

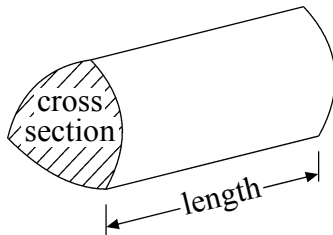
GCSE Mathematics (Linear) 1380

Formulae: Higher Tier



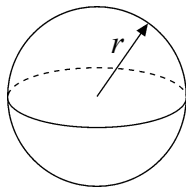
You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

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



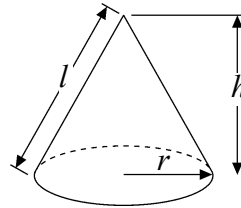
Volume of sphere = $\frac{4}{3}\pi r^3$

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

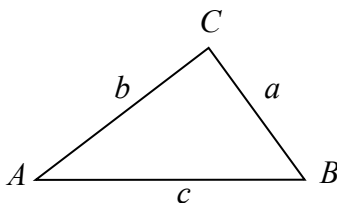


Volume of cone = $\frac{1}{3}\pi r^2 h$

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 = $\frac{1}{2}ab \sin C$



Write your answers in the spaces provided.

You must write down all stages in your working.

You must NOT use a calculator.

1. A box contains milk chocolates and dark chocolates only.
The number of milk chocolates to the number of dark chocolates is in the ratio 2 : 1

There are 24 milk chocolates.

Work out the total number of chocolates.

.....

(Total 2 marks)

Q1

2. (a) Simplify $p \times p \times p \times p$

.....

(1)

- (b) Simplify $2c \times 3d$

.....

(1)

(Total 2 marks)

Q2



3. Here are the first five terms of an arithmetic sequence.

2 6 10 14 18

(a) Find, in terms of n , an expression for the n th term of this sequence.

.....
(2)

(b) An expression for the n th term of another sequence is $10 - n^2$

(i) Find the third term of this sequence.

.....

(ii) Find the fifth term of this sequence.

.....
(2)

(Total 4 marks)

Q4



4.

Paul drives 175 miles to a meeting.
His company pays him 37p for each mile.

Work out how much the company pays Paul.

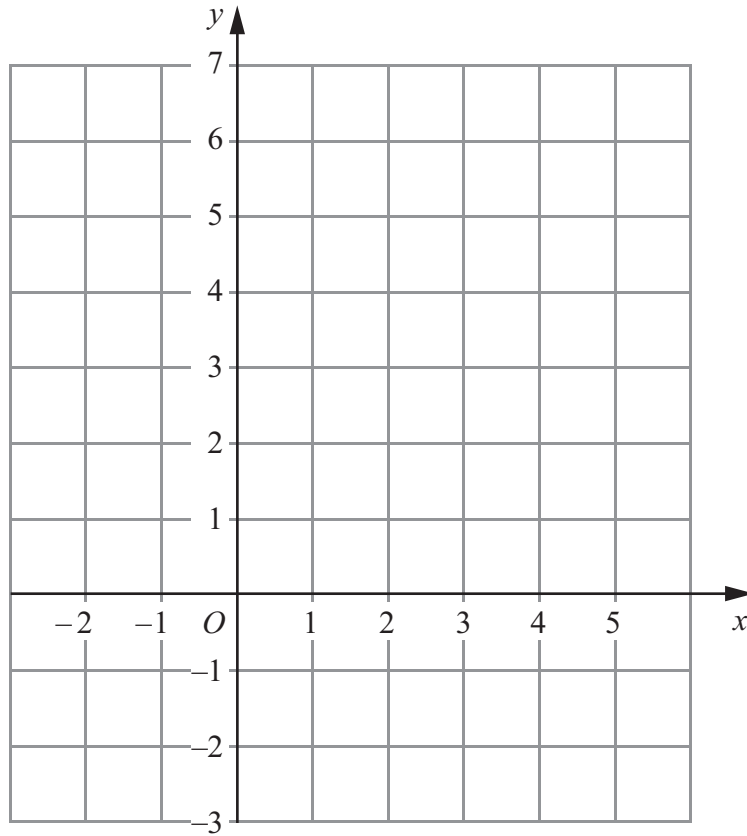
£

(Total 3 marks)

Q7



5. On the grid draw the graph of $x + y = 4$ for values of x from -2 to 5



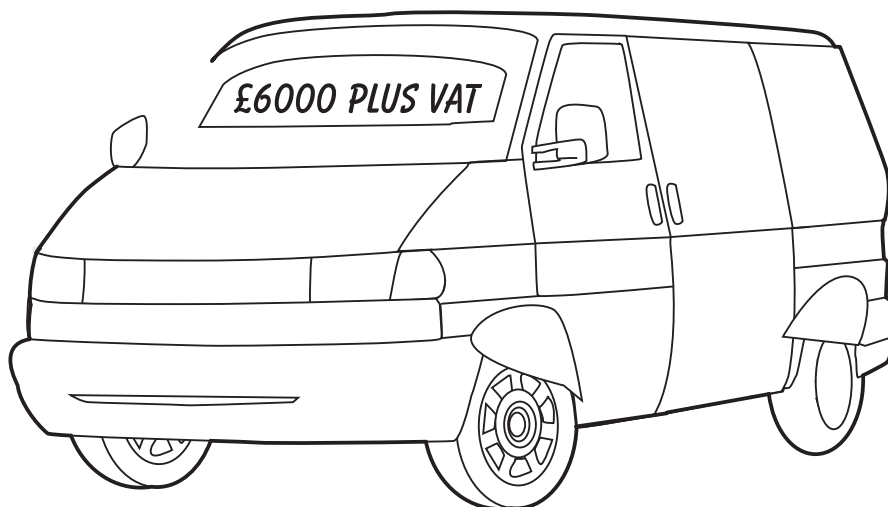
(Total 3 marks)

Q8



6.

Lizzie bought a van.
The total cost of the van was £6000 **plus** VAT at $17\frac{1}{2}\%$.



Lizzie paid £3000 when she got the van.
She paid the rest of the total cost of the van in 10 equal monthly payments.

Work out the amount of each monthly payment.

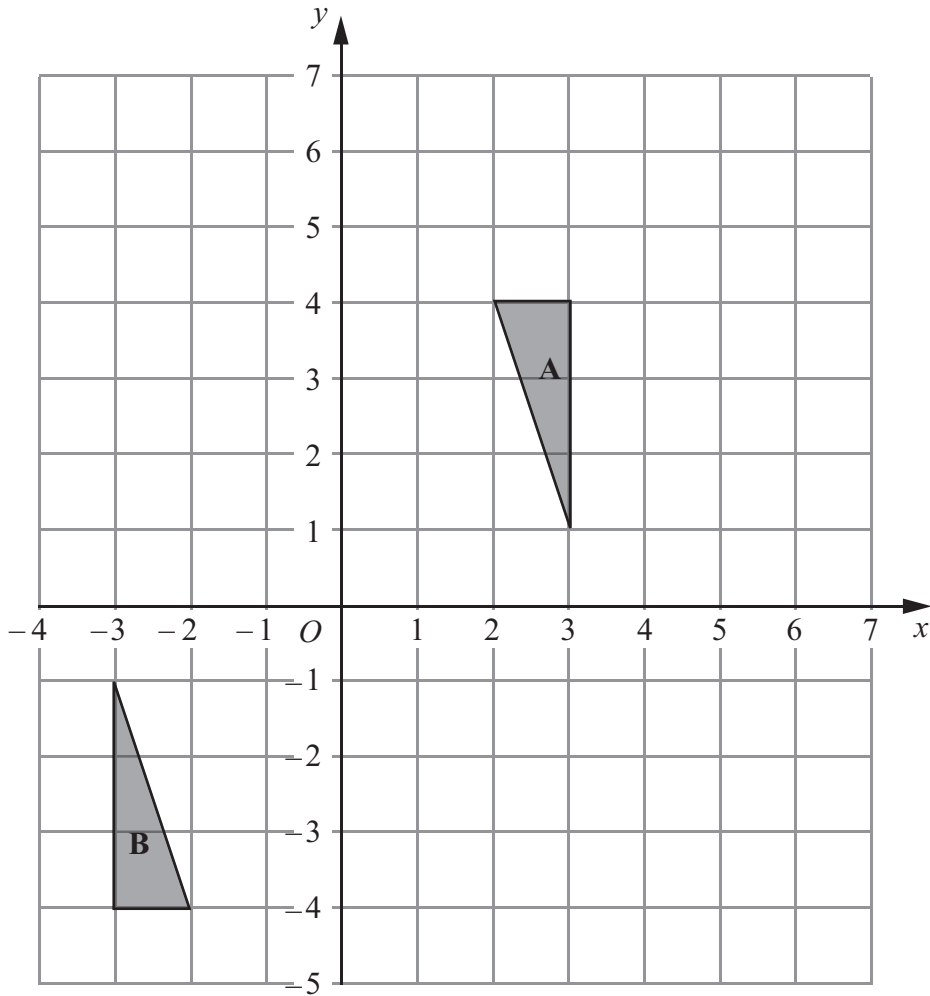
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(Total 6 marks)

Q11



7.



Triangle **A** and triangle **B** are drawn on the grid.

(a) Describe fully the single transformation which maps triangle **A** onto triangle **B**.

.....

 (3)

(b) Translate triangle **A** by the vector $\begin{pmatrix} 3 \\ 0 \end{pmatrix}$.

Label the new triangle **C**.

(1)

(Total 4 marks)

Q12



8. Make v the subject of the formula $t = \frac{v}{5} + 2$

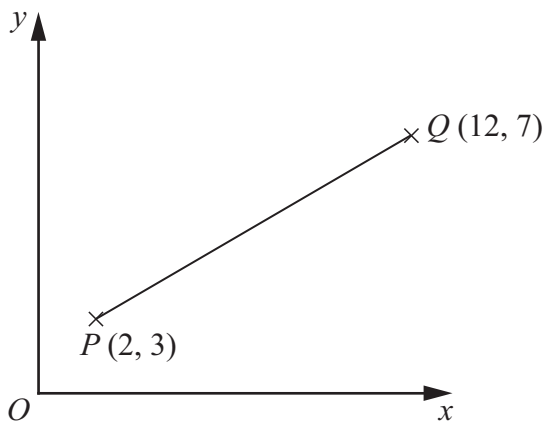
$v = \dots\dots\dots$

(Total 2 marks)

Q13

9.

Diagram NOT accurately drawn



P is the point with coordinates $(2, 3)$.
 Q is the point with coordinates $(12, 7)$.

Work out the coordinates of the midpoint of the line PQ .

(.....,))

(Total 2 marks)

Q14



10.

(a) Expand and simplify $3(x + 5) + 2(5x - 6)$

.....
(2)

(b) Simplify $\frac{2x + 4}{2}$

.....
(1)

(c) Factorise $5x + 10$

.....
(1)

(d) Factorise fully $x^2y + xy^2$

.....
(2)

(Total 6 marks)

Q16



11. Solve the simultaneous equations

$$\begin{aligned}6x + 2y &= -3 \\4x - 3y &= 11\end{aligned}$$

$x = \dots\dots\dots, y = \dots\dots\dots$

(Total 4 marks)

Q21



12.

(a) Expand and simplify $(x - 3)(x + 5)$

.....
(2)

(b) Solve $x^2 + 8x - 9 = 0$

.....
(3)

(Total 5 marks)

Q23



13.

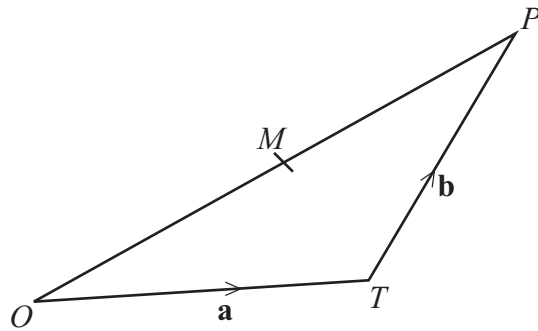


Diagram **NOT** accurately drawn

OPT is a triangle.
 M is the midpoint of OP .

$\vec{OT} = \mathbf{a}$

$\vec{TP} = \mathbf{b}$

(a) Express \vec{OM} in terms of \mathbf{a} and \mathbf{b} .

$\vec{OM} = \dots\dots\dots$
 (2)

(b) Express \vec{TM} in terms of \mathbf{a} and \mathbf{b} .
 Give your answer in its simplest form.

$\vec{TM} = \dots\dots\dots$
 (2)

(Total 4 marks)

Q27

