TARGET B PAPER

Question	My Mark	Total Mark
2008 06 Jun H Calc Q01		3
2008 06 Jun H Calc Q02		2
2008 06 Jun H Calc Q03		5
2008 06 Jun H Calc Q04		2
2008 06 Jun H Calc Q05		2
2008 06 Jun H Calc Q06		2
2008 06 Jun H Calc Q07		4
2008 06 Jun H Calc Q08		2
2008 06 Jun H Calc Q09		5
2008 06 Jun H Calc Q10		8
2008 06 Jun H Calc Q11		9
2008 06 Jun H Calc Q12		5
2008 06 Jun H Calc Q13		4
2008 06 Jun H Calc Q14		8
2008 11 Nov H Calc Q01		4
2008 11 Nov H Calc Q02		3
2008 11 Nov H Calc Q03		3
2008 11 Nov H Calc Q04		3
2008 11 Nov H Calc Q05		2
2008 11 Nov H Calc Q06		4
2008 11 Nov H Calc Q07		4
2008 11 Nov H Calc Q08		4
2008 11 Nov H Calc Q09		3
2008 11 Nov H Calc Q10		2
2008 11 Nov H Calc Q11		6
2008 11 Nov H Calc Q12		4
TOTAL		103

GCSE Mathematics (Linear) 2540
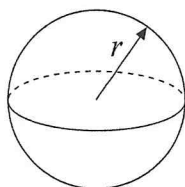
Formulae: Higher Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.
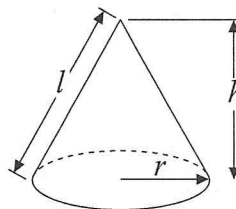
Volume of a prism = area of cross section × length
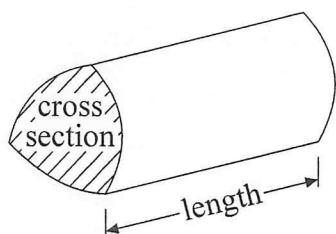
Volume of sphere $= \frac{4}{3}\pi r^3$

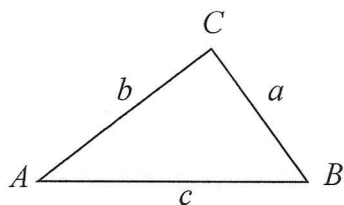**Surface area of sphere** $= 4\pi r^2$

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 $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

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

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

Answer ALL TWENTY FIVE questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1. There are 3 red pens, 4 blue pens and 5 black pens in a box.
    Sameena takes a pen, at random, from the box.

    (a) Write down the probability that she takes a black pen.

    ....
    (2)

    (b) Write down the probability that Sameena takes a pen that is **not** black.

    ....
    (1)

    (Total 3 marks)

    Q1

2. Use your calculator to work out

    $$\frac{22.4 \times 14.5}{8.5 \times 3.2}$$

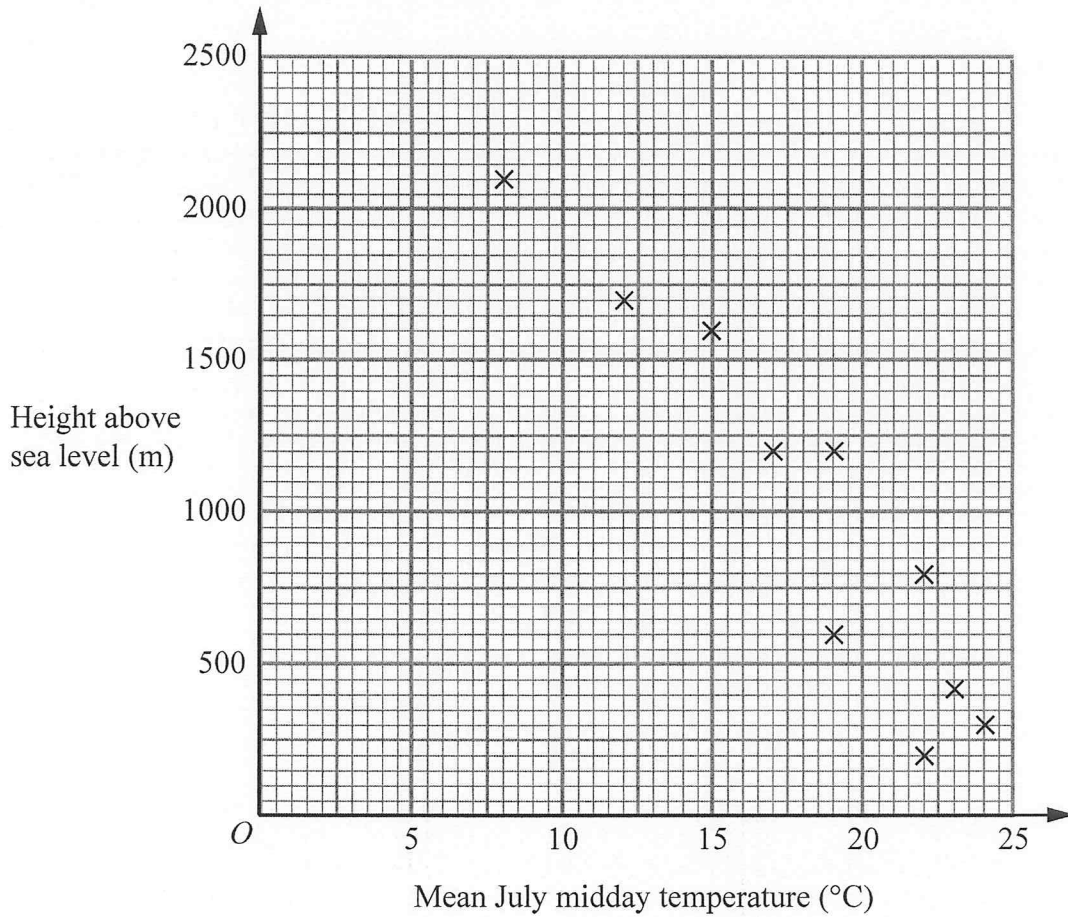   Write down all the figures on your calculator display.

    ....
    (Total 2 marks)

    Q2

3. The scatter graph shows information for some weather stations.
It shows the height of each weather station above sea level (m) and the mean July midday temperature (°C) for that weather station.

The table shows this information for two more weather stations.

Height of weather station above sea level (m)	1000	500
Mean July midday temperature (°C)	20	22

(a) Plot this information on the scatter graph.

(1)

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

....

(1)

(c) Draw a line of best fit on the scatter graph.

(1)

A weather station is 1800 metres above sea level.

(d) Estimate the mean July midday temperature for this weather station.

.... °C

(1)

At another weather station the mean July midday temperature is 18°C.

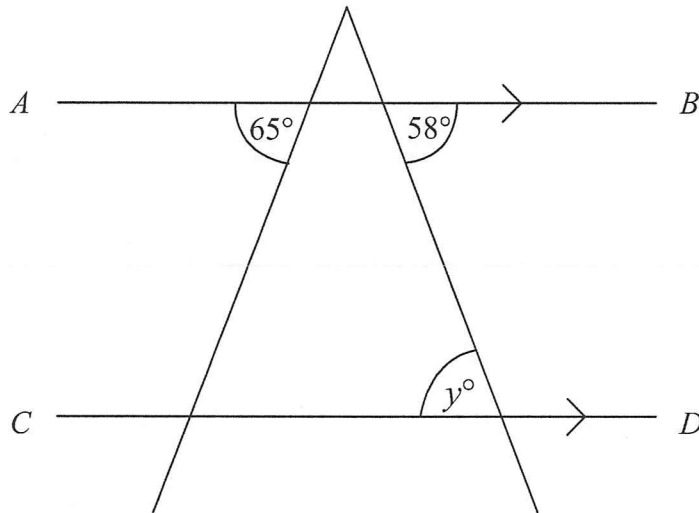(e) Estimate the height above sea level of this weather station.

.... m

(1)   **Q3**

(Total 5 marks)

4.

Diagram **NOT** accurately drawn

AB is parallel to *CD*.

(i) Write down the value of *y*.

....

(ii) Give a reason for your answer.

....   **Q4**
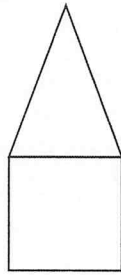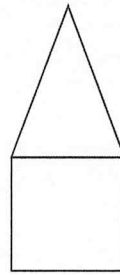
(Total 2 marks)

5. Here are the front elevation, side elevation and the plan of a 3-D shape.
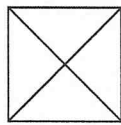
Front elevation   Side elevation

Plan

In the space below, draw a sketch of the 3-D shape.

Q5

(Total 2 marks)

6. Here are the first four terms of an arithmetic sequence.

$$5 \qquad 8 \qquad 11 \qquad 14$$

Find an expression, in terms of n, for the nth term of the sequence.

....

Q6

(Total 2 marks)

7. The equation

$$x^3 + 2x = 26$$

has a solution between 2 and 3

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

$x =$ ....

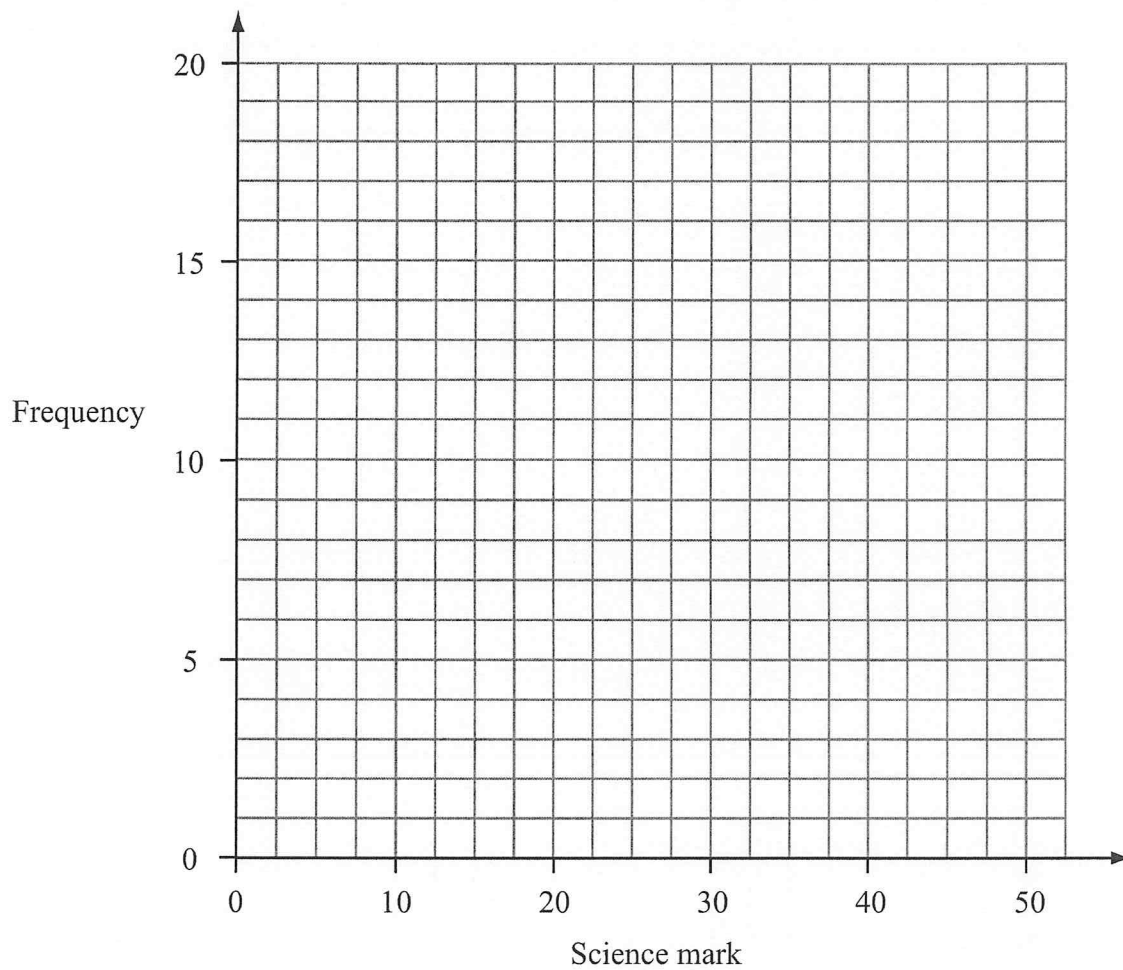**Q7**

(Total 4 marks)

8. 60 students take a science test.
The test is marked out of 50.

This table shows information about the students' marks.

Science mark	0–10	11–20	21–30	31–40	41–50
Frequency	4	13	17	19	7

On the grid, draw a frequency polygon to show this information.

(Total 2 marks)

Q8

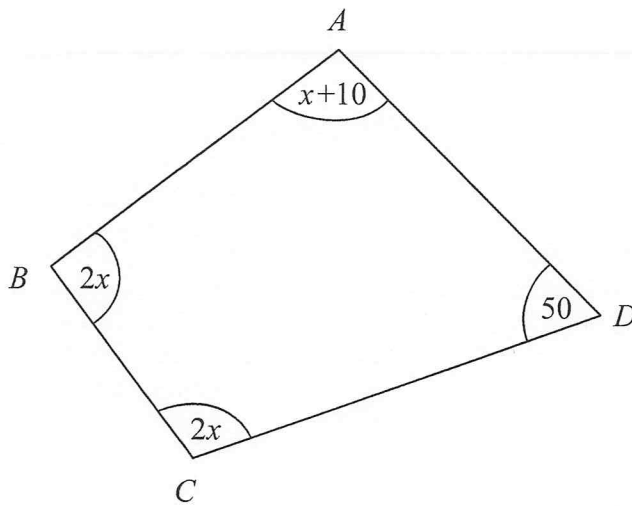**9.**

Diagram **NOT** accurately drawn

In this quadrilateral, the sizes of the angles, in degrees, are

$x + 10$
$2x$
$2x$
50

(a) Use this information to write down an equation in terms of x.

....
(2)

(b) Work out the value of x.

$x =$ ....
(3)

(Total 5 marks)

Q9

10. A garage sells British cars and foreign cars.
The ratio of the number of British cars sold to the number of foreign cars sold is 2 : 7

The garage sells 45 cars in one week.

(a) Work out the number of British cars the garage sold that week.

....

(2)

A car tyre costs £80 plus VAT at $17\frac{1}{2}$ %.

(b) Work out the total cost of the tyre.

£ ....

(3)

The value of a new car is £12 000
The value of the car depreciates by 20% per year.

(c) Work out the value of the car after 2 years.

£ ....

(3)   **Q10**

(Total 8 marks)

11. (a) Simplify $4a + 3c - 2a + c$

....
(1)

(b) $S = \dfrac{1}{2}at^2$

Find the value of S when $t = 3$ and $a = \dfrac{1}{4}$

$S = $ ....
(2)

(c) Factorise $x^2 - 5x$

....
(2)

(d) Expand and simplify $(x + 3)(x + 4)$

....
(2)

(e) Factorise $y^2 + 8y + 15$

....
(2)

Q11

(Total 9 marks)

12. A shop sells mobile phones.

The table shows the number of mobile phones sold each month from January to May.

Jan	Feb	Mar	Apr	May
70	64	73	85	91

(a) Work out the percentage increase in the number of mobile phones sold from April to May.

Give your answer correct to 3 significant figures.

.... %

(3)

(b) Work out the 3-month moving averages for the information in the table.

The first one has been worked out for you.

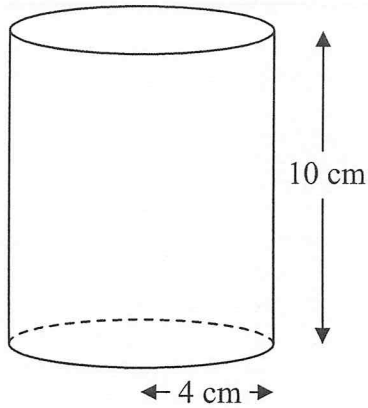......69...... ....

(2)

Q12

(Total 5 marks)

13.

Diagram **NOT** accurately drawn

10 cm

← 4 cm →

A solid cylinder has a radius of 4 cm and a height of 10 cm.

(a) Work out the volume of the cylinder.
      Give your answer correct to 3 significant figures.

.... cm³

(2)

The cylinder is made from wood.
The density of the wood is 0.6 grams per cm³.

(b) Work out the mass of the cylinder.
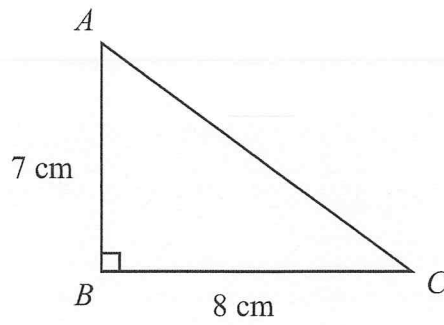   Give your answer correct to 3 significant figures.

.... grams

(2)

Q13

(Total 4 marks)

Turn over

14.

Diagram **NOT**
accurately drawn

ABC is a right-angled triangle.
AB = 7 cm,
BC = 8 cm.

(a) Work out the area of the triangle.

.... cm²
(2)

(b) Work out the length of *AC*.
Give your answer correct to 2 decimal places.

.... cm
(3)
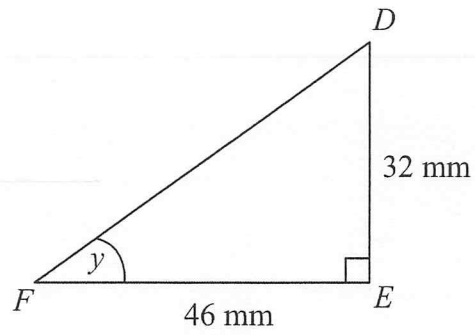
Diagram **NOT** accurately drawn

D

32 mm

y

F 46 mm *E*

DEF is another right-angled triangle.
DE = 32 mm,
FE = 46 mm.

(c) Calculate the size of angle *y*.
   Give your answer correct to 1 decimal place.

°

....

(3)

Q14

(Total 8 marks)

Answer ALL TWENTY SEVEN questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1. Here are the ingredients for making cheese pie for 6 people.

    Cheese pie for **6** people

    180 g flour
    240 g cheese
    80 g butter
    4 eggs
    160 ml milk

    Bill makes a cheese pie for 3 people.

    (a) Work out how much flour he needs.

    .... g

    (2)

    Jenny makes a cheese pie for 15 people.

    (b) Work out how much milk she needs.

    .... ml

    (2)

    Q1

    (Total 4 marks)

2. Use a calculator to work out

$$\sqrt{\frac{21.6 \times 15.8}{3.8}}$$

(a) Write down all the figures on your calculator display.

....
(2)

(b) Give your answer to part (a) correct to 3 significant figures.

....
(1) **Q2**

(Total 3 marks)

3. The cost of a radio is the list price plus VAT at $17\frac{1}{2}$ %.

The list price of a radio is £240

Work out the cost of the radio.

£ **Q3**

(Total 3 marks)

4. (a) Expand $4(x - 3)$

....
(1)

(b) Solve $4t + 1 = 19$

$t = $ ....
(2)

(Total 3 marks)

Q4

5. The nth term of a sequence is $n^2 + 4$

Alex says

"The nth term of the sequence is always a prime number when n is an odd number."
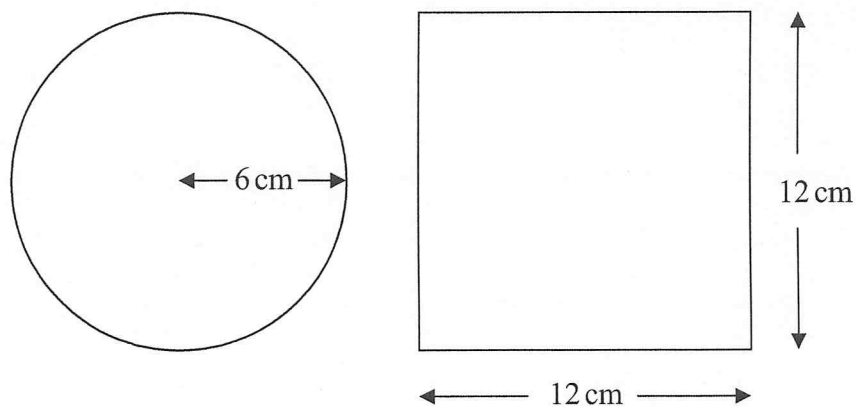
Alex is wrong.

Give an example to show that Alex is wrong.

Q5

(Total 2 marks)

6.

←— 6 cm —→

12 cm

←——— 12 cm ———→

A circle has a radius of 6 cm.

A square has a side of length 12 cm.

Work out the difference between the area of the circle and the area of the square.
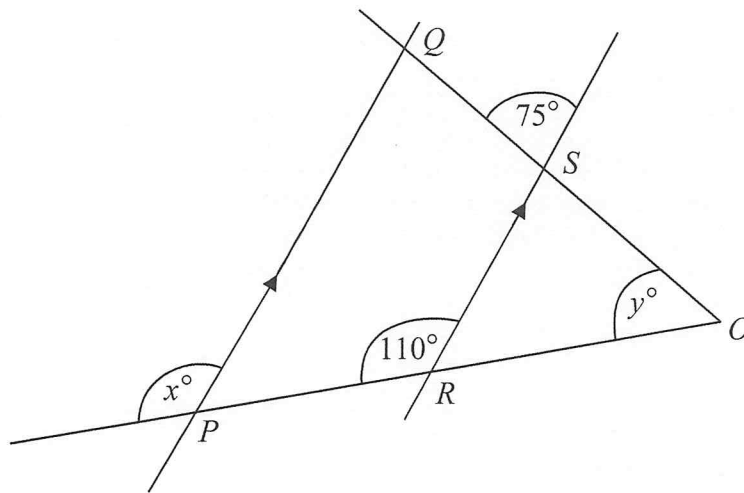Give your answer correct to one decimal place.

.... cm² | **Q6**

(Total 4 marks)

7.

Diagram **NOT** accurately drawn

PQ is parallel to *RS*.

OSQ and *ORP* are straight lines.

(a) (i) Write down the value of *x*.

$x =$ ....

(ii) Give a reason for your answer.

....

(2)

(b) Work out the value of *y*.
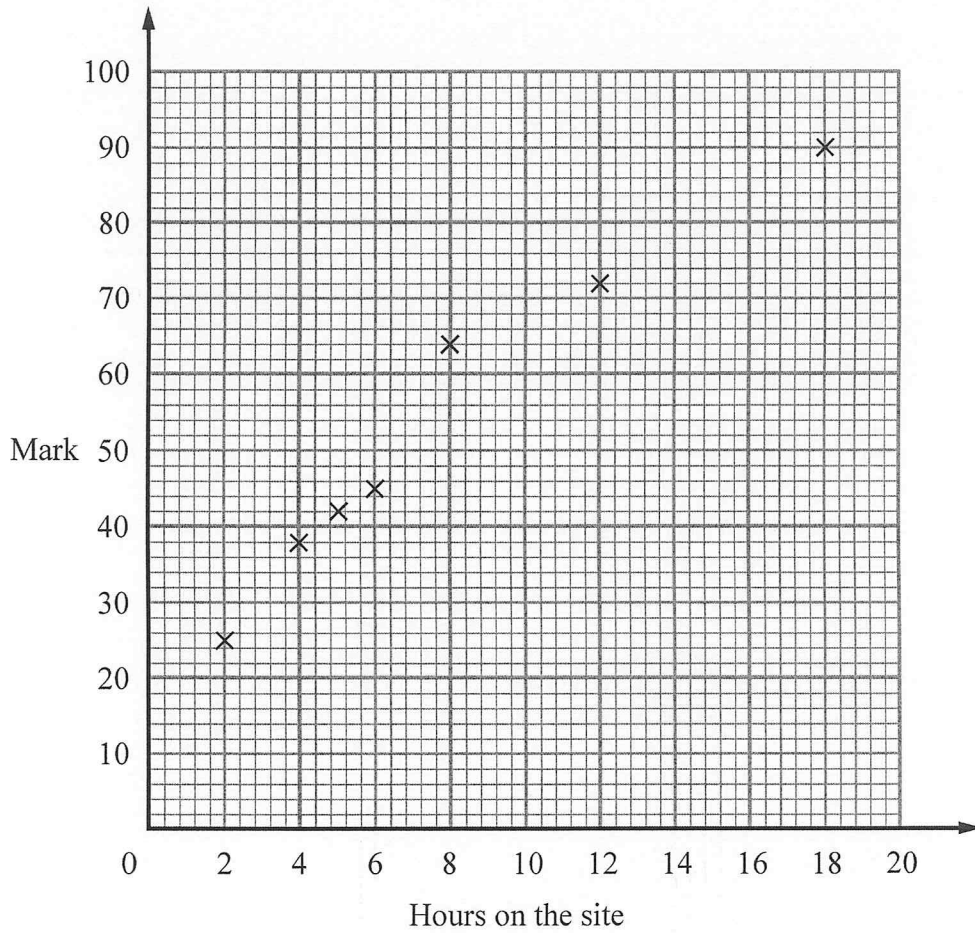
$y =$ ....

(2)

Q7

(Total 4 marks)

8. Some students revised for a mathematics exam.
They used an internet revision site.
The scatter graph shows the times seven students spent on the internet revision site and the marks the students got in the mathematics exam.

Here is the information for 3 more students.

Hours on the site	7	10	16
Mark	50	56	78

(a) Plot this information on the scatter graph.

(1)

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

....

(1)

(c) Draw a line of best fit on the scatter graph.

(1)

A student spent 11 hours on the internet revision site.

(d) Use the line of best fit to estimate this student's mathematics exam mark.

....

(1)   **Q8**

(Total 4 marks)

---

9. Jack invests £3000 for 2 years at 4% per annum compound interest.

Work out the value of the investment at the end of 2 years.

£ **Q9**

(Total 3 marks)

---

10. Jason collected some information about the heights of 19 plants.

This information is shown in the stem and leaf diagram.

```
1 | 1   2   3   3
2 | 3   3   5   9   9
3 | 0   2   2   6   6   7
4 | 1   1   4   8
```
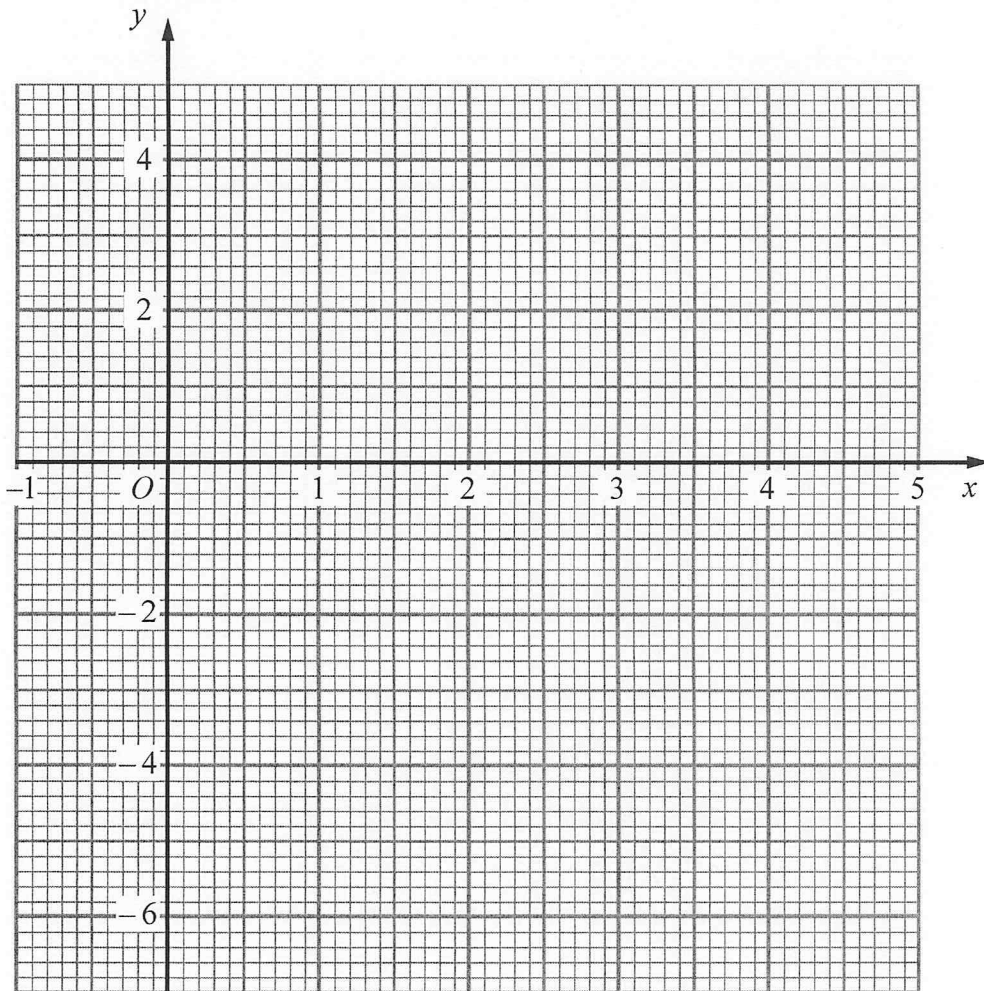
Key 4|8 means 48 mm

Find the median.

.... mm   **Q10**

(Total 2 marks)

11. (a) Complete the table of values for $y = x^2 - 4x - 2$

x	-1	0	1	2	3	4	5
y		-2	-5			-2	3

(2)

(b) On the grid, draw the graph of $y = x^2 - 4x - 2$

(2)

(c) Use your graph to estimate the values of x when $y = -3$

$x = $ ....

$x = $ ....

(2)

(Total 6 marks)

Q11

12. (a) Draw the locus of all points which are equidistant from the points A and B.

$A \times$ $\times B$

(2)

(b) Draw the locus of all points that are exactly $3\,\text{cm}$ from the line PQ.

_____

P Q

(2) Q12

(Total 4 marks)