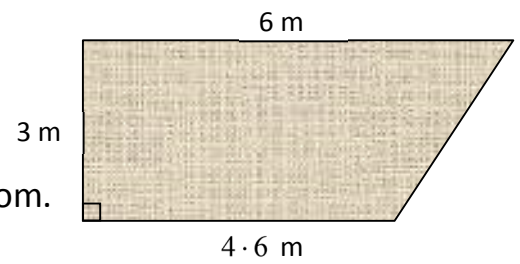
(c) cycling 340 km at 15 km/h.

(d) flying 3400 miles at 500 m.p.h.

# Pythagoras:

1. The room shown opposite has two parallel sides.

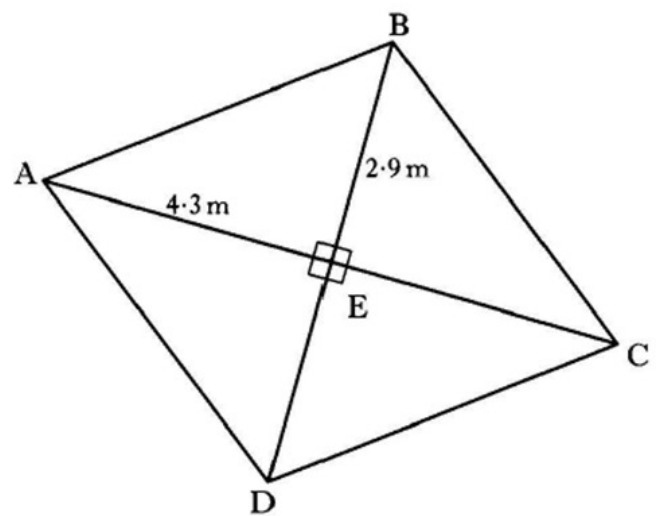
Using the given dimensions calculate the perimeter of the room.



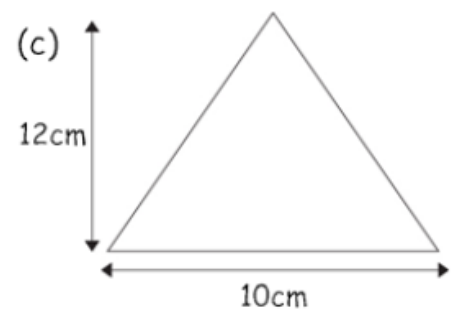
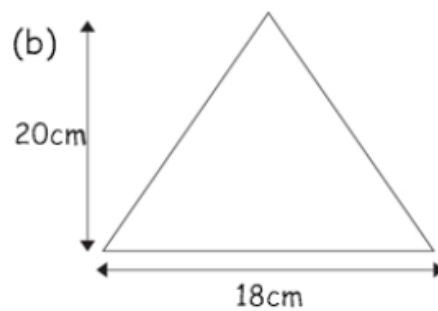
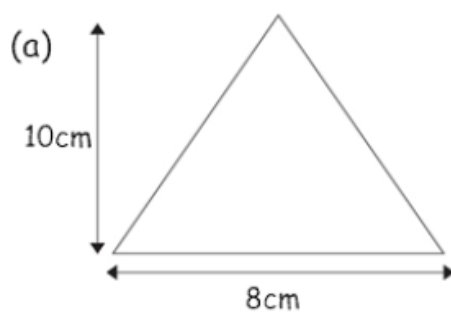
2. ABCD is a rhombus.

AE = 4.3 metres and BE = 2.9 metres.

Calculate the perimeter of the rhombus

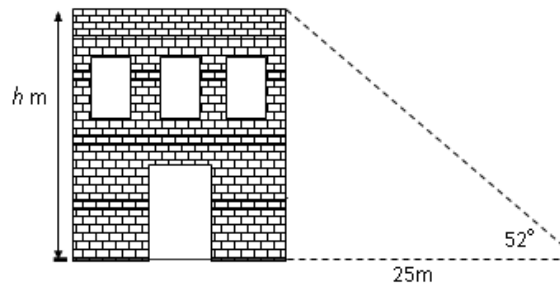


3. Calculate the perimeter of these triangles.

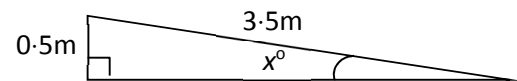
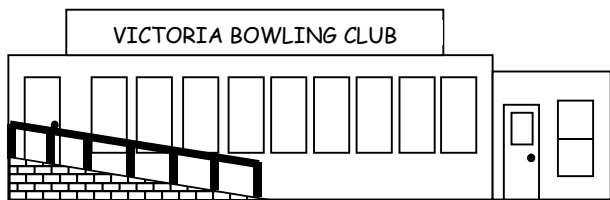


# Trigonometry:

1. Steven thinks the height of a building near his home is probably less than 30m high. Look at the figure below. Is Steven correct? **Give a reason**

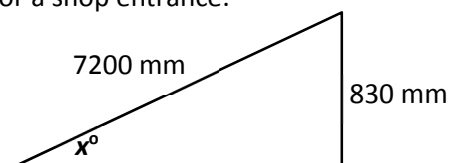


2. A ramp has been constructed at a bowling club. It is 3.5 metres long and rises through 0.5 metres.



These kind of ramps are only safe if the angle  $x$  is less than  $8^\circ$ . Is this ramp safe? **Give a reason**

3. The diagram shows a ramp which has been manufactured for a shop entrance.



- (a) Calculate the size of angle  $x$ .
- (b) For the ramp to be safe for wheelchair users the angle  $x$  should be between  $5^\circ$  and  $7^\circ$ . Is this ramp suitable for wheelchair users? **(Justify your answer)**



4. A children's slide in a park is 4.5 m long, and the angle the slide makes with the ground is  $50^\circ$ . Annie does not want her child playing on the slide if it is over 3.5m high.

a) Calculate the height of the ladders from ground level to the top of the slide.

b) Will Annie let her child play on this slide? **Explain.**

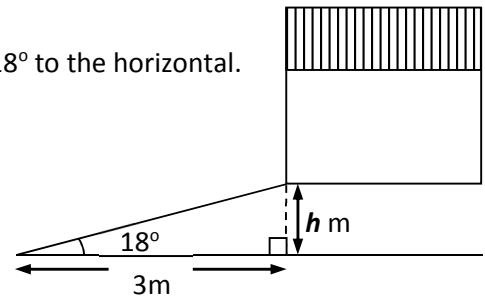


5. A driveway leading up to a garage is 3 metres long and at an angle of  $18^\circ$  to the horizontal.

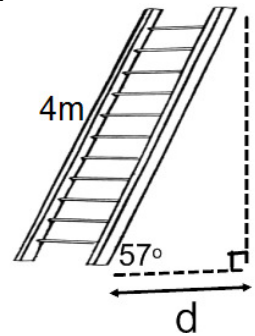
(a) Calculate the height,  $h$  metres, which the ramp rises.

(b) For the driveway to pass regulations it rise by no more than 1 metre.

Would this driveway pass regulations? (**Justify your answer**)

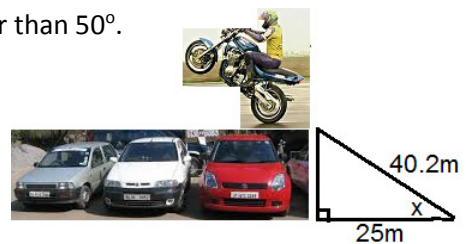


6. This 4 metre long ladder is safe if it is less than 2.2m from the wall. Is it safe? **Explain**



7. The stunts man should be able to jump across if the angle  $x$  is bigger than  $50^\circ$ .

Will he be able to safely jump across?

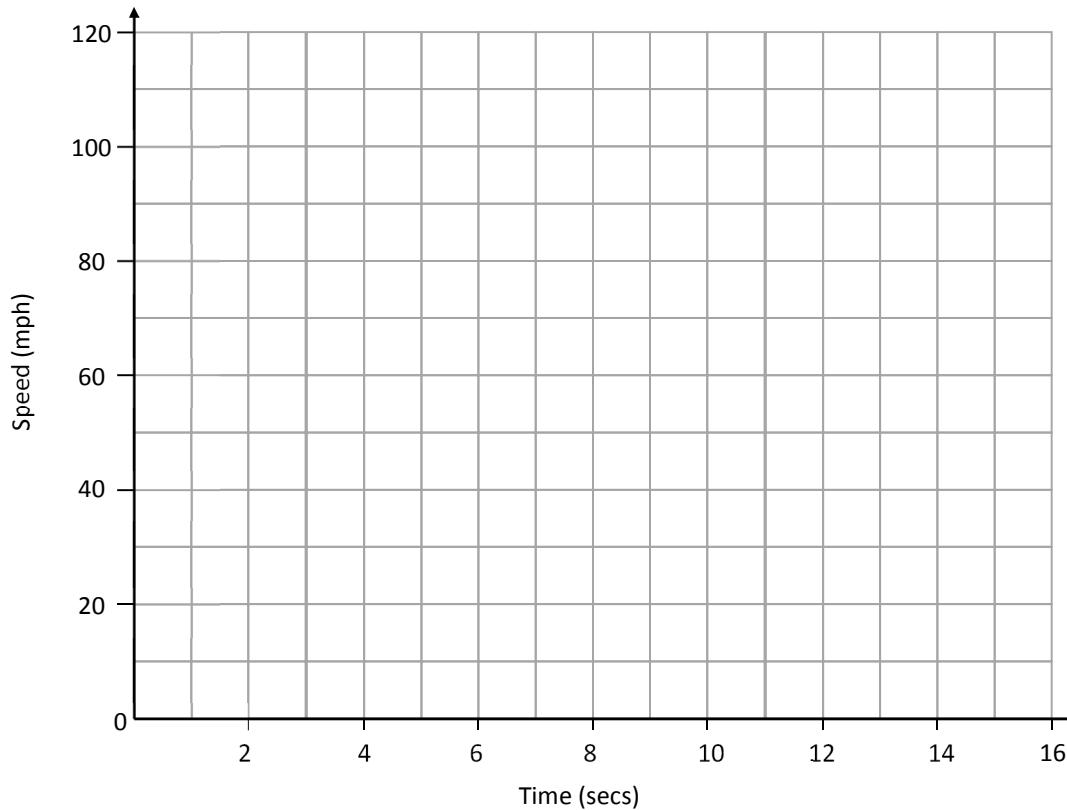


# Scattergraphs

1. The following table shows the speed of a car accelerating from rest.

<b><i>Time (secs)</i></b>	0	2	6	8	12	16
<b><i>Speed (mph)</i></b>	0	10	50	60	80	110

(a) Draw a scattergraph of the information on this grid.



(b) Draw the best fitting line on the graph.

(c) Use your graph to estimate the speed after 10 seconds.

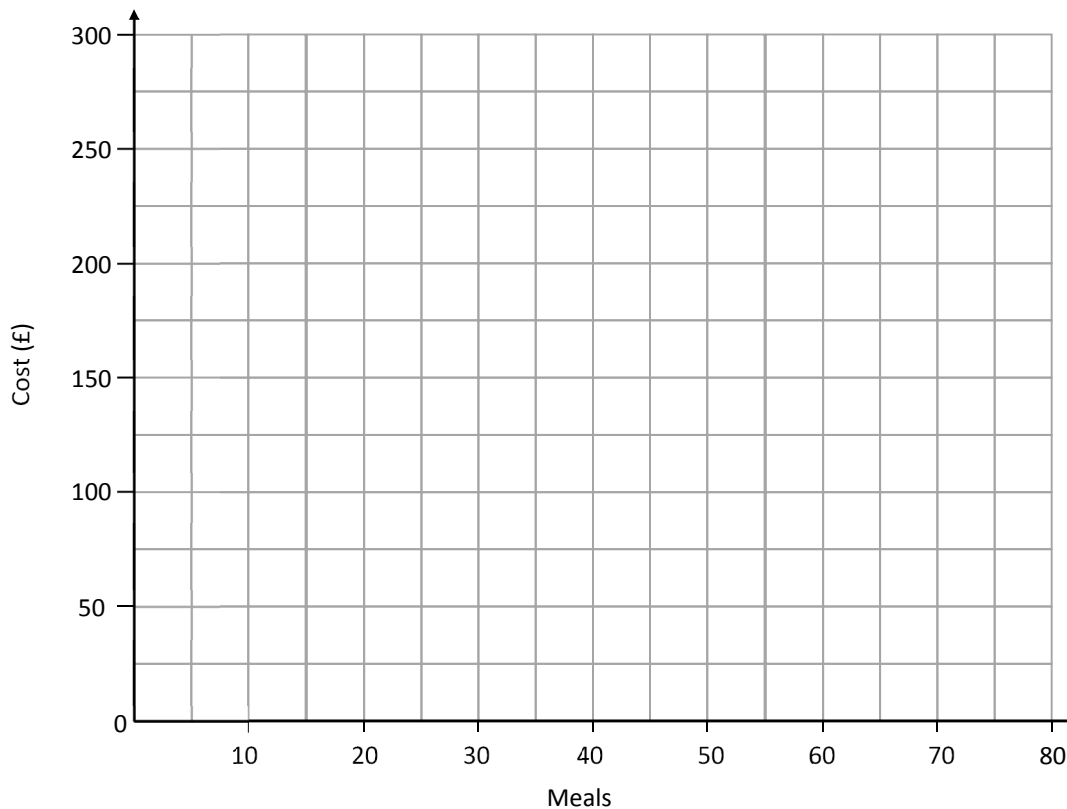
(d) A car travelling at a speed of 70 mph was estimated to have been accelerating for 10 seconds.

Is this a reasonable estimate?

2. A restaurant manager finds that the cost of running his restaurant depends on the number of meals served.

(a) Draw a scattergraph of the information on this grid.

<b>Number of meals</b>	10	20	30	40	50	60
<b>Cost in £</b>	125	175	175	225	225	275



(b) Draw the best fitting line on the graph.

(c) Use your graph to estimate the cost of running the restaurant when 45 meals are served.

(d) The restaurant owner estimates the cost of running the restaurant when 75 meals were served would be £300.

Is this a reasonable estimate?

## Probability:

1. Julie was given two bags full of goodies. There were 10 chocolate bars and 5 mint candies in bag A. There were 7 chocolate bars and 2 strawberry mini-pies in bag B. She wanted to eat a chocolate bar. From which bag should she take the candy (so that the probability of taking a chocolate bar was greater)?

2. Tickets are being sold for two different prizes at a fayre. Corinne has tickets for both. 80 tickets have been sold for prize A and 120 tickets have been sold for prize B. Corinne has 5 tickets for prize A and 8 tickets for prize B.

Which prize has Corinne the better chance of winning? Justify your answer by calculation.

3. A representative for the school Government has to be chosen from Class A or Class B. The pupil will be picked at random.

There are 30 pupils in class A and 24 in class B. 8 people in Class A want to be the rep and 6 people in Class B want to be the rep.

Which class is the representative more likely to come from? Justify your answer by calculation.