



# **S4 Homework**



**National 4**  
**Maths**



Expressions and Formulae  
E&F - 1.1a

1. Simplify by collecting like terms.

a)  $5x + 5 - 3x + 6$     b)  $11g - 9h + 6g - 3h$     c)  $15y - 3x - 7y + 8x$

d)  $9a + 7 - 5b - 6a + 8b$     e)  $6x - 3y + 15 - 4y - 4x$

2. Multiply out these brackets:

a)  $5(x + 7)$     b)  $8(y - 8)$     c)  $-3(8 + x)$     d)  $-4(x - y)$

e)  $4(3p - 2q + 3)$     f)  $x(x + 4y - 5)$     g)  $y(2y - 5x + 7)$     h)  $-a(3 - 4a - 2b)$

3. Expand and simplify where possible:

a)  $9(x + y + z)$     b)  $x(4x + 3 + y)$     c)  $3(9x - 4) + 5x$     d)  $6(3x + 1) + 5(x + 2)$

4. Expand and simplify where possible:

\*Reminder  $(3p)^2 = 3p \times 3p = 3 \times 3 \times p \times p = 9p^2$

a)  $(4x)^2 + 5x^2 - 14$     b)  $3 - (2y)^2 - y^2 + 5$     c)  $(4a)^2 + (3b)^2 - 7a$

5. Factorise these expressions;

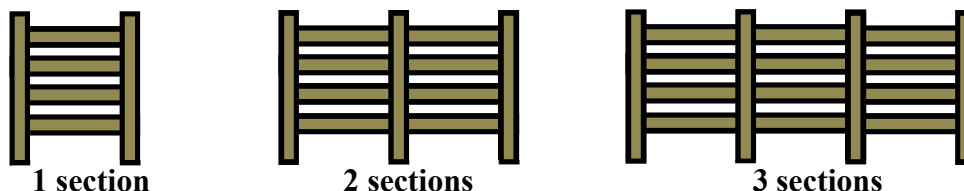
a)  $6a + 9$     b)  $7x - 35$     c)  $18 - 6y$     d)  $-3p - 27$     e)  $-6p + 24r$

6. Factorise fully;

a)  $6x + 4w + 12y$     b)  $-2x - 8y - 4z$     c)  $p^2 - 7p$     d)  $4c^2 - 24c$

### Linear Patterns E&F - 1.1b

- 1 A children's play park is to be fenced.  
The fence is made in sections, using lengths of wood as shown:



- a) Copy and complete the table below.

Number of sections (s)	1	2	3	4	5		12
Number of lengths of wood (w)	6	11					

- b) Write down a formula for calculating the number of lengths of wood (w), when you know the number of sections (s).
- c) A fence has been made from 81 lengths of wood. How many sections are in this fence? **(You must show your working).**

- 2 Auchinleck Academy is installing new windows which are made up of alternate large and small window panes. The ends of the windows are always made with large window panes.



- a) Copy and complete the following table to allow the builder to work out the correct amount of glass to order.

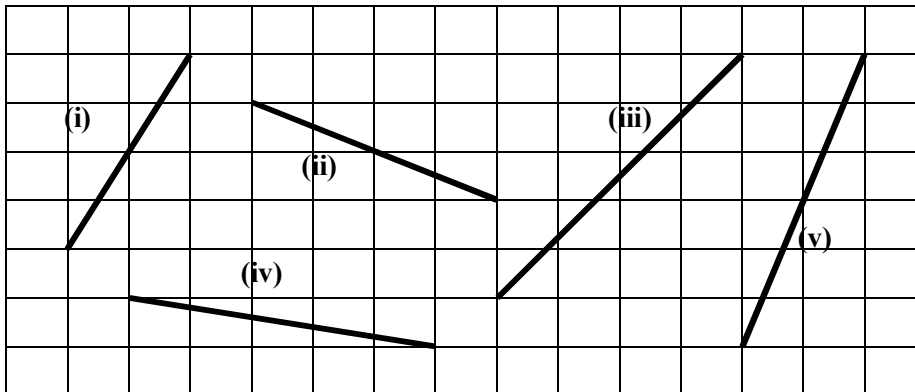
Number of large panes (L)	2	3	4	5	6		11
Number of small panes (S)	3	9					

- b) Copy and complete the formula for the number of small panes (S) in a block with (L) large panes.
- c) Can a block of windows have exactly 28 small panes, and explain your answer.
- d) Each pane is exactly 2 metres wide. How long would a block be if it had 24 small panes.

### Gradient of a Straight line E&F - 1.1c

1 In your own words give the meaning of gradient and describe where this can be applied in a real-life situation.

2 (a) Calculate the gradient of each line in the diagram below.



(b) **Copy** and complete each statement below:

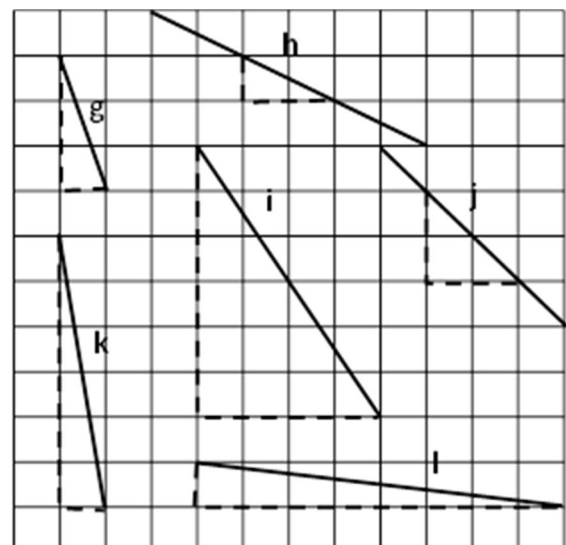
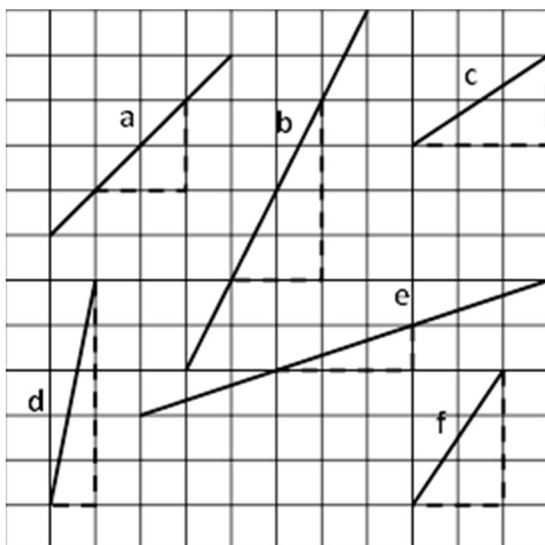
The gradient of any horizontal line is \_\_\_\_\_.

The gradient of any vertical line is \_\_\_\_\_.

A line sloping upwards from left to right has a \_\_\_\_\_ gradient.

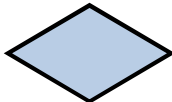


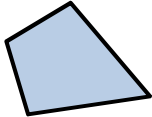

A line sloping upwards from right to left has a \_\_\_\_\_ gradient.

3 Clearly showing your working, calculate the gradient of each line.  
(Remember to consider whether the gradient is positive or negative!)

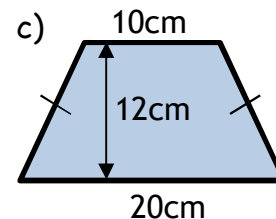
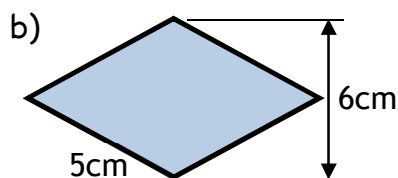
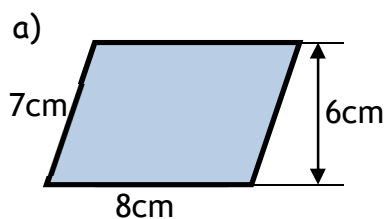


### Area and Perimeter E&F - 1.2a

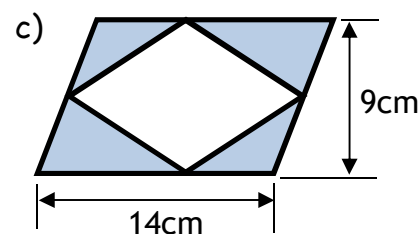
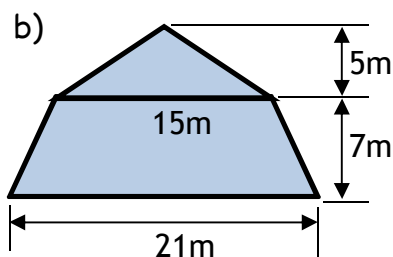
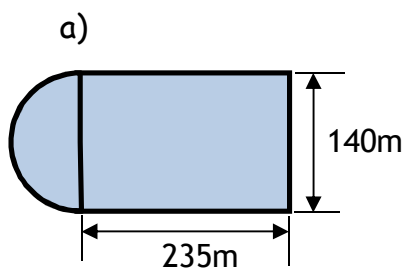
- 1 Match the following shapes to their correct name, description and formula to calculate area:

A. 	B. 	C. 	D. 	E. 
RECTANGLE	KITE	TRAPEZIUM	RHOMBUS	PARALLELOGRAM
No lines of symmetry. Two pairs of parallel sides.	All sides equal. Rotational symmetry of order 2.	Two pairs of equal adjacent sides. One pair of equal angles.	Two pairs of equal sides. Two lines of symmetry.	No line of symmetry. One pair of parallel sides.
$A = \frac{1}{2}h(a+b)$	$A = \frac{1}{2}d_1d_2$	$A = \frac{1}{2}d_1d_2$	$A = lh$	$A = lb$

- 2 Calculate the Perimeter and Area of the following shapes:

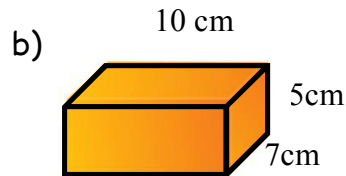
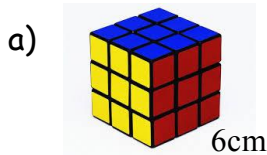


- 3 Calculate the **shaded area** for the following composite shapes:

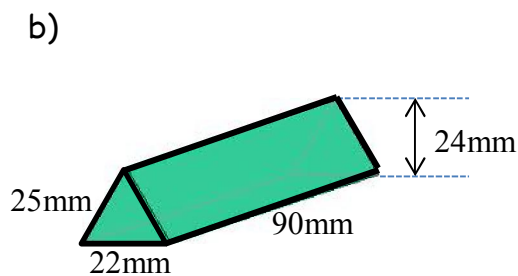
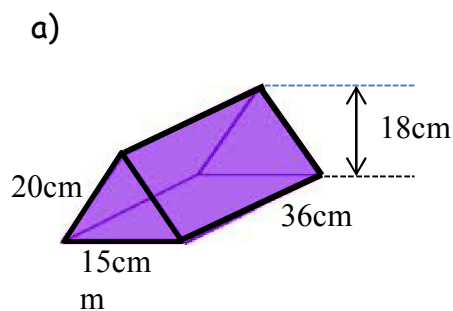


### Surface Area E&F - 1.2b

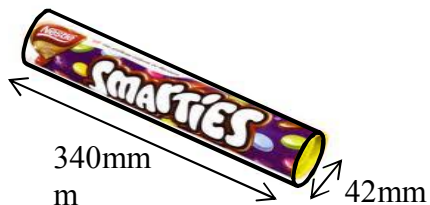
1 Calculate the Surface Area of these shapes:



2 Calculate the Surface Area of these Triangular Prisms:



3 This is a giant tube of Smarties:



- Find the Curved Surface Area.
- Find the Area of the Circular lid.
- Find the Total Surface Area.

4 The makers of Toblerone are releasing a special limited edition. They Want to know how much cardboard is required to manufacture the Packaging.

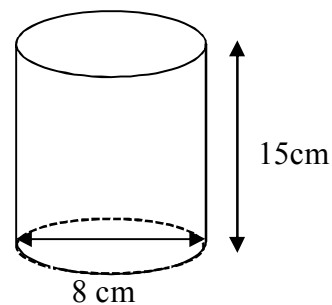


- Find the Surface Area of cardboard required.
- If they have 1 million cm of packaging available, how many can they release?

Volumes  
E&F - 1.2c

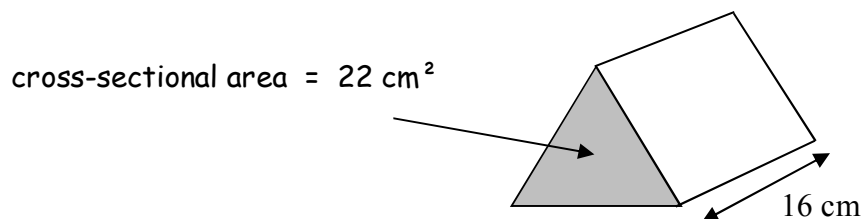
1. Calculate the volume contained by a cube of side 8cm.
2. Calculate the volume contained by a cuboid of sides 6cm by 3cm by 10cm

3. The diameter of this cylinder is 8cm.  
Its height is 15cm.  
Calculate its volume.

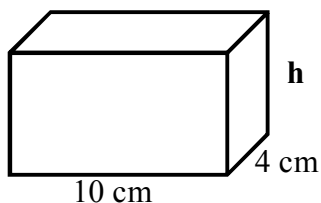


4. The shaded triangular face of the triangular prism has a cross-sectional area of  $22 \text{ cm}^2$ . The length of the triangular prism is 16 cm.

Calculate the volume of the triangular prism.



5

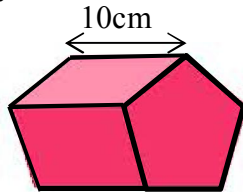


This cuboid has a volume of  $200 \text{ cm}^3$ .  
Find the height of the shape, clearly  
showing your working.

### Volumes Extension (2) E&F - 1.2c

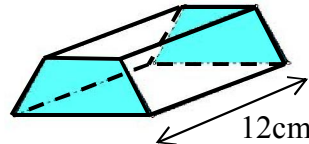
1 Calculate the Volume of these prisms:

a)



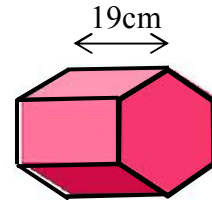
$$A = 43\text{cm}^2$$

b)



$$A = 28\text{cm}^2$$

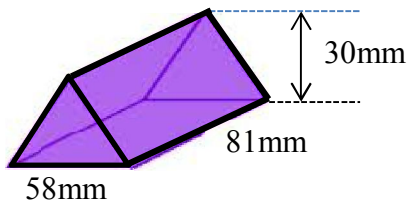
c)



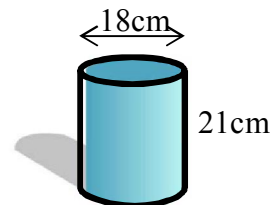
$$A = 62\text{cm}^2$$

2 Calculate the Volume of these Prisms, correct to 2 sig. figs.

a)

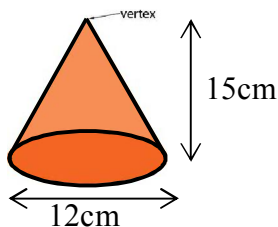


b)

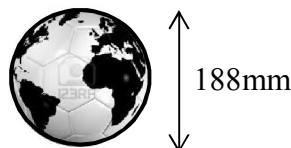


3 Calculate the Volumes of these shapes:

a)



b)



$$\begin{aligned} \text{Volume of a Cone} &= \frac{1}{3} \pi r^2 h \\ \text{Volume of a Sphere} &= \frac{4}{3} \pi r^3 \end{aligned}$$

4 The Area of the Base of The Great Pyramid at Giza, Egypt is  $53084\text{m}^2$   
Its height is 139m. Calculate its Volume.  
Give your answer in scientific notation, correct to 3 significant figures.



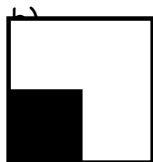
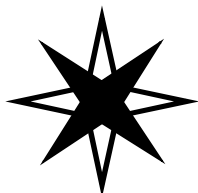
Volume of a Pyramid =

$$\frac{1}{3} \times \text{Area of Base} \times \text{Height}$$

### Rotational Symmetry E&F - 1.2d

1 State the order of rotational symmetry for each of the shapes below:

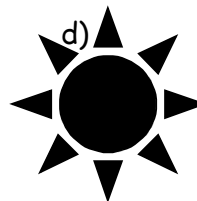
a)



c)

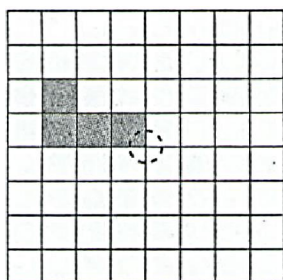


d)

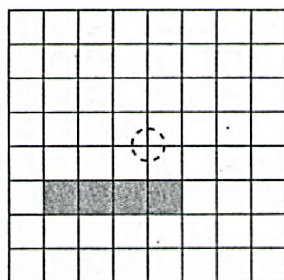


2 Copy and complete the following diagrams, to give the shapes rotational symmetry about the centre of:

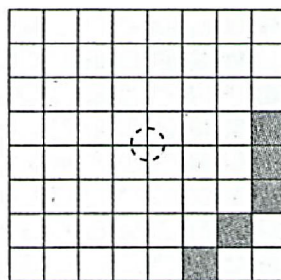
a) **Order 2**



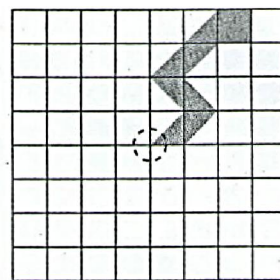
b) **Order 4**



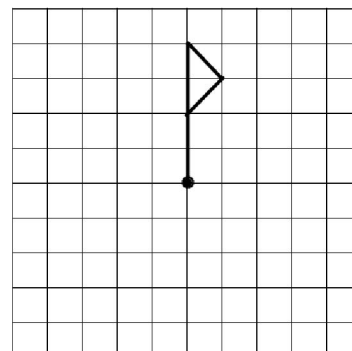
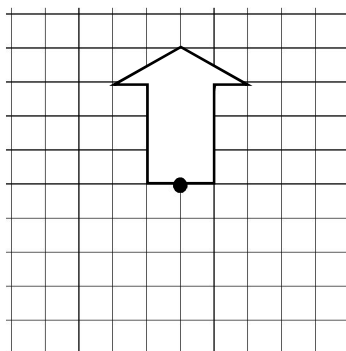
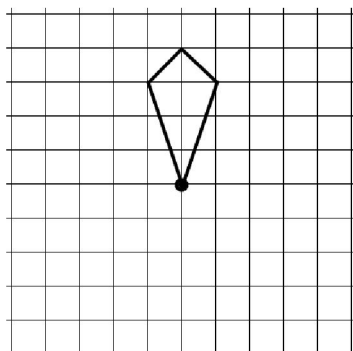
c) **Order 2**



d) **Order 4**



3 Copy each shape neatly into your jotter and give each shape  $\frac{1}{4}$  turn symmetry about the centre point.



Probability and Data Analysis  
E&F - 1.3a

- 1 In a bag there are 5 red, 7 green, 3 blue, 4 purple and 2 yellow Jelly Beans. A hole is torn in the bag, and a Jelly Bean falls out.



- Find the probability that the Jelly Bean that falls out is blue.
- The Jelly Bean that fell out was blue and is put in the bin.  
Find the probability that the next one that falls out will be red.

- 2 In any given year, the chance of a house being struck by lightning is 0.005.  
If there are 56000 homes in East Ayrshire, how many would be expected to be hit by lightning this year?



- 3 The cost of petrol (pence per litre) is compared in 5 petrol stations around East Ayrshire:

133.9, 136.9, 138.9, 134.9, 133.9

- Calculate the **median** petrol price.
  - Calculate the **mode** and **range**.
- 4 A group of pupils were asked how many books they had read this year.  
The results are shown in this frequency table

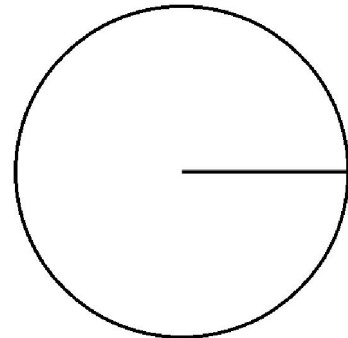
No. of Books	Frequency	No. Books $\times$ Frequency
0	13	
1	22	
2	26	
3	19	
4	11	
5	9	
<b>TOTAL</b>		

- Write down the modal number of books read.
- Copy and complete the table and find the mean number of books read.  
Give your answer correct to 1 decimal place.
- Find the probability that a pupil read more than 2 books this year.

### Pie Charts E&F - 1.3b

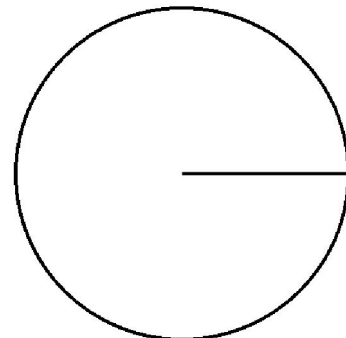
- 1 Sixty pupils were asked how they travelled to school.  
The table below shows the results.  
Copy and complete the table and construct a pie chart to display this information.

Travel method	No of pupils	Angle at Centre
Cycle	15	
Walk	20	
Car	25	



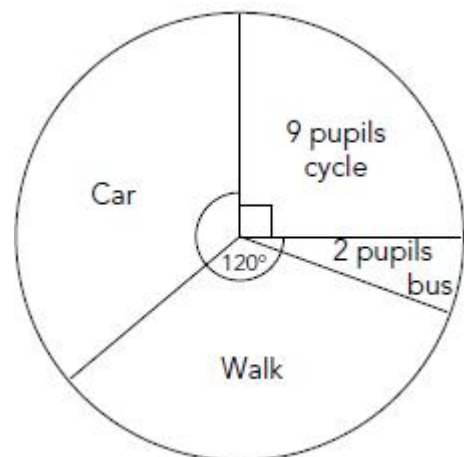
- 2 A pupil conducts a survey in class on pupils preferred interval snack. The results are shown below. Copy and complete the table and construct a pie chart to display this information.

Snack	Frequency	Angle at Centre
Crisps	12	
Fruit	7	
Chocolate	4	
Biscuit	7	
TOTAL	30	



- 3 This pie chart shows how students in class 3A travel to school.

- How many pupils walk to school?
- What is the angle for the bus sector?
- How many pupils attend the school?
- Complete the car sector?





Expressions and Formula  
REVISION Homework 1

- 1 Expand the brackets and simplify if possible  
(a)  $3(7x - 3)$  (b)  $4(6y + 4)$  (c)  $3(4h - 3) + 2h$  (d)  $7(2m - 1) - 11m$
- 2 Factorise: (a)  $6f + 18$  (b)  $4y - 24$  (c)  $28g - 12$
- 3 Simplify: (a)  $6a + 2b + 5a - b$  (b)  $3x + 5y - 6x - y$
- 4 (a) When  $x = 4$  and  $y = 6$ , find the value of  $6x - 3y$ .

- (b) Sally works for a camera repair shop.  
Her weekly pay is calculated using the formula:

$$P = 2.5H + 1.5R$$

where  $P$  is her pay (in pounds),  $H$  is the hours she works, and  $R$  is the number of repairs she makes.

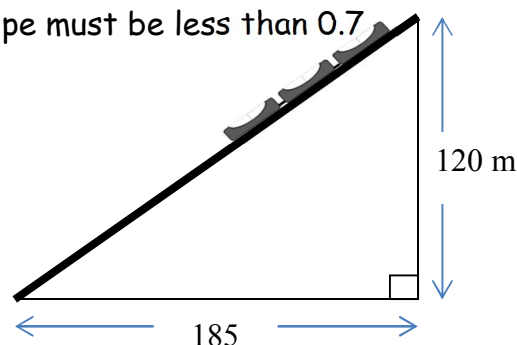
One week she works 30 hours and repairs 32 cameras.

Calculate her pay for that week

- 5 A new ski lift is being designed at the Slopes in Aviemore.  
For safety reasons the gradient of the uphill slope must be less than 0.7.  
The plan of the slope is shown below.

- (a) Calculate the gradient of the slope.  
(b) Will the slope pass safety inspection?

Give a reason for your answer.



- 6 The number of visitors to a local library was recorded each day for two weeks.  
The results are shown below.

71	84	67	90	87	54	96
62	85	87	78	99	75	91

Using suitable class intervals, draw a grouped frequency table for this data

### Expressions and Formula REVISION Homework 2

- 1 Eight people, who were attending an 8pm showing of a film at the local cinema, were asked their age. The results are shown below.

- (a) Calculate the mean age.
- (b) Calculate the median age.
- (c) Calculate the modal age.
- (d) Calculate the range.

15	27	14	23
26	18	19	18

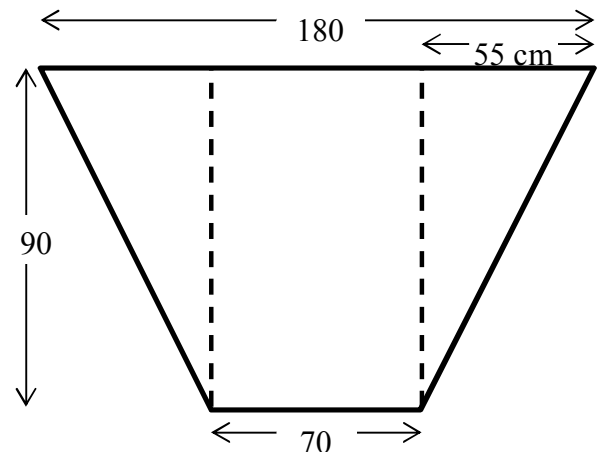
The next day the same survey was conducted at the 2pm showing of the film.

- the mean was 15 years
- the range was 24 years

- (e) Write two comments comparing the results between the two showings of the film.

- 2 The trapezium is made up of a rectangle and two identical right-angled triangles, as shown.

Find the area of this shape.

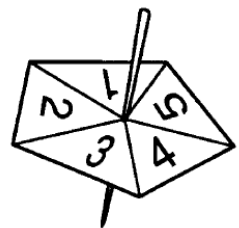


- 3 A spinner has 5 edges as shown in the diagram.

When it is spun it comes to rest on one edge.

What is the probability that it comes to rest on a number:

- (a) less than 4? (b) that is even? (c) that is less 6 ?



- 4 Expand the brackets and simplify if possible

- (a)  $5(3x - 6)$  (b)  $3(2y + 4)$  (c)  $6(2h - 5) - 8h$  (d)  $2(3m - 5) - 11$

Mathematics  
Expressions and Formula  
REVISION Homework 3

- 1 Eighty pupils were asked how they travelled to school.

The table below shows the results.

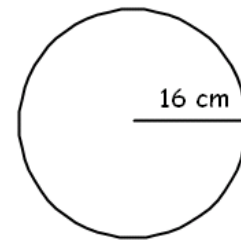
Calculate the angle at the centre and then construct a pie chart to display this information.

Travel method	No of pupils
Bus	44
Walk	18
Car	12
Other	6

- 2 The diagram shows a wheel. The wheel is a circle with a radius of 16 cm, as shown.

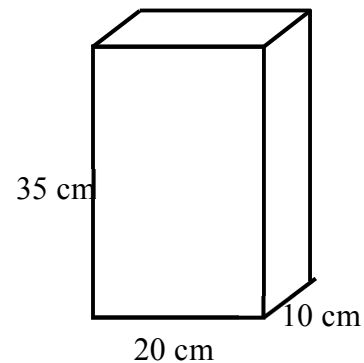
(a) Calculate the circumference of the wheel.

(b) Calculate the area of wheel.



- 3 A cereal box is in the shape of a cuboid. The cuboid is 20 cm long, 10 cm wide and 35 cm high, as shown in the diagram.

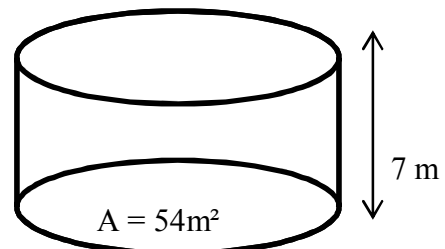
Find the **surface area** of the cuboid shown.



- 4 A cereal manufacturer has a large cylindrical container for storing grain.

The area of the base of the container is 54 square metres. The height of the container is 7 metres.

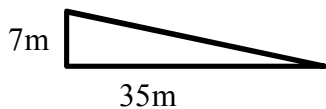
Calculate the volume of the container.



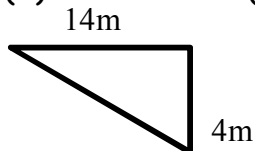
### Straight Line Relationships - 1.1a

1 State the Gradient of each slope as a fraction expressed in simplest form.

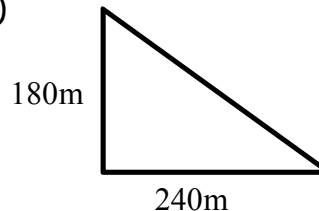
(a)



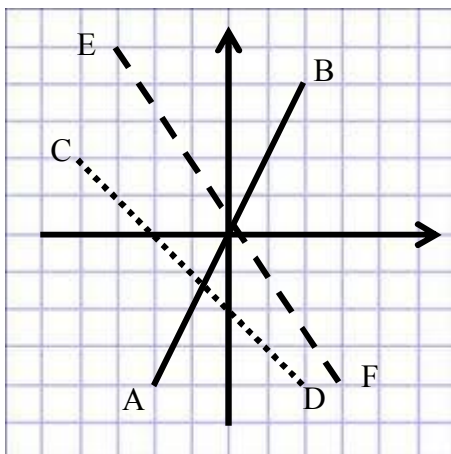
(b)



(c)



2



(a) Calculate the Gradient of AB

(b) Calculate the Gradient of CD

(c) Calculate the Gradient of EF

3 State the gradient (m) and y-intercept of the following lines:

(a)  $y = 3x + 2$

(b)  $y = 5x - 3$

(c)  $y = 2x + 4$

(d)  $y = 7x$

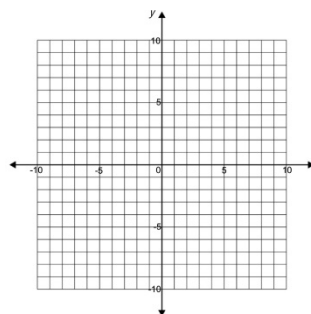
(e)  $y = 4$

(f)  $x = 2$

4 (a) Copy and complete the table below for the straight line:  $y = 2x - 1$ .

x	0	1	2	3
y				

(b) On a suitable axes, plot the above points to draw the line  $y = 2x - 1$



5 Using a Table of Values, Sketch the following lines:

(a)  $y = 2x + 1$

(b)  $y = 3x - 2$

(c)  $y = -4x + 4$

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



**Equations & Inequations  
Relationships - 1.1b**

- 1 Solve:  
a)  $x + 7 = 14$       b)  $y - 6 = 21$       c)  $2b + 6 = 14$       d)  $3c - 7 = 23$
- 2 Solve:  
a)  $21 = 3f + 9$       b)  $2 + 4x = 10$       c)  $15 - 5x = 5$       d)  $72 = 3a + 36$
- 3 Solve each equation:  
a)  $6x + 2 = 2x + 10$       b)  $4y - 18 = 3y + 20$       c)  $4s + 12 = 48 - 2s$
- 4 Solve these equations:  
a)  $9 - 3y = 4y + 30$       b)  $5w + 4 = 44 - 3w$       c)  $10 - 7b = 1 - 4b$
- 5 Solve:  
a)  $5(y + 1) = 25$       b)  $120 = 5(1 + x)$       c)  $-2(3b + 6) = 12$
- 6 Solve these inequations:  
a)  $4(x + 4) > 32$       b)  $6(y - 2) \geq 36$       c)  $5(p - 1) + 3p \leq 59$
- 7 Brian thinks of a number, multiplies it by two, and then he adds on 11.  
His answer is 25.  
What number did he think of?
- 8 Colette adds  $6y$  to 8, and then multiplies that answer by 4. Her answer is 152.  
What is the value of  $y$ ?



Formula and changing the subject  
Relationships - 1.1c

1. The distance, in kilometres, that a car can travel can be found as follows :-

*"Multiply the speed you are travelling at by the time you take for the journey".*

How many kilometres did a car travel, doing 90 km/h for a period of 5 hours ?

2. To change from degrees Celsius ( $^{\circ}\text{C}$ ) to degrees Fahrenheit ( $^{\circ}\text{F}$ ) use the following formula :-

*"Multiply the temperature in  $^{\circ}\text{C}$  by  $1.8$ , then add  $32$  to the answer".*

Use the formula to change :-      a)  $28^{\circ}\text{C}$  to  $^{\circ}\text{F}$ .      b)  $34^{\circ}\text{C}$  to  $^{\circ}\text{F}$ .

3. The cost of hiring an electric planer from a local Hire Shop is :-

*" £12 plus £1.90 per day"*

How much would it cost to hire the electric planer for

a) 3 days      b) 8 days      c) 3 weeks

4. To cook a chicken, we can use the following formula :-

*" Give it 45 minutes per kilogram then add on an extra 18 minutes"*

How long would it take to cook a 3 kilogram chicken ?

5. Change the subject of the following formulae.

a)  $T = r + s$       change the subject to       $r =$

b)  $F = ma$       change the subject to       $a =$

c)  $V = IR$       change the subject to       $I =$

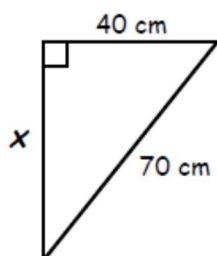
d)  $V = l \times b \times h$       change the subject to       $h =$

e)  $S = 20 + 9p$       change the subject to       $p =$

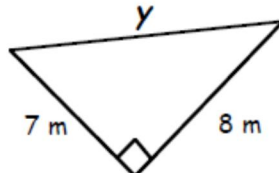
## Pythagoras Revision Relationships - 1.2a

1 For each question below, use an appropriate formula to find the values of  $x$ ,  $y$  and  $z$  :-

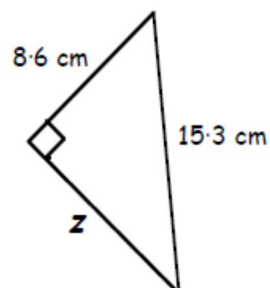
(a)



(b)



(c)

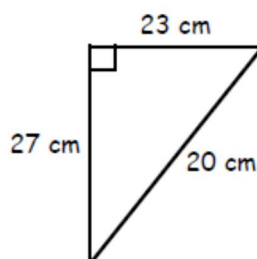


2

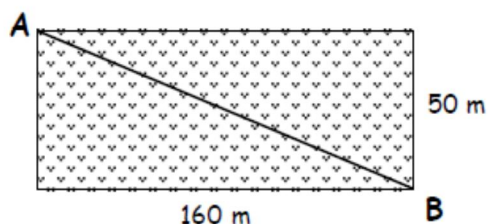
(a) What is wrong with the triangle shown ?

(b) In fact, the length of the hypotenuse has been given incorrectly.

What should its length be ?



3



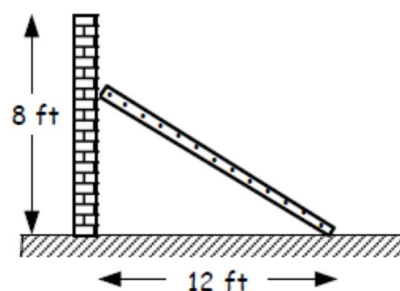
A farmer has a path which runs diagonally across a rectangular field.

How much longer is it to walk around the outside of the field from A to B than walking across the pathway ?

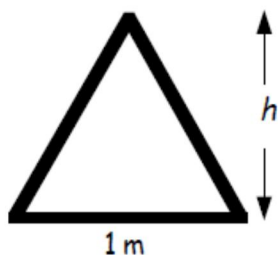
4

The top of a ladder is placed **three quarters** of the way up an eight foot high wall.

Find the length of the ladder.



5

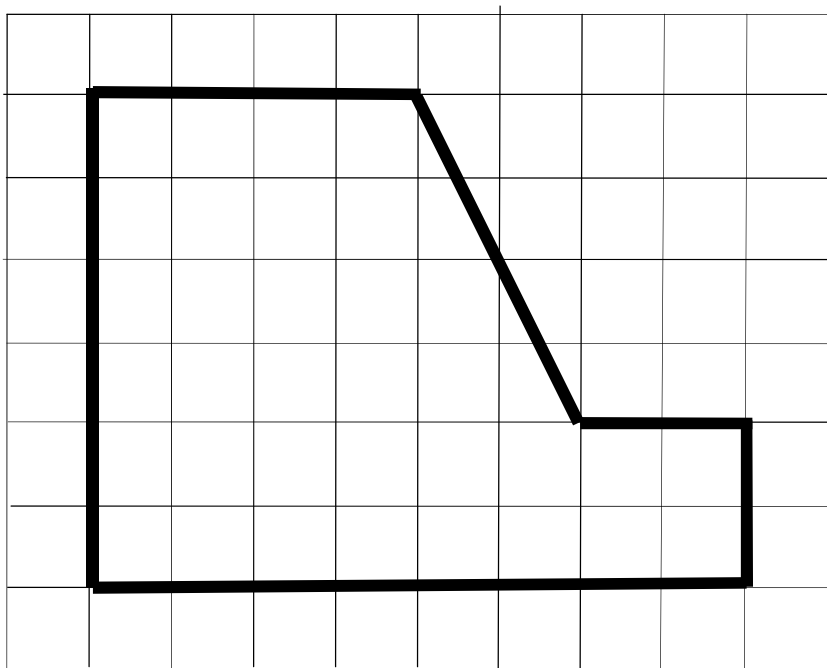


The road sign is in the shape of an equilateral triangle with side 1 metre.

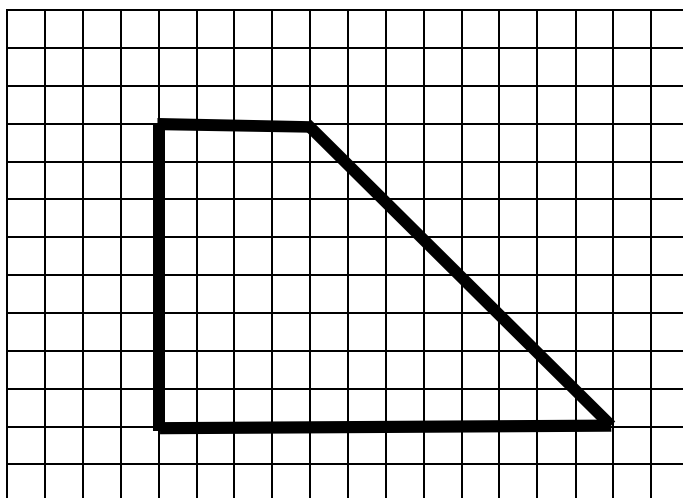
Find the height of the sign ( $h$  metres).

Scale and Similar Shapes  
Relationships - 1.2b

- 1 In your jotter draw a reduction of this shape using a scale factor of  $\frac{1}{2}$ .



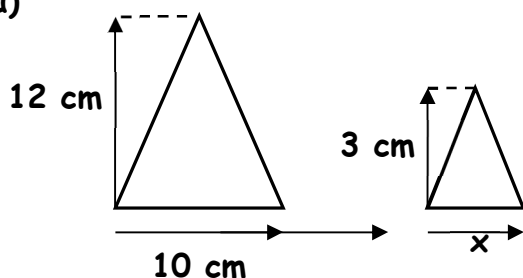
- 2 In your jotter draw enlargements of the shape shown below using:  
a) a scale factor of  $\frac{5}{4}$       b) a scale factor of  $\frac{3}{2}$



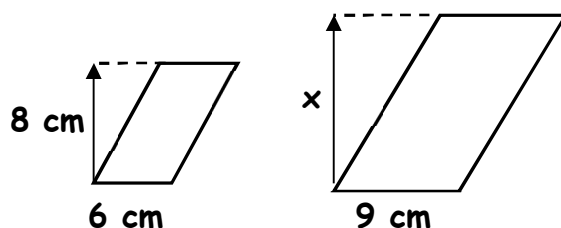
PTO ->

- 3 The following shapes are similar, find the side marked  $x$ .

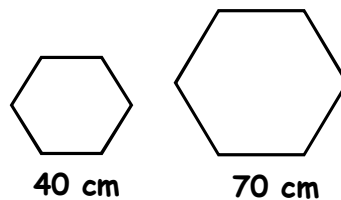
a)



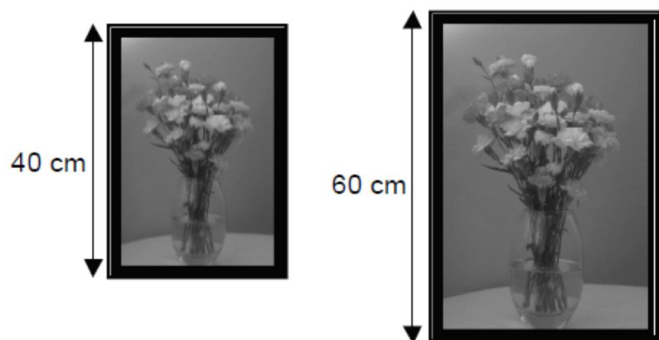
b)



- 4 Two regular hexagons are mathematically similar in shape.  
The larger hexagon has an **area** of  $7350 \text{ cm}^2$ .  
Find the area of the smaller one.

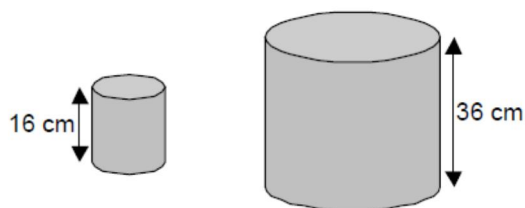


5



Two picture frames are mathematically similar in shape.  
The cost of the frames depends on their area. The cost of the smaller frame is £4.60.  
Find the cost of the larger one.

6



Two cylinders are similar.  
The smaller cylinder has a volume of  $1260 \text{ cm}^3$ .  
Find the volume of the larger one.  
Give your answer correct to 3 significant figures.

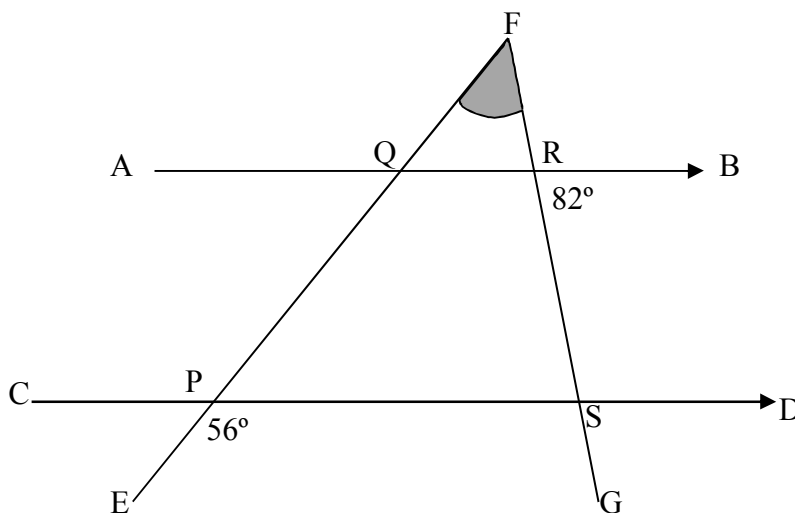
7

The pitchers shown opposite are similar.  
The larger pitcher can hold 864 ml of liquid.  
How much liquid can the smaller pitcher hold?



## Angles Revision Relationships - 1.2c (1)

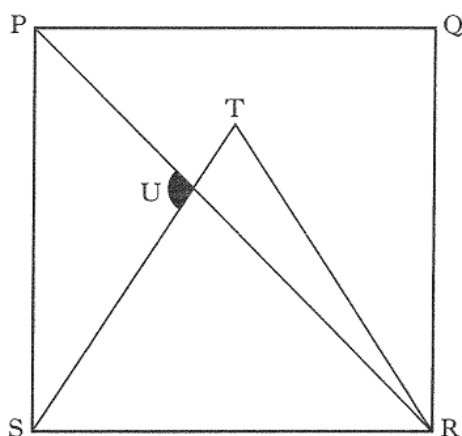
- 1 In the diagram below, lines AB and CD are parallel.  
Lines EF and GF intersect AB and CD at the points P, Q, R and S as shown.  
Angle QPS is  $56^\circ$  and angle BRS is  $82^\circ$ . Calculate the size of angle EFG.



- 2 In the diagram shown:

- PQRS is a square
- PR is a diagonal of the square
- Triangle RST is equilateral

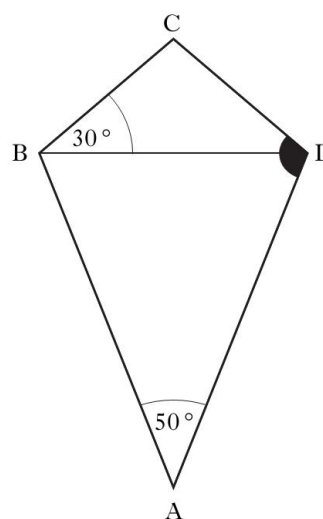
Calculate the size of the shaded angle SUP.



- 3 In the diagram:

- ABCD is a kite
- Angle DAB =  $50^\circ$
- Angle DBC =  $30^\circ$

Calculate the size of shaded angle ADC

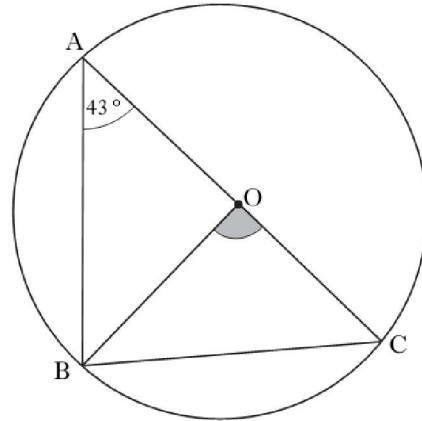


# Angles in Circles Relationships - 1.2c (2)

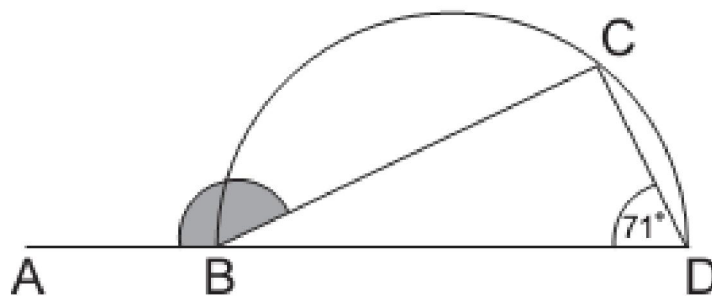
1 In the diagram:

- $O$  is the centre of the circle
- $AC$  is a diameter
- $B$  is a point on the circumference
- angle  $BAC = 43^\circ$ .

Calculate the size of shaded angle  $BOC$ .



2



The diagram above shows a semi-circle with  $BD$  as diameter.

- $C$  lies on the circumference
- In triangle  $BCD$ , angle  $CDB$  is  $71^\circ$
- $AD$  is a straight line

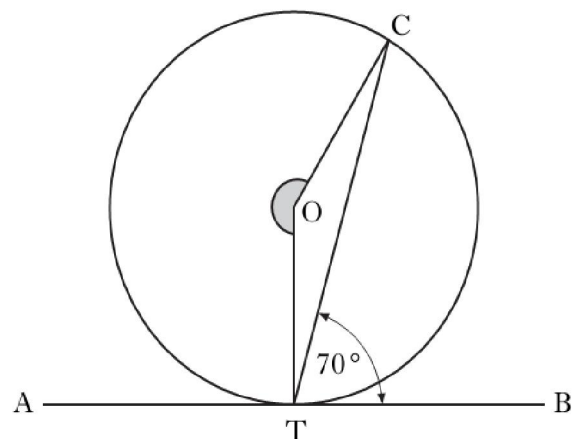
Calculate the size of the shaded angle  $ABC$ .

3

In the diagram shown:

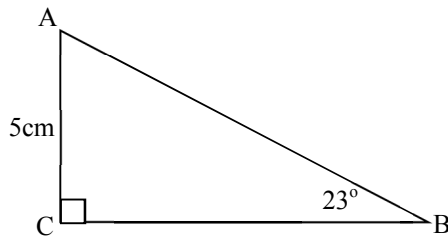
- $O$  is the centre of the circle
- $AB$  is a tangent to the circle at  $T$
- angle  $BTC = 70^\circ$ .
- 

Calculate the size of the shaded angle  $TOC$ .

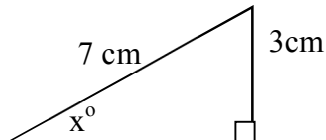


Trigonometry  
Relationships - 1.3 (1)

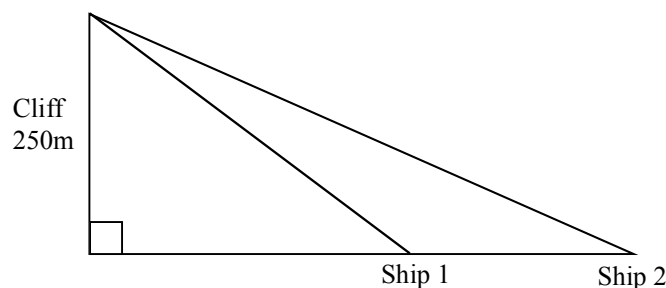
- 1 For the triangle shown calculate the length of the side AB.



- 2 Calculate the value of  $x$ :

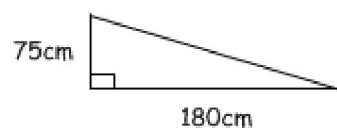


- 3 From a point 250 metres above sea-level, a coastguard measures the angle of depression of two ships due East of him as  $14^\circ$  and  $26^\circ$ .



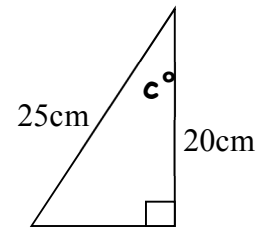
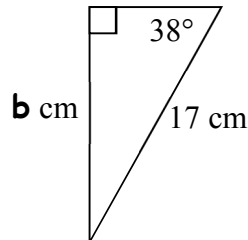
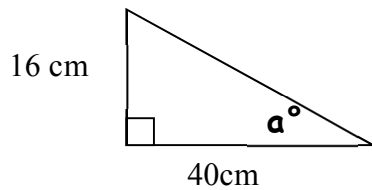
Calculate the distance between the ships.

- 4 Peter sees a notice on a ramp allowing access to a shopping mall. It says it does not exceed an incline of  $22^\circ$ .  
If the height of the ramp is 75cm, and the distance from the base of the step is 180cm, is the sign correct?



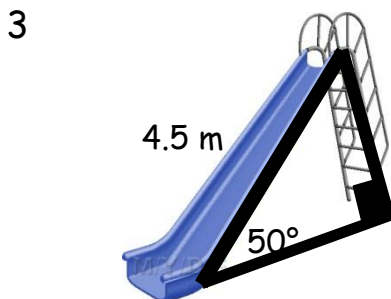
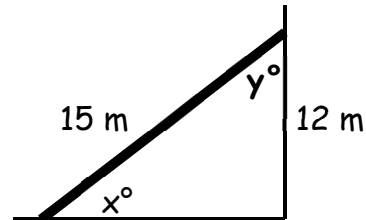
### Trigonometry Relationships - 1.3 (2)

- 1 Sketch the following triangles and calculate the size of the marked angles or lengths. Give your answers correct to 1 d.p.



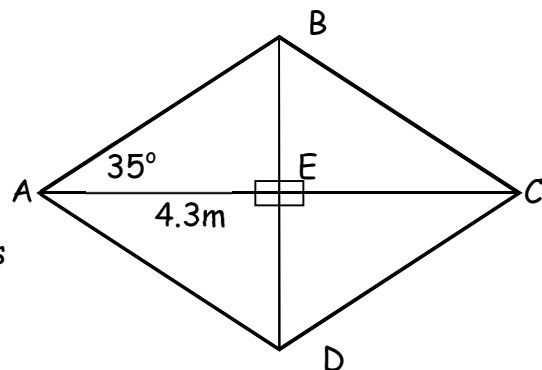
- 2 A ladder 15 metres long leans against a vertical wall so that the top of the ladder is 12 metres above the ground.  
What angle does the ladder make:

- a) with the ground ( $x^\circ$ )  
b) with the wall ( $y^\circ$ )



A children's slide in a park is 4.5 m long, and the angle the slide makes with the ground is  $50^\circ$ .  
Calculate the height of the ladders from ground level to the top of the slide.

- 4 ABCD is a rhombus  
AE is 4.3 m  
Angle BAE is  $35^\circ$   
Calculate the **perimeter** of the rhombus





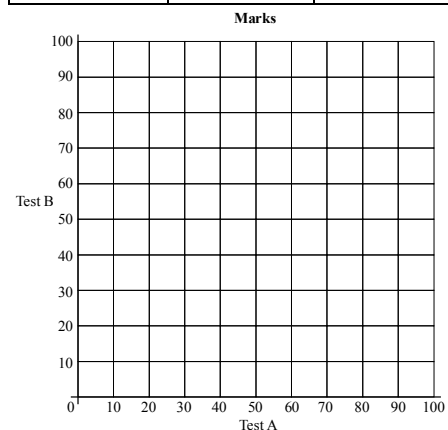
## Scatter graphs and line of best fit

### Relationships - 1.4

- 1 A class of students sat two tests in the same Subject. Here are the marks for six of the students who sat the tests:

Student	Test A	Test B
Arthur	50	30
Sue	71	54
Kaye	45	20
Hector	79	76
Mary	74	68
Agnes	65	55

- (a) On a suitable scale (similar to the one shown below), draw a scattergraph of these marks.
- (b) Draw a best fitting straight line for this scattergraph.
- (c) Use your line to estimate a pupils score in Test B, if they scored 60 in test A.
- (d) Use your line to estimate a pupils score in test A, when they scored 45 in test B.



- 2 A class of students sat two tests in Maths and Physics. Here are the marks for six of the students who sat the tests:

Student	Maths	Physics
Tom	30	40
Mary	55	50
Sarah	35	40
David	65	85
Kyle	45	62
Alan	42	30

- (a) On a suitable scale draw a scattergraph of these marks.
- (b) Draw a best fitting straight line for this scattergraph.
- (c) Claire scored 65 marks for Maths. Use **your line** to estimate the number of marks she scored in Physics.
- (d) Brian scored 55 for Physics but was absent for Maths. His teacher estimated his mark to be 40 for Maths. Is this a reasonable estimate?

### Relationships REVISION Homework 1

1 Solve the following equations

(a)  $3k + 8 = -7$       (b)  $5g + 12 = -3$       (c)  $\frac{1}{4}x + 2 = 10$

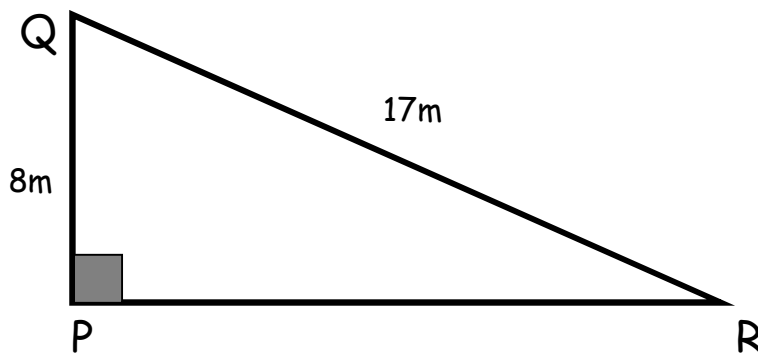
2 In Physics, Distance = Velocity  $\times$  Time or  $D = VT$ .

Change the subject of the formula to T

3 Change the subject of the formula

$w = 6v + 7$  , to v

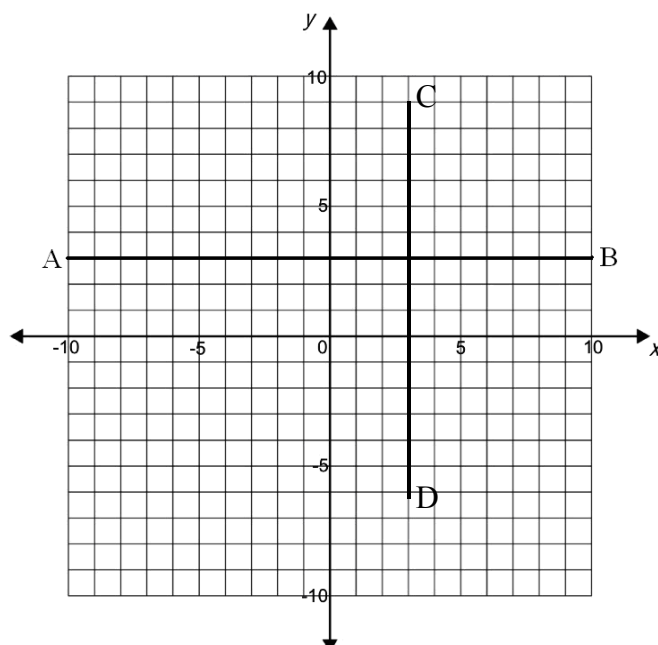
4 Triangle PQR is a right-angled triangle as shown in the diagram below.  
PQ is 8 metres long and QR is 17 metres long.



Calculate the length of PR (in metres).

5 Calculate the length of the line joining the following coordinates (5, 4) and (9, 14).

6



(a) Write down the equation of the line AB

(b) Write down the equation of the line CD

(c) Copy and complete the table of value for the line  $y = 3x - 1$ :

x	-1	0	1
y			

(d) On a suitable axis draw the line  $y = 3x - 1$

### Relationships REVISION Homework 2

- 1 A class sat two tests in the same subject. Here are the marks for six of the students who sat the tests:

Student	Test A	Test B
John	40	30
Sarah	68	56
Karen	55	35
David	80	72
Peter	74	68
Louise	65	55

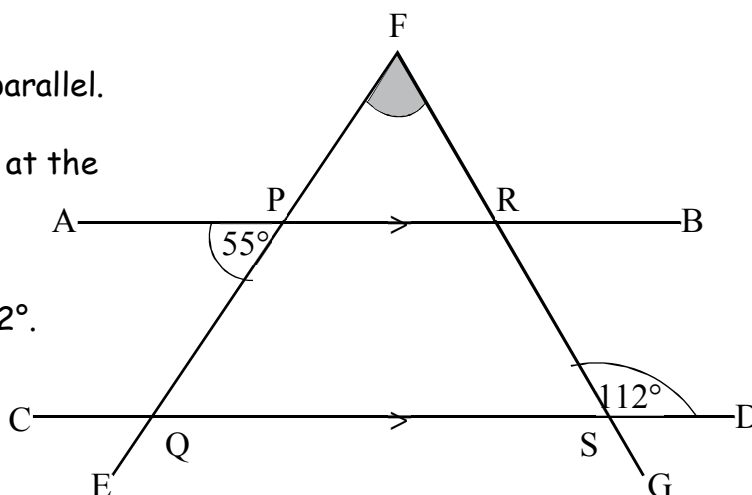
- (a) On a suitable axis, draw a scattergraph of these marks on the grid provided.  
 (b) Draw a best fitting straight line for this scattergraph.  
 (c) Joe scored 50 marks for Test A. Use your line to estimate the number of marks he scored in Test B.

- 2 In the diagram, lines AB and CD are parallel.

Lines EF and GF intersect AB and CD at the points P, Q, R and S as shown.

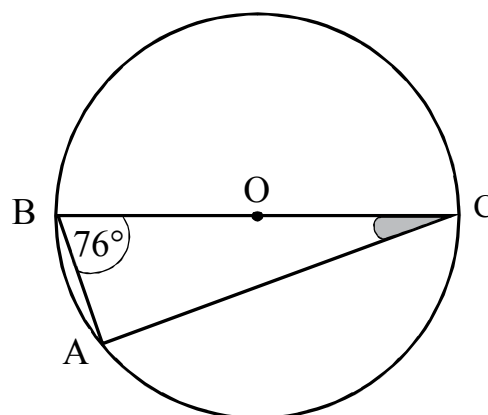
Angle APQ is  $55^\circ$  and angle DSR is  $112^\circ$ .

Calculate the size of angle EFG



- 3 AB is the diameter of a circle, centre O.  
 D is a point on the circumference of the circle.  
 Angle ABC is  $78^\circ$ .

Calculate the size of the shaded angle BCA



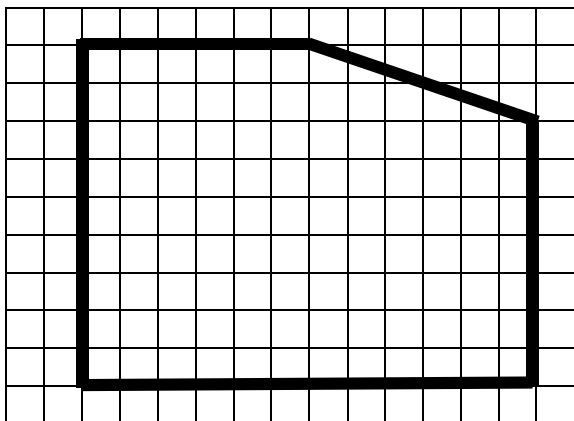
- 4 Change the subject of the formula to x:

a)  $3x - 4 = y$

b)  $\frac{1}{2}x = 6 - y$

### Relationships REVISION Homework 3

1

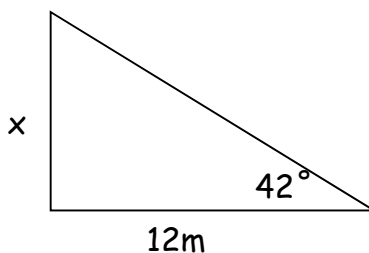
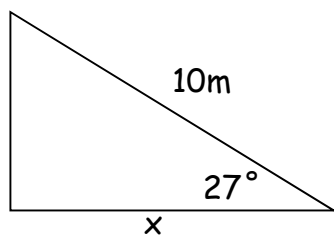


(a) Enlarge this shape by a scale factor of  $\frac{5}{3}$

(b) Reduce this shape by a scale factor of  $\frac{1}{3}$

2

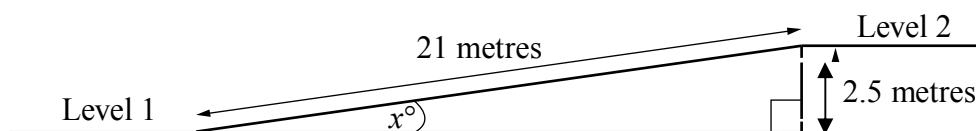
Calculate the length of side  $x$  in the right-angled triangles below.



3

A ramp 21 m long slopes at an angle of  $x^\circ$  from level 1 to level 2.

The height between levels is 2.5 metres.



(a) Calculate  $x^\circ$ .

(b) For safety reasons angle  $x^\circ$  should be less than 10 degrees.

Can the angle of the ramp be considered safe?

(Justify your answer.)

4

Solve the following equations:

(a)  $4k + 5 = -7$

(b)  $2(g + 6) = 8$

(c)  $\frac{1}{2}y + 12 = 10$

### Numeracy REVISION Homework 1

- 1 John bought a new HD Ready 3D TV. The price was £600 + VAT. VAT is charged at 20%.



What was the total price?

- 2 An empty box has a weight of 325 g. When thirty bars of chocolate are put into it, it has a weight of 1765 g. What is the weight of one bar of chocolate?

- 3 Craig is going to Spain. How much currency will he get for £550 when the exchange rate is 1.18 euros to a pound?

- 4 Complete the following table which shows departure and arrival times for different bus journeys.

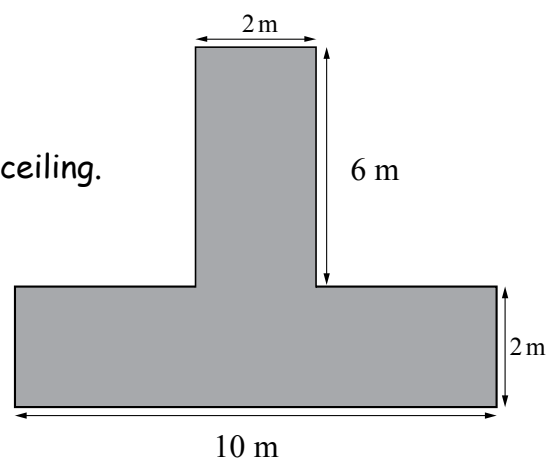
Depart	Arrive	Time taken
1015	1135	
1925		5h 20 min
	1700	7h 40 min

- 5 A room is in the shape of two rectangles.

The room is being decorated and a border is to go all round the walls of the room near the ceiling.

25 metres of border is bought.

Is the roll long enough for the room?



- 6
- (a) A bus travels at a constant speed of 42 mph for 15 minutes. How far does the bus travel in this time?
  - (b) A car journey of 115 miles takes 2 hours 18 minutes. Calculate the average speed.
  - (c) How long would it take to travel 136 miles at 40 mph? Give your answer in hours and minutes.



Numeracy  
REVISION Homework 2

- 1 Calculate the following:  
(a) 30% of 250kg (b) 15% of 380cm (c) 7% of \$780
- 2 In an emergency relief effort 217 kg of food is to be divided between two communities. The populations of the communities are in the ratio 2:5.  
The smaller community received 70 kg.

Is this the correct amount? Justify your answer by calculation.

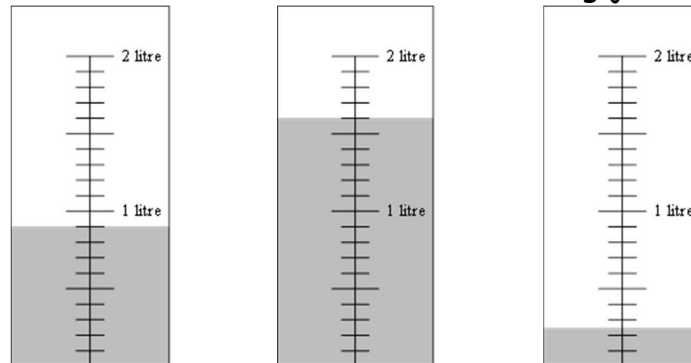
- 3 Between 12 noon and 3am the temperature in Mauchline dropped from  $9^{\circ}\text{C}$  to  $-5^{\circ}\text{C}$ . By how many degrees has its temperature dropped?

- 3 A group of 145 students are planning a trip to Alton Towers. They need to hire buses. The Local bus company offers two sizes of bus as shown. The students want to pay the lowest possible price.

Size A	48 seats	Price £220
Size B	25 seats	Price £140

(a) How many buses of each size should they hire? (b) How much will this cost?

- 4 Some coloured water has been added to these measuring jars.



How much water is needed to fill each jar?

- 5 Two shops are selling the same model of television. They are offering these for sale with different deals.

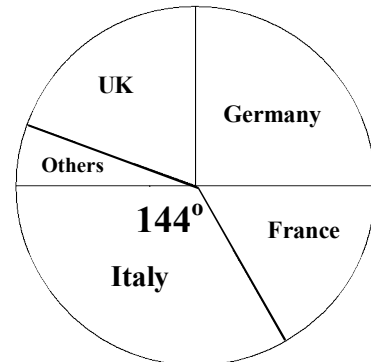
Tex- co
Deposit £120
Five payments of £56.70

Salisbury's
Deposit £110
Six payments of £49.50

Which shop has the cheaper deal? Justify your answer by calculation.

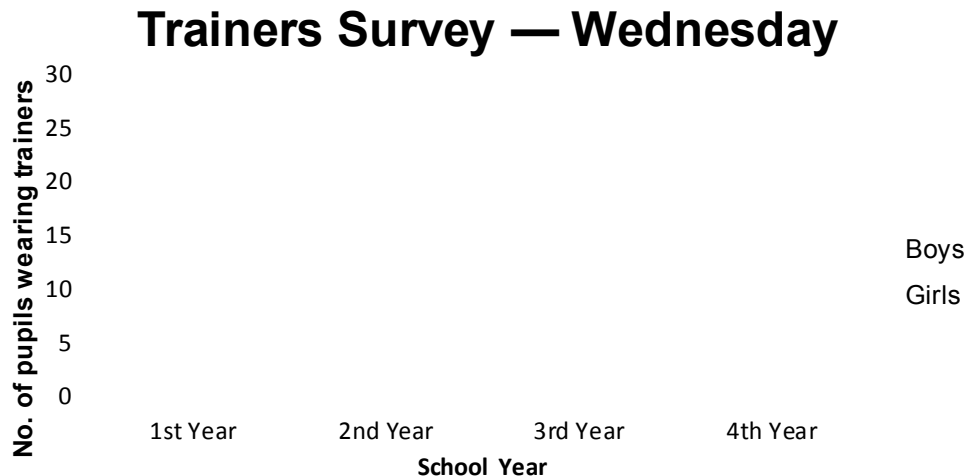
Numeracy  
REVISION Homework 3

- 1 A survey of an alpine ski resort showed that there were a total of 380 visitors from a variety of countries. The diagram below shows the proportion of visitors that came from each country.



How many visitors were there from Germany?

- 2 A local school conducted a survey on a Wednesday afternoon to establish the number of pupils who were wearing trainers. The compound bar chart below gives the results of the data collected.



- (a) How many S2 boys wore trainers that day?
- (b) In which year group did Girls wear trainers least?
- (c) Compare the results for both Boys and Girls.
- 3 An empty box has a weight of 260 g. When twenty bars of soap are put into it, it has a weight of 1350 g. What is the weight of one bar of soap?
- 4 Craig is going to America. How much currency will he get for £940 when the exchange rate is 1.68 dollars to a pound?
- 5 Liquid cools from 17 °C to -9 °C. By how many degrees has its temperature dropped?



**Numeracy**  
**REVISION Homework 4**

- 1 The table shows the amount of yearly interest a selection of banks will pay to a customer on savings.

Bank	Less than £1000	Between £1000 and £5000	More than £5000
A	1.2%	1.3%	1.5%
B	1.3%	1.4%	1.6%
C	1.2%	1.5%	1.5%
D	1.3%	1.3%	1.4%

- a) Which bank would pay the most interest for a savings of £4700?
- b) Where is the best place to invest £7000? Explain!

- 2 Two sports clubs have to send young athletes to a showcase event. The young people allowed to go, are chosen at random.

Auchinleck Athletico has 28 members and has been given 5 tickets to use.  
Ochiltree Olympians has 32 members and has been given 6 tickets to use.

In which club does any one person have a better chance of being selected. Justify your answer by calculation.

- 3 Four football teams play in a local league.

- Team A have won 6 out of their 9 games.
- Team B have won 8 out of their 11 games.
- Team C have won 10 out of their 14 games.

Which team has the best winning record? Justify your answer by calculation

- 4 Three mobile phone companies each have a contract available at the same price.

	Company A	Company B	Company C
Calls (minutes)	160	200	220
Texts	1000	750	850
Internet (Mb)	160	170	140

Rachel is looking for a mobile phone contract which will give her 150 minutes of calls, 800 texts, and 150Mb of internet use.

Which company's plan would be best for her?



**ADDED VALUE PRACTICE**  
**Non Calculator**

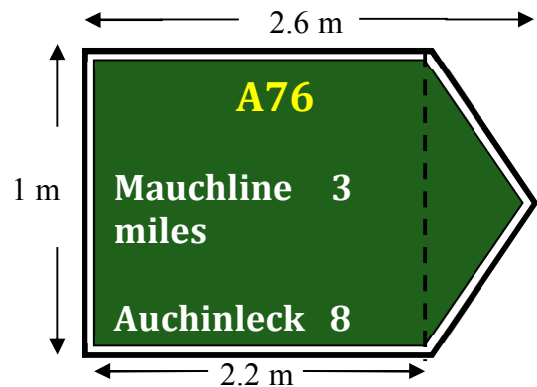
- 1      a) To buy a house, 40% of the total cost must be paid at the time of sale. How much must be paid for a house worth £85000 ?
- b) The cost of fuel has increased by 6% this year. If the average yearly fuel bill is £1300, by how much will the bills have increased?
- 2      The ages of seven friends at a skate park are listed below.
- 11   12   10   11   9   8   13
- Calculate the mean weight. Round your answer to 2 decimal places.
- 3      a) A theatre has 870 seats.  
         At a Saturday matinee performance, the theatre was  $\frac{4}{5}$  full.  
         How many people were at the theatre on Saturday?
- b) Hampden Park has a capacity of 52062. At a recent Scottish Cup Final, the stadium was  $\frac{5}{6}$  full. How many people were attending the match?
- 4      To make cement, a builder mixes 3.87 tonnes of sand with 1.6 tonnes of concrete.
- The builder then uses 4.3 tonnes of the cement to complete a construction project. How much concrete is not used?
- 5      a) If one concert tickets costs £32.96, how much will it cost to buy 7 of these tickets?
- b) The combined train fare for a group of friends travelling to Glasgow is £70.65. If there are 9 people travelling, how much is the cost of each ticket?

### ADDED VALUE PRACTICE

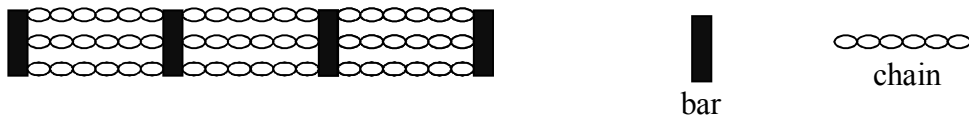
Calculator Allowed

- 1 Solve algebraically the equation:  
 $7x - 6 = 3x + 2$

- 2 A road sign is constructed from a **rectangle** and an **isosceles** triangle. The dimensions are shown:
- Calculate the area of this road sign.



- 3 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.

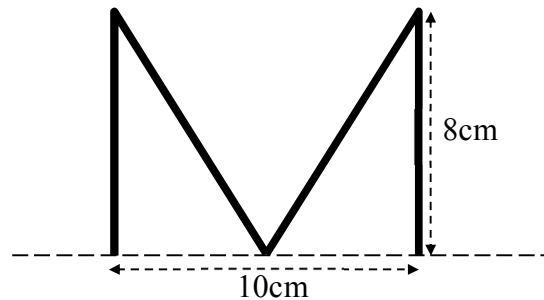
Number of bars ( <i>b</i> )	2	3	4		8
Number of chains ( <i>c</i> )					

- (b) Write down a formula for calculating the number of chains (*c*) when you know the number of bars (*b*).
- (c) Julie has 50 pieces of chain. How many bars will she need if she wants to use as many of the pieces of chain as possible?

- 4 Jane travels by car to visit a friend in York. The journey of 240 miles took 4 hours 36 minutes.

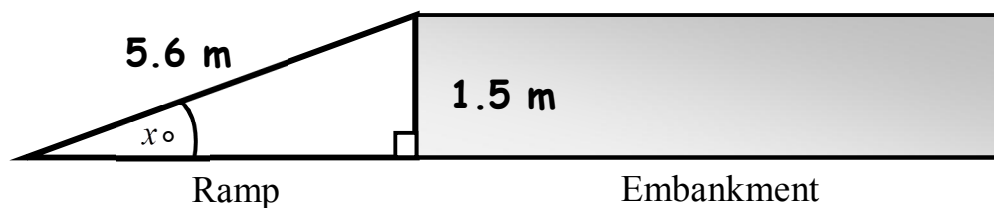
What was the average speed of her journey?  
Give your answer in miles per hour

- 5 The capital letter 'M' can be formed using straight lines as shown below.



Calculate the **total** length of the lines forming the letter.

- 6 A ramp is built to allow vehicles to reach an embankment.



The length of the ramp is 5.6 metres and the height is 1.5 metres.  
To pass safety regulations the angle that the ramp makes with the horizontal must be less than  $18^\circ$ . Will this ramp be safe? (show working!)

- 7 (a) Draw coordinate axes and plot the points  $A(-4, -4)$ ,  $B(-2, 2)$  and  $C(3, 2)$ .
- (b) Plot a fourth point D to form a parallelogram ABCD.  
Join up the points to show the parallelogram ABCD.
- (c) Write down the coordinates of the point D.