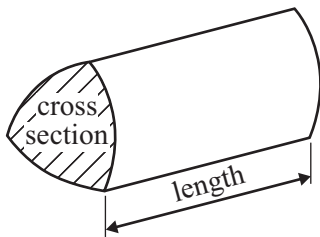


## GCSE Mathematics (Linear) 1380

Formulae: Higher Tier

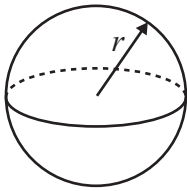
**You must not write on this formulae page.**  
**Anything you write on this formulae page will gain NO credit.**

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



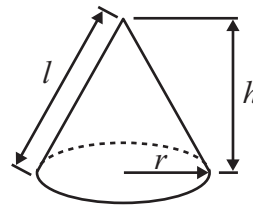
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

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

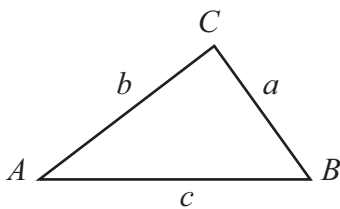


**Volume of cone** =  $\frac{1}{3}\pi r^2 h$

**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 SIXTEEN 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) Simplify  $2a + 3b - a - b$

.....  
(2)

(b) Expand  $4(2m - 3n)$

.....  
(1)

**(Total 3 marks)**

**Q1**

2. Work out an estimate for the value of  
Give your answer as a decimal.

$$\frac{60.2 \times 0.799}{223}$$

.....

**(Total 3 marks)**

**Q2**

3. Fred buys 18 tins of polish costing £2.37 each.

(a) Work out the total cost.

£.....  
**(3)**

A vacuum cleaner costs £85  
Fred gets 10% off the price of the vacuum cleaner.

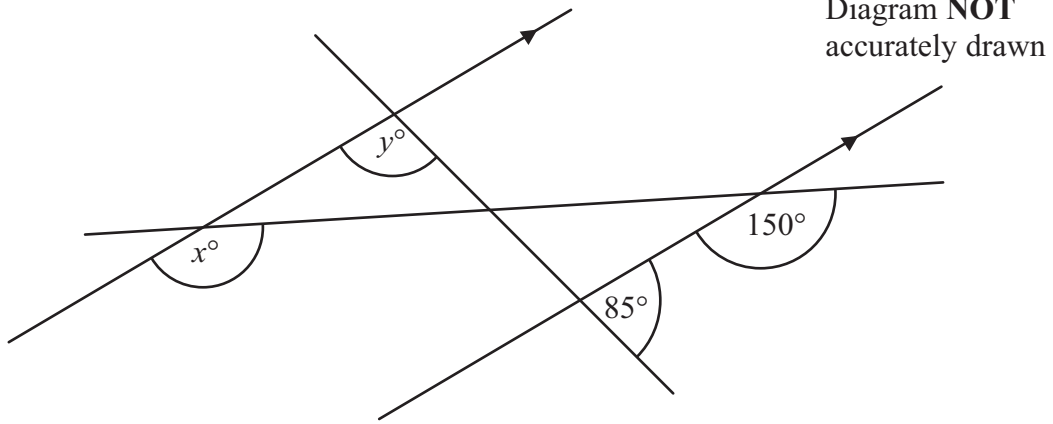
(b) Work out how much he has to pay.

£.....  
**(3)**

**(Total 6 marks)**

**Q3**

4.



(a) Find the value of  $x$ .

.....  
(1)

(b) Find the value of  $y$ .  
Give reasons for your answer.

.....  
(2)

(Total 3 marks)

Q4

5. There are only red counters, blue counters and green counters in a bag.  
There are 5 red counters.  
There are 6 blue counters.  
There is 1 green counter.

Jim takes at random a counter from the bag.

- (a) Work out the probability that Jim takes a counter that is **not** red.

.....  
(2)

Jim puts the counter back in the bag.  
He then puts some more green counters into the bag.

The probability of taking at random a red counter is now  $\frac{1}{3}$

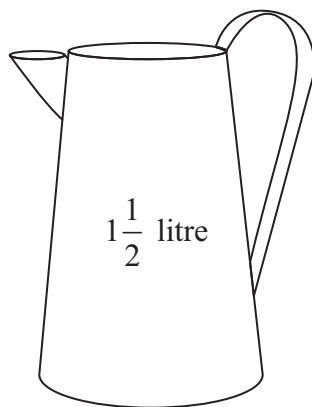
- (b) Work out the number of green counters that are now in the bag.

.....  
(2)

(Total 4 marks)

Q5

6.



There are  $1\frac{1}{2}$  litres of juice in a jug.

Lisa is going to pour the juice into some glasses.  
She will fill each glass with 175 ml of juice.

Work out the greatest number of glasses she can fill.

.....

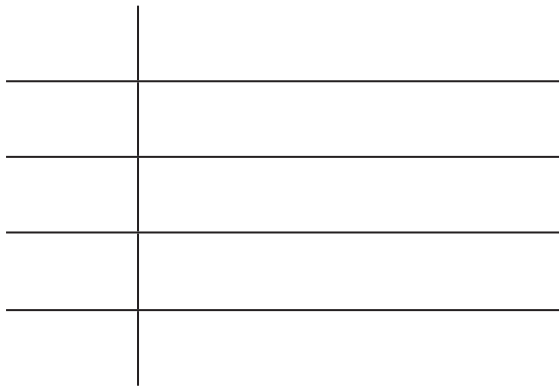
**(Total 4 marks)**

Q6

7. Jo measured the times in seconds it took 18 students to run 400 m. Here are the times.

67	78	79	98	96	103
75	85	94	92	61	80
82	86	90	95	90	89

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



Key:

**(3)**

(b) Work out the median.

..... seconds  
**(2)**

**(Total 5 marks)**

**Q7**

8. (a) Solve  $13x + 1 = 11x + 8$

$x = \dots\dots\dots$   
(2)

(b) Show that  $y = -2$  is a solution of the equation  $\frac{4}{y} + y = 2y$

(2)

Q8

(Total 4 marks)

9. Sweets are sold in bags and in tins.

There are 20 sweets in a bag.  
There are 30 sweets in a tin.

Lee buys  $B$  bags of sweets and  $T$  tins of sweets.

He buys a total of  $S$  sweets.  
Write down a formula for  $S$  in terms of  $B$  and  $T$ .

Q9

.....  
(Total 3 marks)



**10.** Jim has only 5p coins and 10p coins.

The ratio of the number of 5p coins to the number of 10p coins is 2 : 3

Work out the ratio of

the total value of the 5p coins : the total value of the 10p coins.

Give your answer in its simplest form.

..... : .....

**(Total 2 marks)**

**Q10**

11.

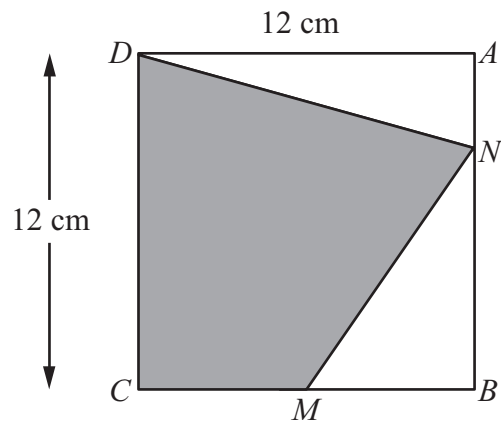


Diagram **NOT** accurately drawn

$ABCD$  is a square of side 12 cm.

$M$  is the midpoint of  $CB$ .

$N$  is a point on  $AB$ .

$$AN = \frac{1}{4} AB.$$

Calculate the area of the shaded region  $CDNM$ .

..... cm<sup>2</sup>

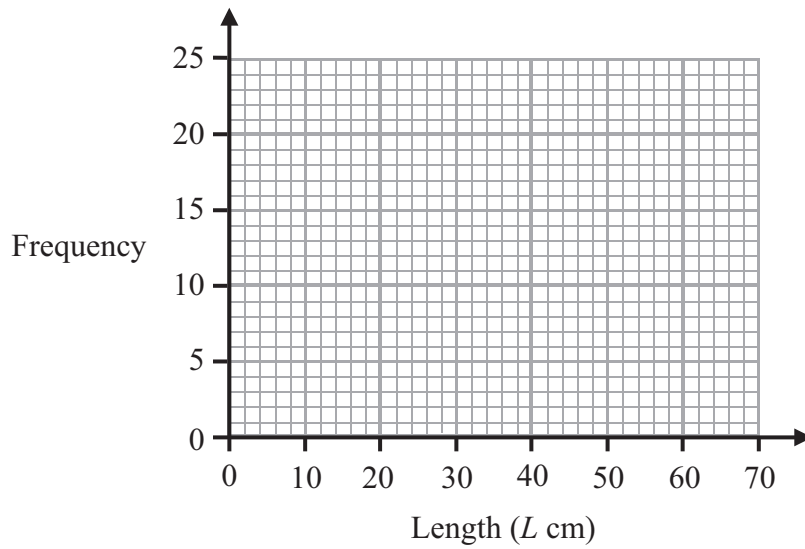
**(Total 6 marks)**

**Q11**

12. The table gives information about the lengths of the branches on a bush.

Length ( $L$ cm)	Frequency
$0 \leq L < 10$	20
$10 \leq L < 20$	12
$20 \leq L < 30$	10
$30 \leq L < 40$	8
$40 \leq L < 50$	6
$50 \leq L < 60$	0

(a) Draw a frequency polygon to show this information.



(2)

(b) Write down the modal class interval.

.....

(1)

(Total 3 marks)

Q12

13. (a) Write  $6.43 \times 10^5$  as an ordinary number.

.....  
(1)

(b) Work out the value of  $2 \times 10^7 \times 8 \times 10^{-12}$   
Give your answer in standard form.

.....  
(2)

(Total 3 marks)

Q13

14. (a) Factorise fully  $2x^2 - 4xy$

.....  
(2)

(b) Factorise  $p^2 - 6p + 8$

.....  
(2)

(c) Simplify  $\frac{(x+2)^2}{x+2}$

.....  
(1)

(d) Simplify  $2a^2b \times 3a^3b$

.....  
(2)

(Total 7 marks)

Q14

15. All the students in Mathstown school had a test.

The lowest mark was 18

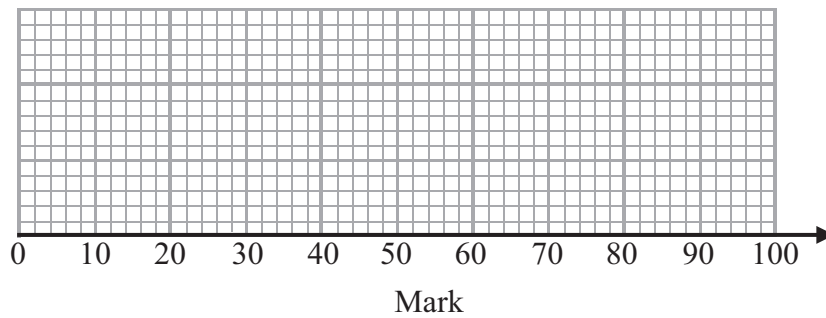
The highest mark was 86

The median was 57

The lower quartile was 32

The interquartile range was 38

On the grid, draw a box plot to show this information.



Q15

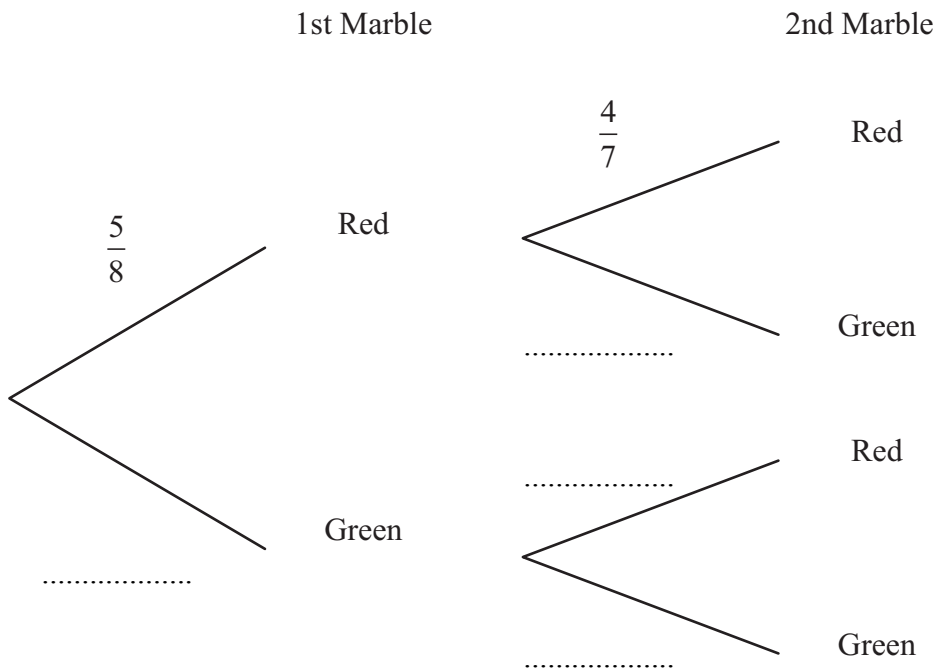
(Total 3 marks)

16. There are only red marbles and green marbles in a bag.  
There are 5 red marbles and 3 green marbles.

Dwayne takes at random a marble from the bag.  
He does not put the marble back in the bag.

Dwayne takes at random a second marble from the bag.

- (a) Complete the probability tree diagram.



(2)

- (b) Work out the probability that Dwayne takes marbles of different colours.

.....  
(3)

(Total 5 marks)

Q16