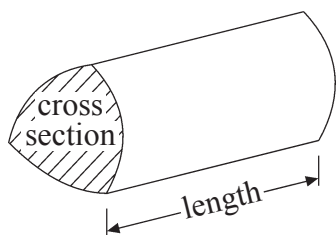


GCSE Mathematics (Linear) 1380

Formulae: Higher Tier

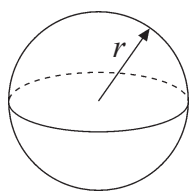
You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of a prism = area of cross section \times length



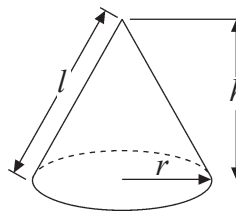
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$

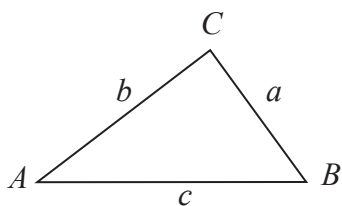


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$



In any triangle ABC



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

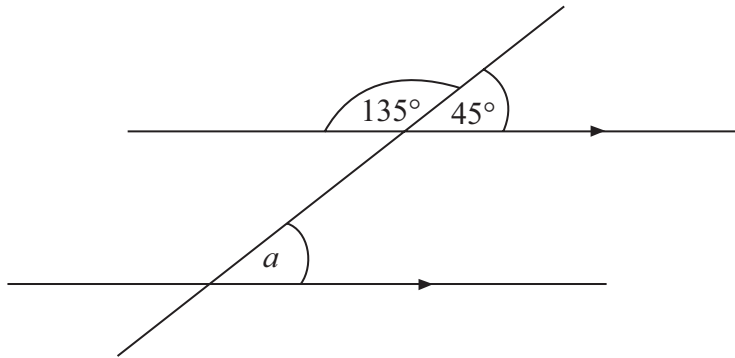
Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2}ab \sin C$



1.

Diagram NOT accurately drawn



(i) Write down the size of the angle marked a .

..... °

(ii) Give a reason for your answer.

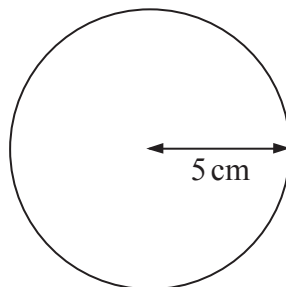
.....

(Total 2 marks)

Q6

2. A circle has a radius of 5 cm.

Diagram NOT accurately drawn



Work out the area of the circle.
Give your answer correct to 3 significant figures.

..... cm²

(Total 2 marks)

Q7

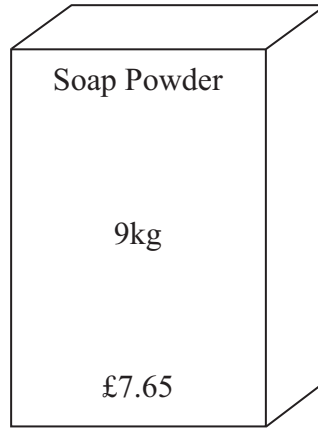


3.

Soap powder is sold in two sizes of box.



Small box



Large box

A small box contains 2 kg of soap powder and costs £1.72

A large box contains 9 kg of soap powder and costs £7.65

Which size of box gives the better value for money?

.....

Explain your answer.

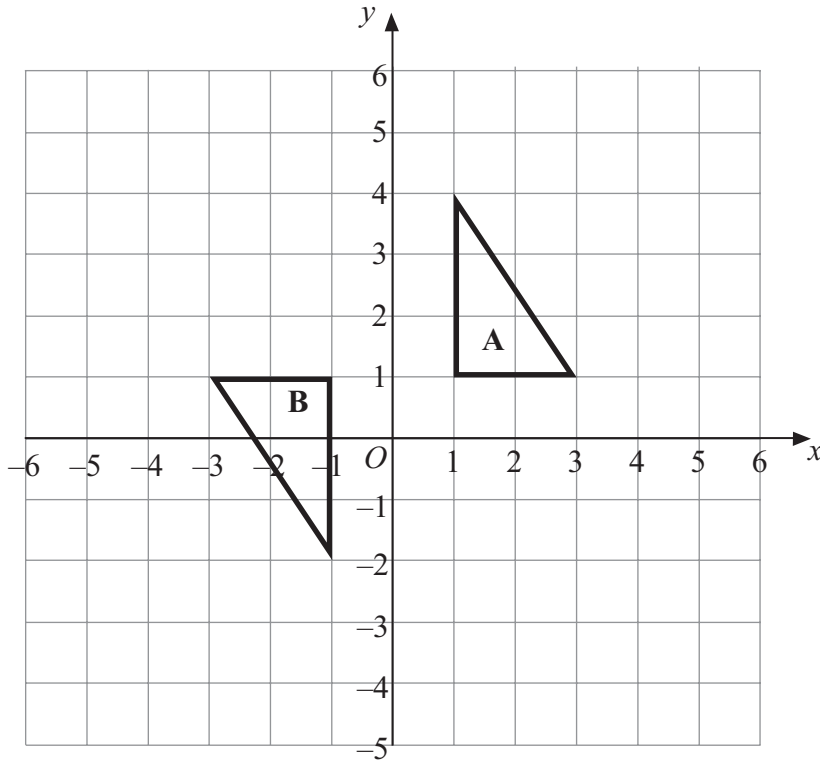
You must show all your working.

(Total 3 marks)

Q8



4.



Describe fully the single transformation that maps triangle A onto triangle B.


.....

(Total 3 marks)

Q9

5. A computer costs £360 plus $17\frac{1}{2}\%$ VAT.

Calculate the total cost of the computer.

	£360
	plus
	$17\frac{1}{2}\%$ VAT

£

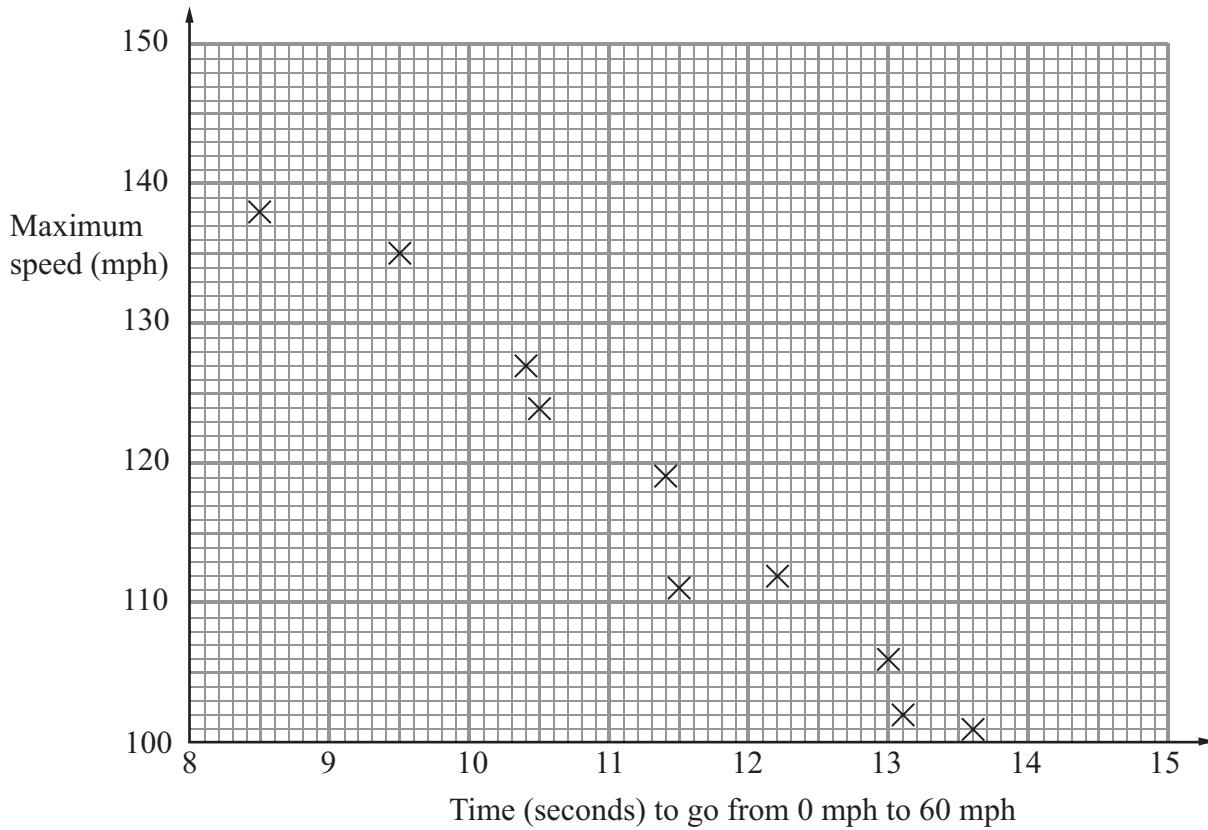
(Total 3 marks)

Q10



6.

The scatter graph shows some information about 10 cars. It shows the time, in seconds, it takes each car to go from 0 mph to 60 mph. For each car, it also shows the maximum speed, in mph.



(a) What type of correlation does this scatter graph show?

.....
(1)

The time a car takes to go from 0 mph to 60 mph is 11 seconds.

(b) Estimate the maximum speed for this car.

..... mph
(2)

(Total 3 marks)

Q11



7.

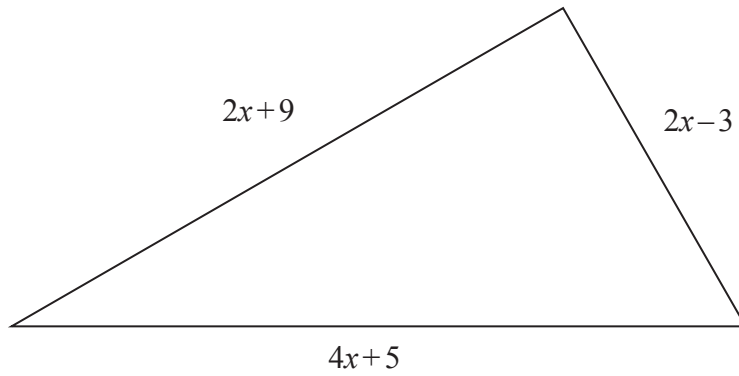


Diagram **NOT** accurately drawn

In the diagram, all measurements are in centimetres.

The lengths of the sides of the triangle are

- $2x+9$
- $2x-3$
- $4x+5$

- (a) Find an expression, in terms of x , for the perimeter of the triangle.
Give your expression in its simplest form.

.....
(2)

The perimeter of the triangle is 39 cm.

- (b) Find the value of x .

$x =$
(2)

(Total 4 marks)

Q12



8. A piece of wood is 180 cm long.
Tom cuts it into three pieces in the ratio 2 : 3 : 4

Work out the length of the longest piece.

..... cm

(Total 3 marks)

Q13

9. The equation

$$x^3 + 2x = 60$$

has a solution between 3 and 4

Use a trial and improvement method to find this solution.
Give your answer correct to 1 decimal place.
You must show all your working.

$x =$

(Total 4 marks)

Q14



10.

(a) Simplify $m^3 \times m^4$

.....
(1)

(b) Simplify $p^7 \div p^3$

.....
(1)

(c) Simplify $4x^2y^3 \times 3xy^2$

.....
(2)

(Total 4 marks)

Q15

11.

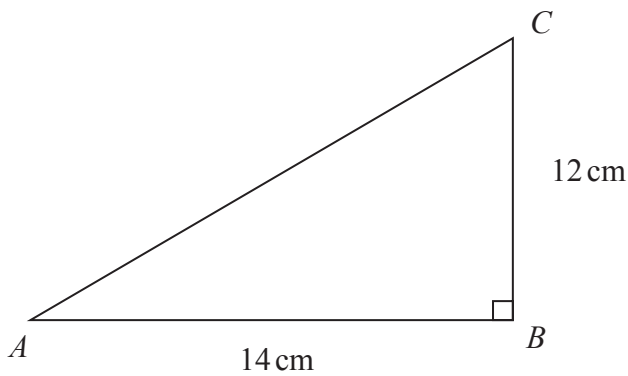


Diagram NOT accurately drawn

ABC is a right-angled triangle.

$AB = 14$ cm.

$BC = 12$ cm.

Calculate the length of AC .

Give your answer correct to 3 significant figures.

..... cm

(Total 3 marks)

Q16



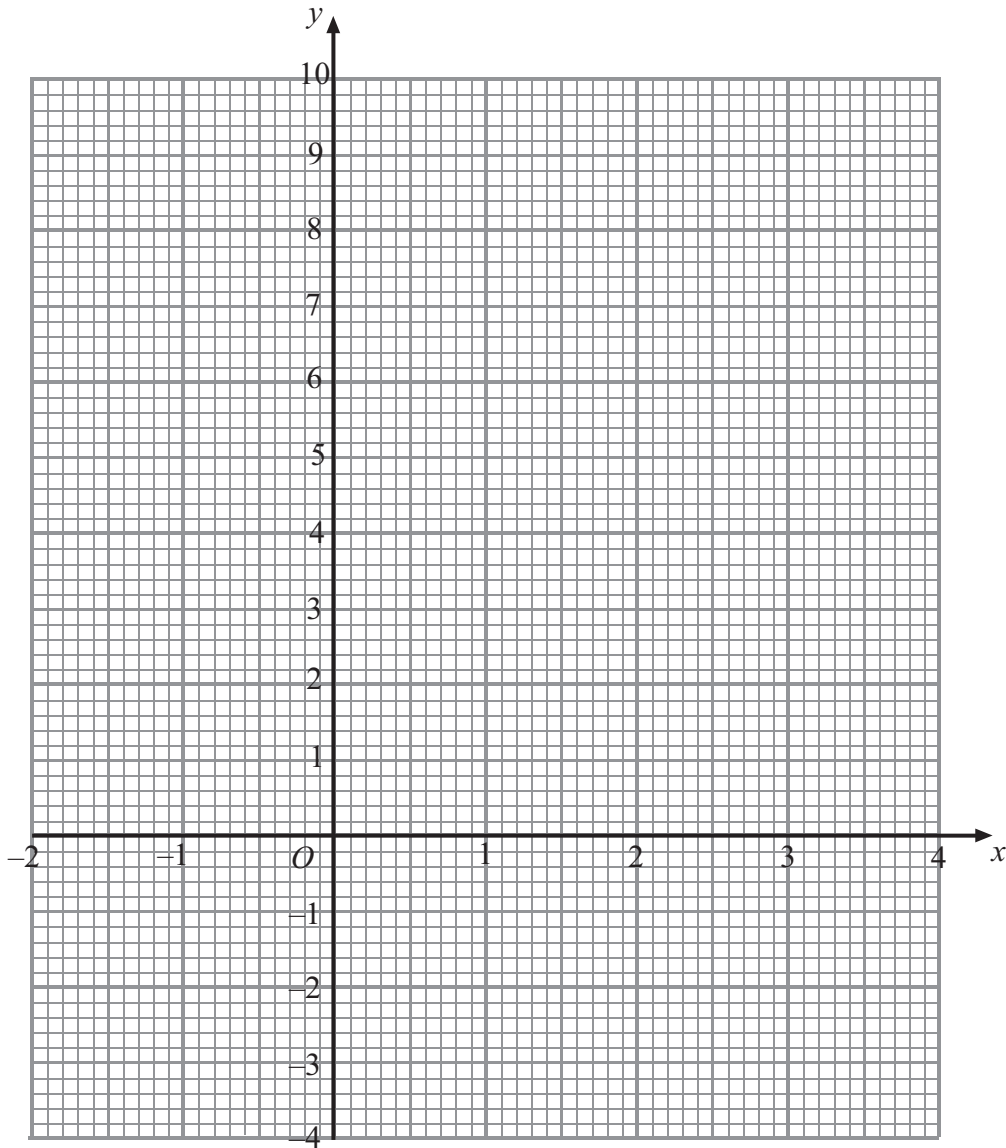
12.

(a) Complete the table of values for $y = x^2 - 3x - 1$

x	-2	-1	0	1	2	3	4
y		3	-1	-3		-1	

(2)

(b) On the grid, draw the graph of $y = x^2 - 3x - 1$ for values of x from -2 to 4



(2)

Q17

(Total 4 marks)



13.

The table shows some information about the heights (h cm) of 100 students.

Height (h cm)	Frequency		
$120 \leq h < 130$	8		
$130 \leq h < 140$	16		
$140 \leq h < 150$	25		
$150 \leq h < 160$	30		
$160 \leq h < 170$	21		

(a) Find the class interval in which the median lies.

.....
(1)

(b) Work out an estimate for the mean height of the students.

..... cm
(4)

(Total 5 marks)

Q18



14.

The table below gives some information about some students in a school.

Year group	Boys	Girls	Total
Year 12	126	94	220
Year 13	77	85	162
Total	203	179	382

Andrew is going to carry out a survey of these students.
He uses a sample of 50 students, stratified by year group and gender.

Work out the number of Year 13 girls that should be in his sample.

.....
(Total 2 marks)

Q24

15.

y is directly proportional to x .

When $x = 500$, $y = 10$

(a) Find a formula for y in terms of x .

$y =$
(3)

(b) Calculate the value of y when $x = 350$

$y =$
(1)

(Total 4 marks)

Q25



16.

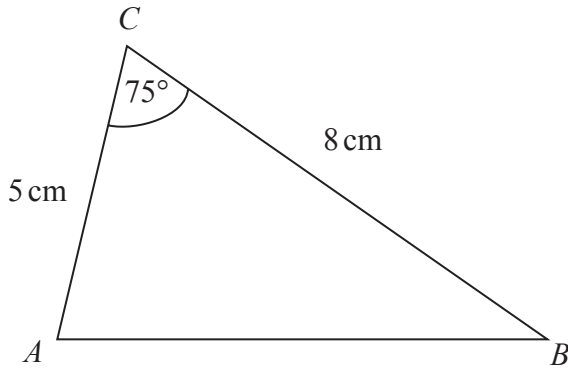


Diagram NOT accurately drawn

In triangle ABC ,

$AC = 5 \text{ cm.}$

$BC = 8 \text{ cm.}$

Angle $ACB = 75^\circ.$

- (a) Calculate the area of triangle ABC .
Give your answer correct to 3 significant figures.

..... cm^2
(2)

- (b) Calculate the length of AB .
Give your answer correct to 3 significant figures.

..... cm
(3)

(Total 5 marks)

Q26

