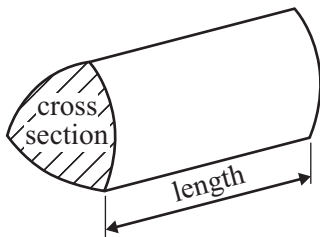


GCSE Mathematics (Linear) 1380

Formulae: Higher Tier

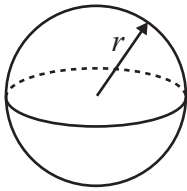
You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

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



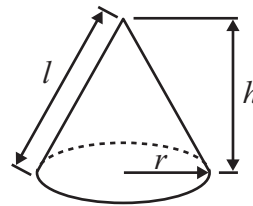
Volume of sphere = $\frac{4}{3}\pi r^3$

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

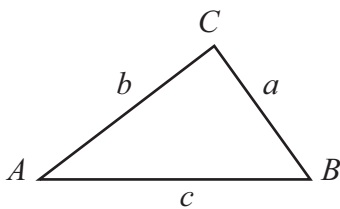


Volume of cone = $\frac{1}{3}\pi r^2 h$

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

Answer ALL EIGHTEEN questions.

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 $2c \times 3d$

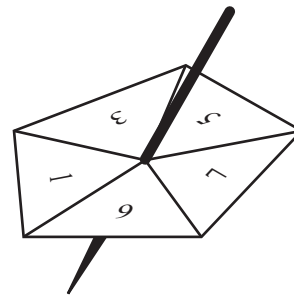
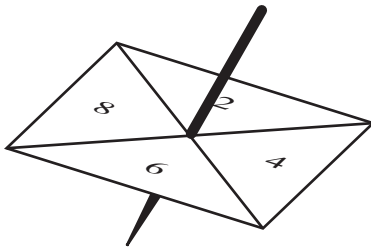
.....

(1)

(Total 2 marks)

Q2

3. Louise spins a four-sided spinner and a five-sided spinner.



The four-sided spinner is labelled 2, 4, 6, 8
 The five-sided spinner is labelled 1, 3, 5, 7, 9

Louise adds the score on the four-sided spinner to the score on the five-sided spinner.
 She records the possible total scores in a table.

		4-sided spinner			
		2	4	6	8
5-sided spinner	1	3	5	7	9
	3	5	7	9	11
	5	7	9	11	13
	7	9	11		
	9	11	13		

(a) Complete the table of possible total scores. (1)

(b) Write down all the ways in which Louise can get a total score of 11
 One way has been done for you.
 (2, 9) (2)

Both spinners are fair.

(c) Find the probability that Louise's total score is less than 6

..... (2)

(Total 5 marks)

4. 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

5.

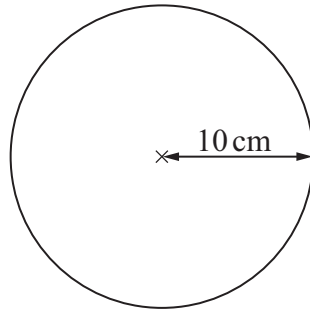


Diagram **NOT** accurately drawn

The radius of a circle is 10 cm.

Work out the area of this circle.

Use $\pi = 3.14$

.....cm²

(Total 2 marks)

Q5

6. Work out an estimate for

$$\frac{3870}{236 \times 4.85}$$

.....

(Total 2 marks)

Q6

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

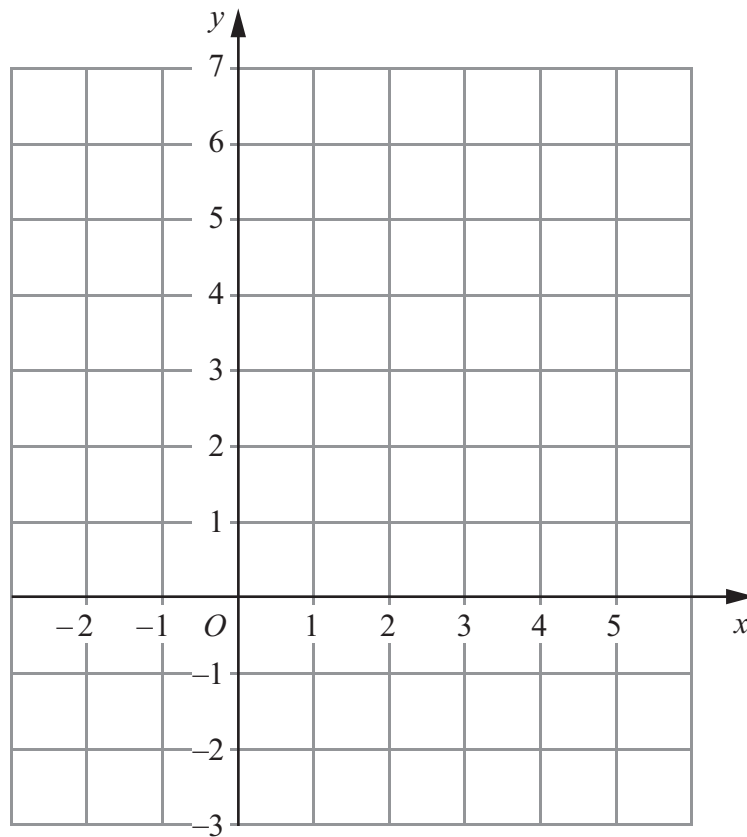
Work out how much the company pays Paul.

£

(Total 3 marks)

Q7

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

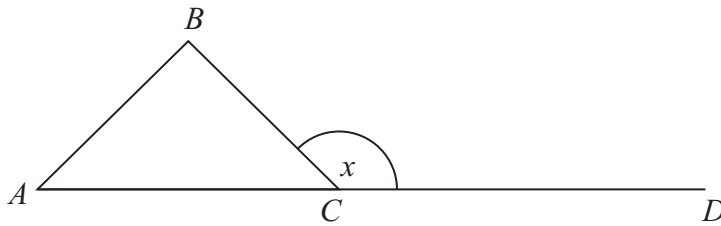


(Total 3 marks)

Q8

9.

Diagram **NOT** accurately drawn



ABC is an equilateral triangle.
 ACD is a straight line.

(a) Work out the size of the angle marked x .

.....
(2)

(b) Give a reason for your answer.

.....
.....
(1)

(Total 3 marks)

Q9

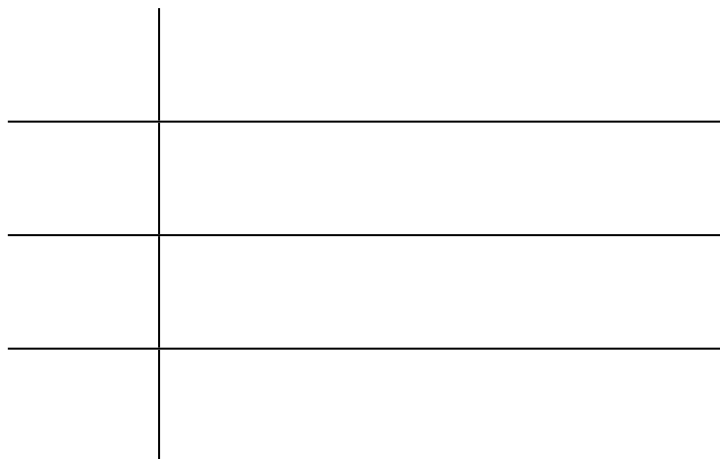
10. Chris plays golf.

Here are 15 of his scores.

69	78	82	86	77
83	91	77	92	80
74	81	83	77	72

(a) Draw an ordered stem and leaf diagram to show this information.

You must include a key.



Key:

(3)

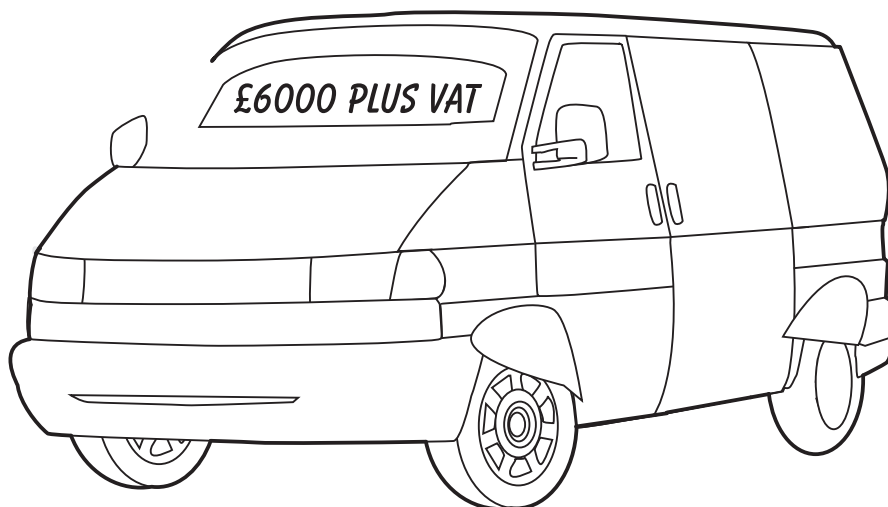
(b) Write down the mode.

.....
(1)

(Total 4 marks)

Q10

11. 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.

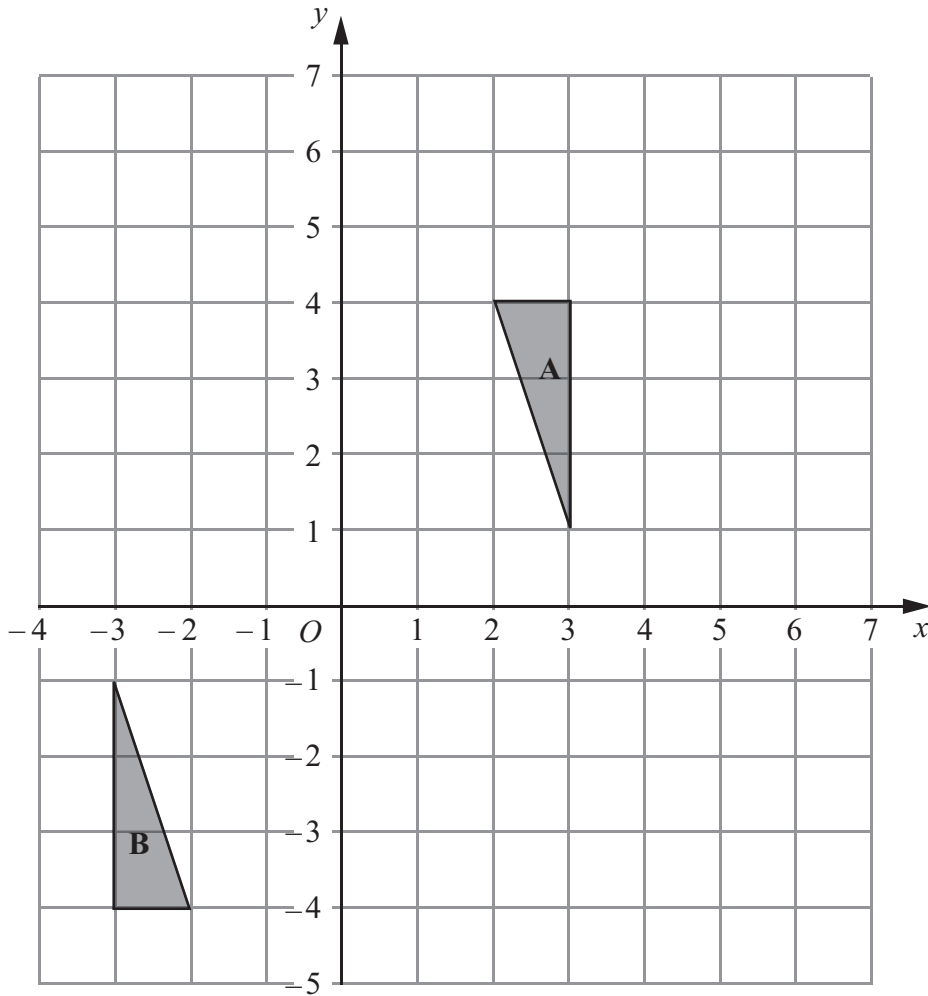
Work out the amount of each monthly payment.

£

(Total 6 marks)

Q11

12.



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

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

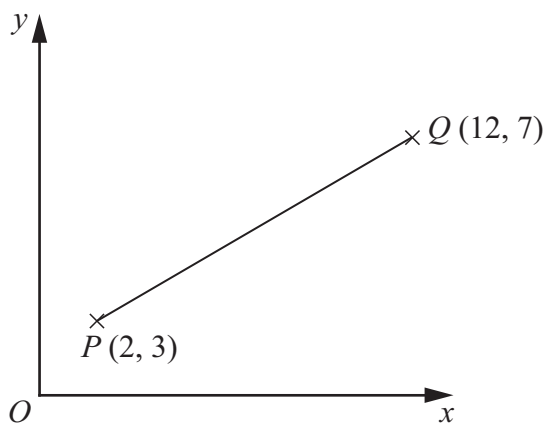
$v = \dots\dots\dots$

(Total 2 marks)

Q13

14.

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

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

.....
(2)

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

.....
(1)

(c) Factorise $5x + 10$

.....
(1)

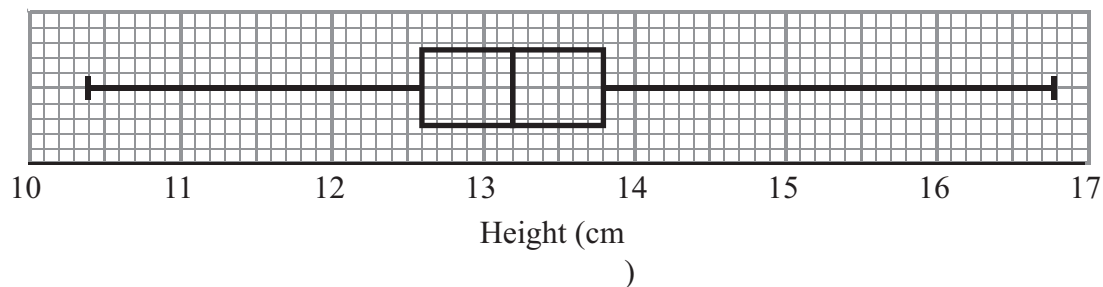
(d) Factorise fully $x^2y + xy^2$

.....
(2)

(Total 6 marks)

Q15

16. Mr Green measured the height, in cm, of each tomato plant in his greenhouse. He used the results to draw the box plot shown below.



(a) Write down the median height.

.....cm
(1)

(b) Work out the interquartile range.

.....cm
(2)

(c) Explain why the interquartile range may be a better measure of spread than the range.

.....
.....
(1)

(Total 4 marks)

Q16

17. 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)

Q17

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

.....
(2)

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

.....
(3)

(Total 5 marks)

Q18