Q1.
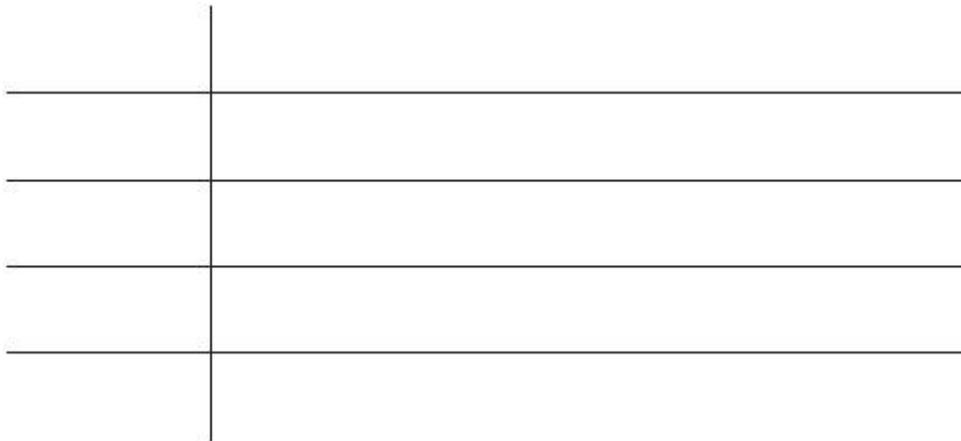
Here are the heights in centimetres of 20 men.

165   164   176   179   188   178   183   172   180   190

167   159   156   176   173   168   169   182   167   192

(a) Show this information in an ordered stem and leaf diagram.

(3)

(b) Work out the percentage of these men with a height greater than 184cm.

....%

(2)

(Total for question = 5 marks)

Q2.

Here are the first five terms of an arithmetic sequence.

| 4 | 11 | 18 | 25 | 32 |

(a) Write down, in terms of n, an expression for the nth term of this sequence.

....

(2)

An expression for the nth term of another sequence is $3n^2 - 1$

(b) Find the fourth term of this sequence.

....

(2)

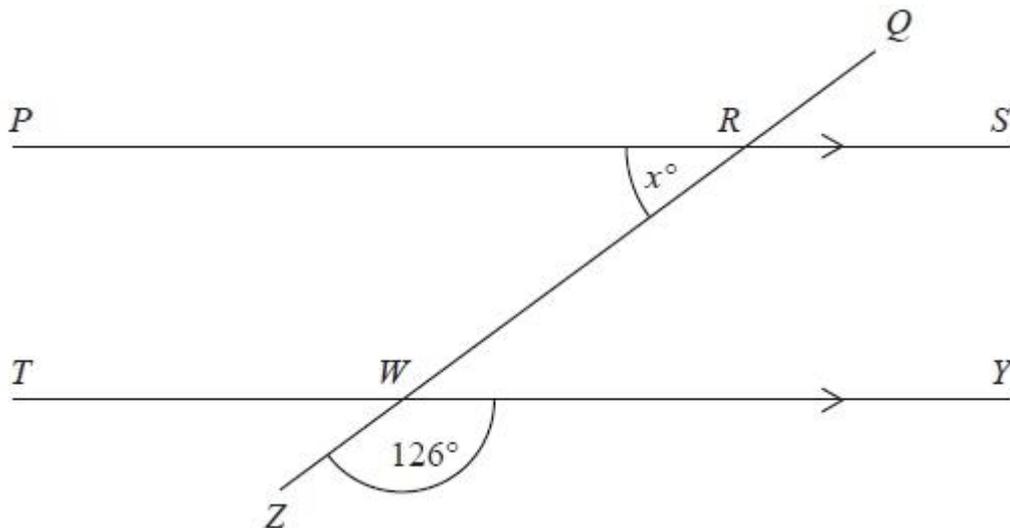**(Total for Question is 4 marks)**

Q3.

*

Diagram **NOT** accurately drawn

PRS and *TWY* are parallel straight lines.
QRWZ is a straight line.

Work out the value of x.
Give reasons for your answer.

Q4.

(a) (i) Use your calculator to work out $\dfrac{\sqrt{46.2 - 17.5}}{2.39 \times 0.7}$

Write down all the figures on your calculator display.

....

(ii) Give your answer to (i) correct to 3 significant figures.

....

(3)

(Total for Question is 3 marks)

Q5.

The diagram shows a solid prism.

4 cm

Diagram **NOT** accurately drawn

3 cm

4 cm

2 cm

8 cm

5 cm
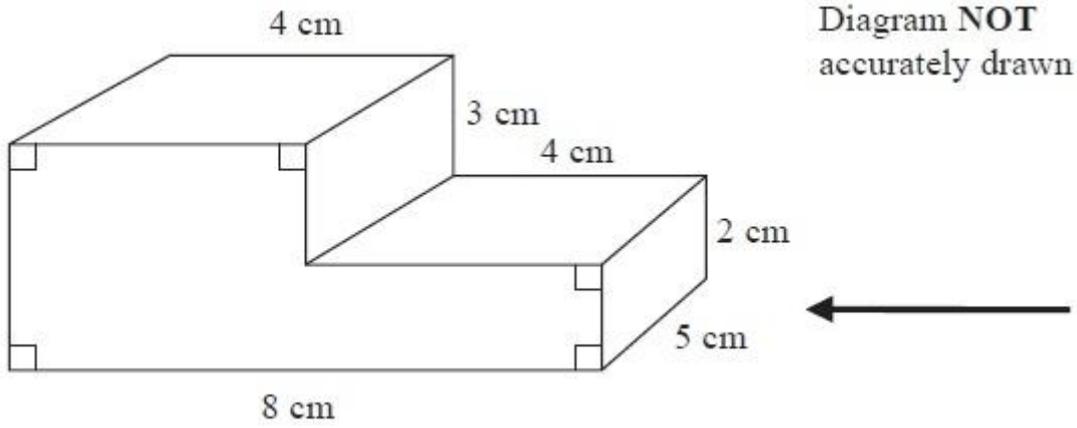
On the centimetre square grid, draw the side elevation of the solid prism from the direction shown by the arrow.
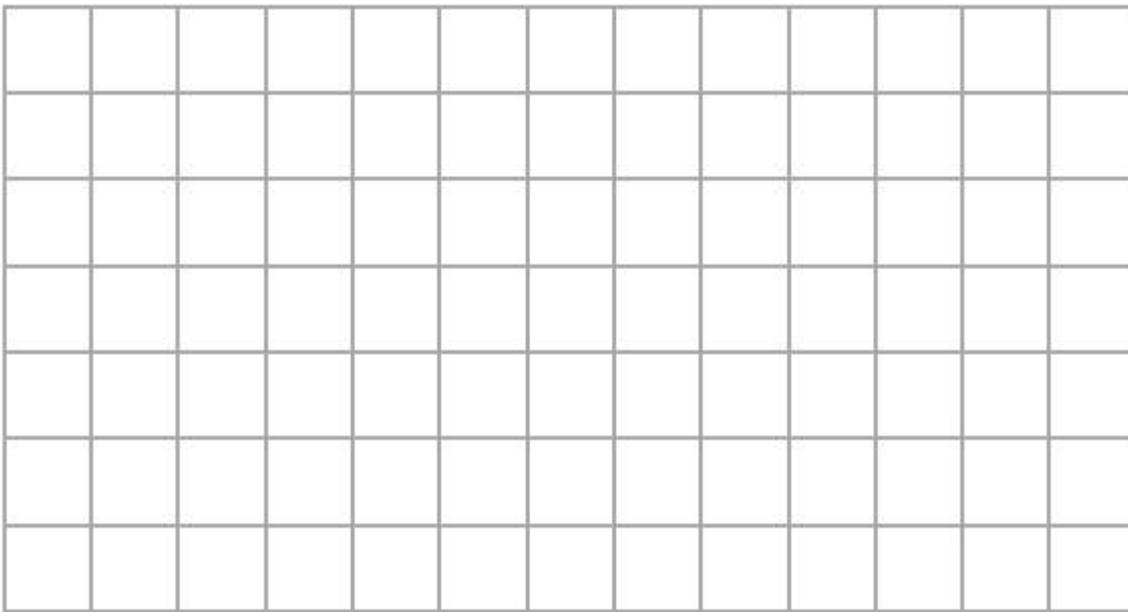
(Total for Question is 2 marks)

Q6.

The table gives information about the temperature, $T\,°C$, at noon in a town for 50 days.

Temperature (T °C)	Frequency
$8 < T \leqslant 12$	6
$12 < T \leqslant 16$	8
$16 < T \leqslant 20$	13
$20 < T \leqslant 24$	21
$24 < T \leqslant 28$	2

(a) Write down the modal class interval.

....

(1)

(b) Calculate an estimate for the mean temperature.

.... ° C

(4)

(c) Draw a frequency polygon for the information in the table.
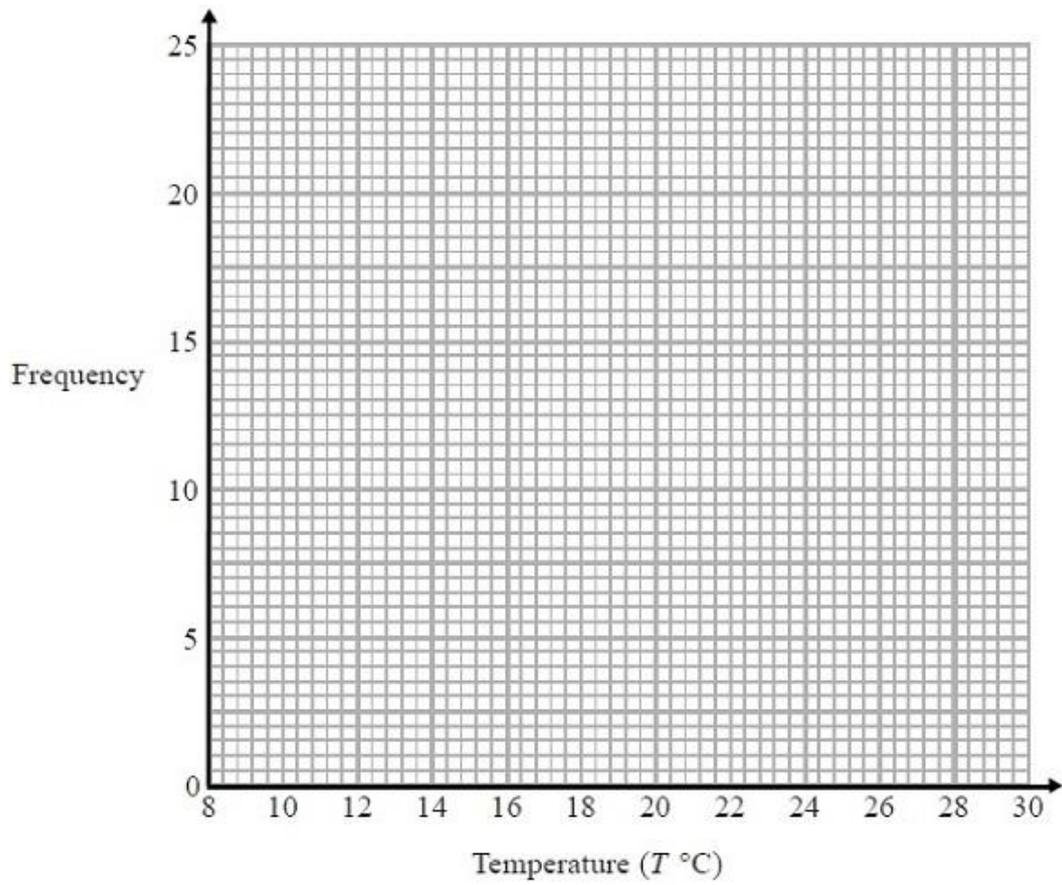
(Total for Question is 7 marks)

Q7.

Sandra has a piece of string 153 cm long.
She cuts the string into three lengths in the ratio 4 :2:3

Work out the length, in centimetres, of each piece of string.

.... cm

.... cm

.... cm

(Total for question = 3 marks)

Q8.
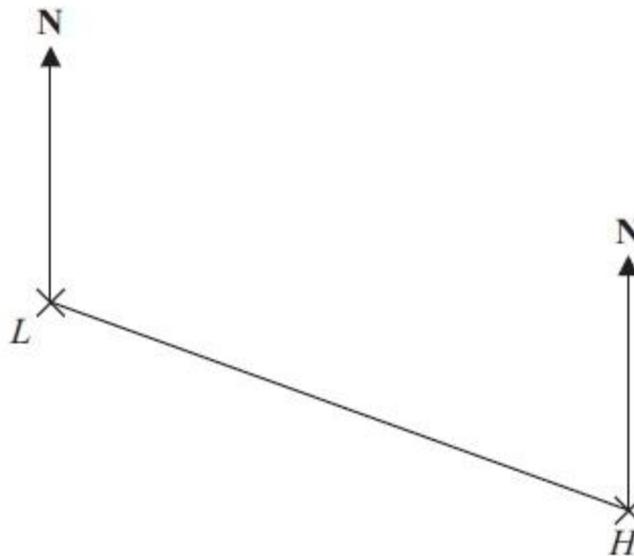
Mason invests £1500 at 2.5% per year compound interest.
Work out the value of Mason's investment at the end of 3 years.

£...

(Total for question = 3 marks)

Q9.

The diagram shows the position of a lighthouse *L* and a harbour *H*.

The scale of the diagram is 1 cm represents 5 km.

(a) Work out the real distance between *L* and *H*.

. . . . km

(1)

(b) Measure the bearing of *H* from *L*.

. . . .°

A boat *B* is 20 km from *H* on a bearing of 040°.

(c) On the diagram, mark the position of boat *B* with a cross (✗).
Label it *B*.

(Total for Question is 4 marks)

Q10.

The equation

$$x^3 - 2x = 125$$

has a solution between 5 and 6

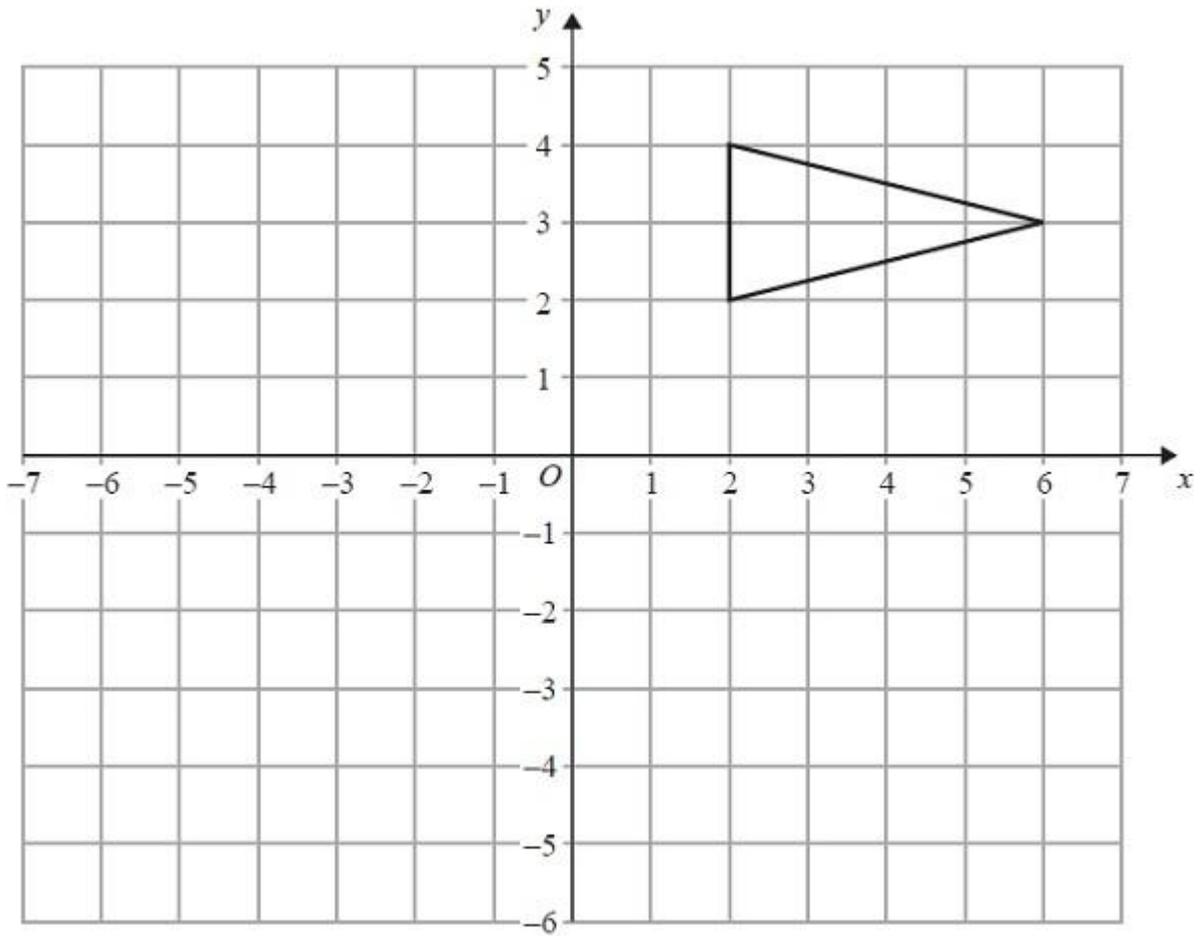Use a trial and improvement method to find this solution.
Give your answer correct to 1 decimal place.
You must show all your working.

x = ...

(Total for question = 4 marks)

Q11.

On the grid, enlarge the triangle by scale factor $-\dfrac{1}{2}$, centre (0, −2).

(Total for Question is 2 marks)

Q12.

You can change temperatures from °F to °C by using the formula

$$C = \frac{5(F - 32)}{9}$$

F is the temperature in °F.
C is the temperature in °C.

The minimum temperature in an elderly person's home should be 20°C.

Mrs Smith is an elderly person.
The temperature in Mrs Smith's home is 77°F.

*(a) Decide whether or not the temperature in Mrs Smith's home is lower than the minimum temperature should be.
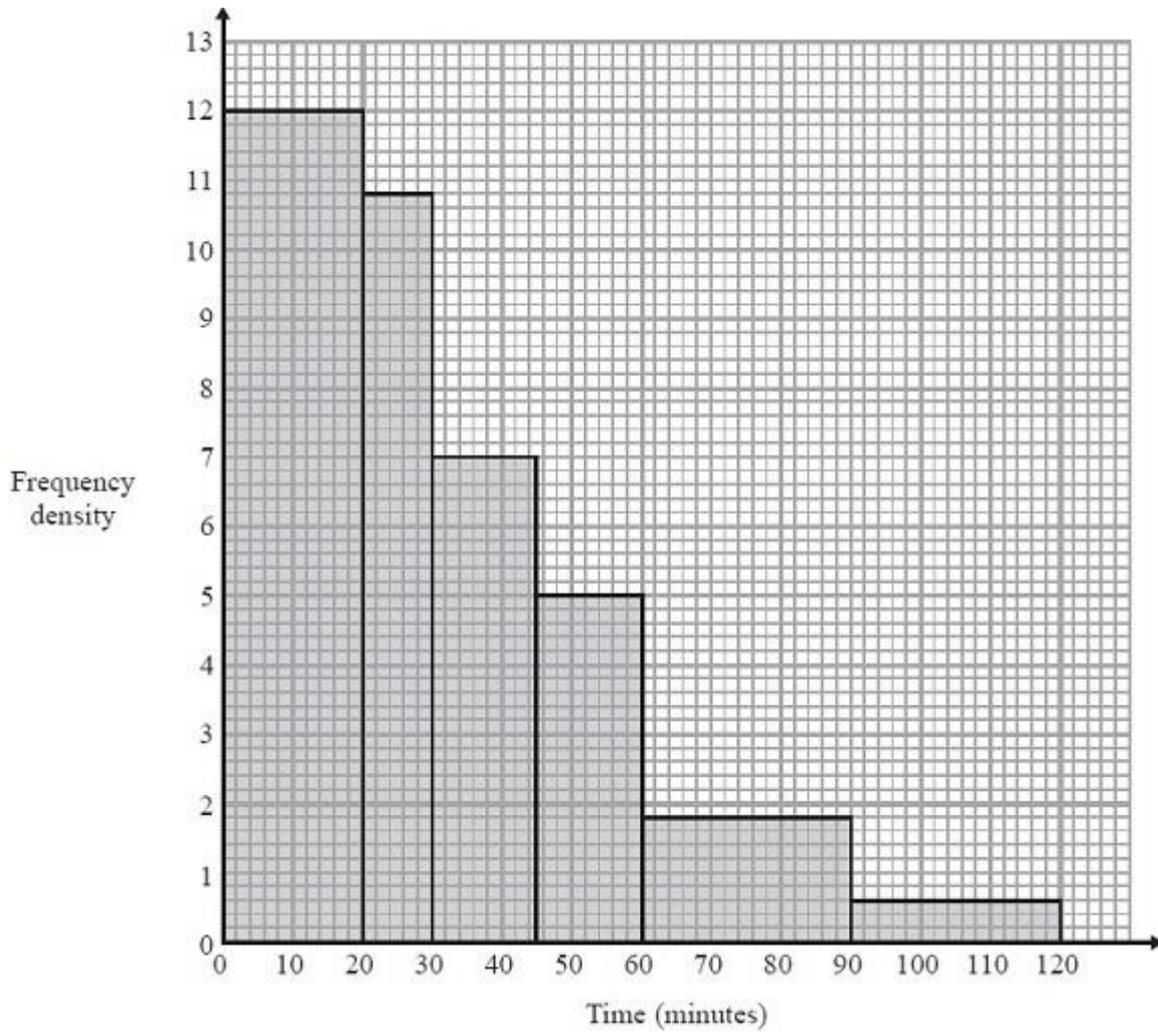
(3)

(b) Make *F* the subject of the formula $C = \frac{5(F - 32)}{9}$

....

(3)

(Total for Question is 6 marks)

Q13.
The histogram shows information about the times, in minutes, that some passengers had to wait at an airport.

Work out the percentage of the passengers who had to wait for more than one hour.

....

(Total for Question is 3 marks)

Q14.

Write these numbers in order of size.

Start with the smallest number.

$$5^{-1} \qquad 0.5 \qquad -5 \qquad 5^{0}$$

....

(Total for Question is 2 marks)

Q15.
In a sale normal prices are reduced by 20%.

A washing machine has a sale price of £464

By how much money is the normal price of the washing machine reduced?

£ ....

(Total for Question is 3 marks)

Q16.
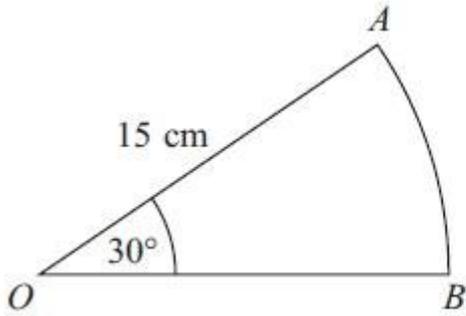
OAB is a sector of a circle, centre *O*.
The radius of the circle is 15 cm.
The angle of the sector is 30°.

Calculate the area of sector *OAB*.
Give your answer correct to 3 significant figures.

. . . . cm^2

(Total for Question is 2 marks)

Q17.

Express the recurring decimal $0.1\dot{5}$ as a fraction.
Give your answer in its simplest form.

. . . .

(Total for Question is 3 marks)

Q18.

Solve the simultaneous equations

$$5x + 2y = 11$$
$$4x - 3y = 18$$

$x = $ . . . .

$y = $ . . . .

(Total for Question is 4 marks)

Q19.

156 students went to London.

Each student visited one of the British Museum or the National Gallery or the Stock Exchange.

The table gives information about these students.

	Place visited		
	British Museum	National Gallery	Stock Exchange
Male	25	18	35
Female	27	32	19

Kate takes a sample of 30 of these students.

The sample is stratified by place visited and by gender.

Work out the number of male students who visited the Stock Exchange in the sample.

....
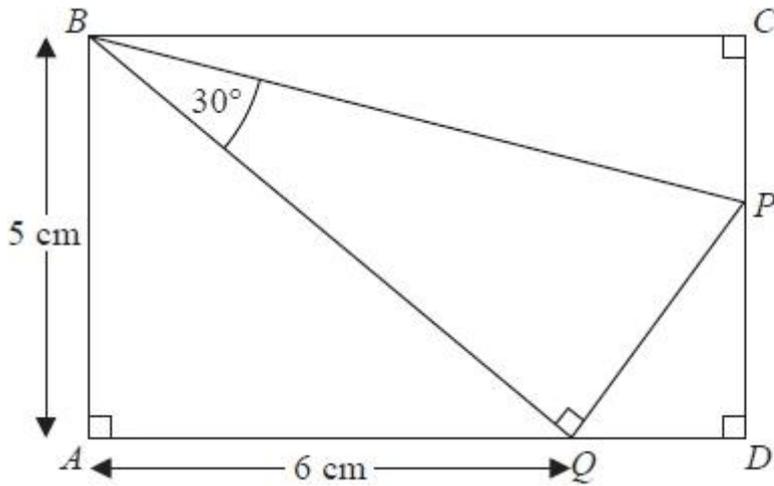
(Total for Question is 2 marks)

Q20.

In the diagram,

ABCD is a rectangle
P lies on the line CD
Q lies on the line AD
PQB is a right-angled triangle

Work out the length of BC.
Give your answer correct to 3 significant figures.
You must show your working.

....cm

(Total for question = 5 marks)

Q21.

The value of *p* is 4.3

The value of *q* is 0.4

Both *p* and *q* are given correct to the nearest 0.1

(a) Write down the lower bound for *p*.

....

(1)

$$r = p + \frac{1}{q}$$

(b) Work out the upper bound for *r*.
    You must show all your working.

....

(3)

(Total for question = 4 marks)

Q22.

Prove that

$(2n + 3)^2 - (2n - 3)^2$ is a multiple of 8

for all positive integer values of *n*.

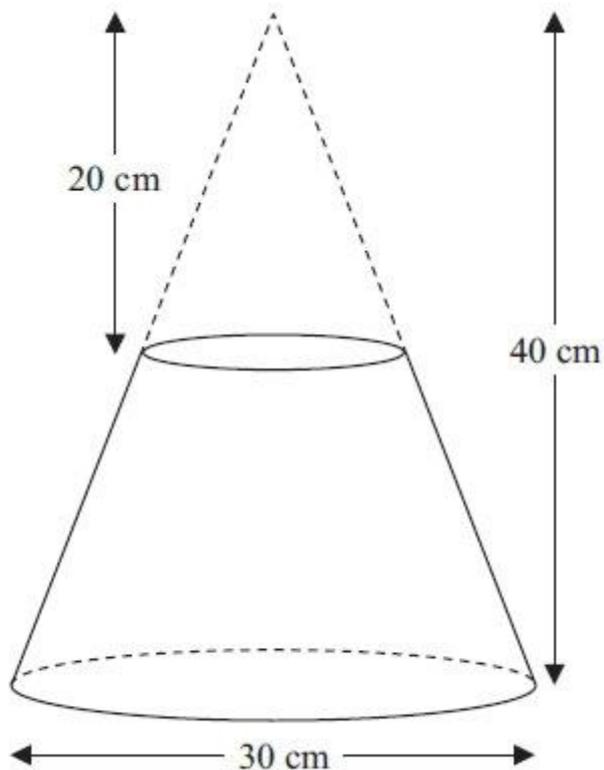**(Total for Question is 3 marks)**

Q23.

Diagram **NOT**
accurately drawn

A frustrum is made by removing a small cone from a similar large cone.

The height of the small cone is 20 cm.
The height of the large cone is 40 cm.
The diameter of the base of the large cone is 30 cm.

Work out the volume of the frustrum.
Give your answer correct to 3 significant figures.

. . . . .cm^3
(Total for Question is 4 marks)

Q24.

Solve $2x^2 + 4x - 5 = 0$
Give your solutions correct to 2 decimal places.

Q25.
(a) Complete the table of values for $y = x^3 - 4x$

x	-3	-2	-1	0	1	2	3
y			3	0			15

(2)

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

(2)
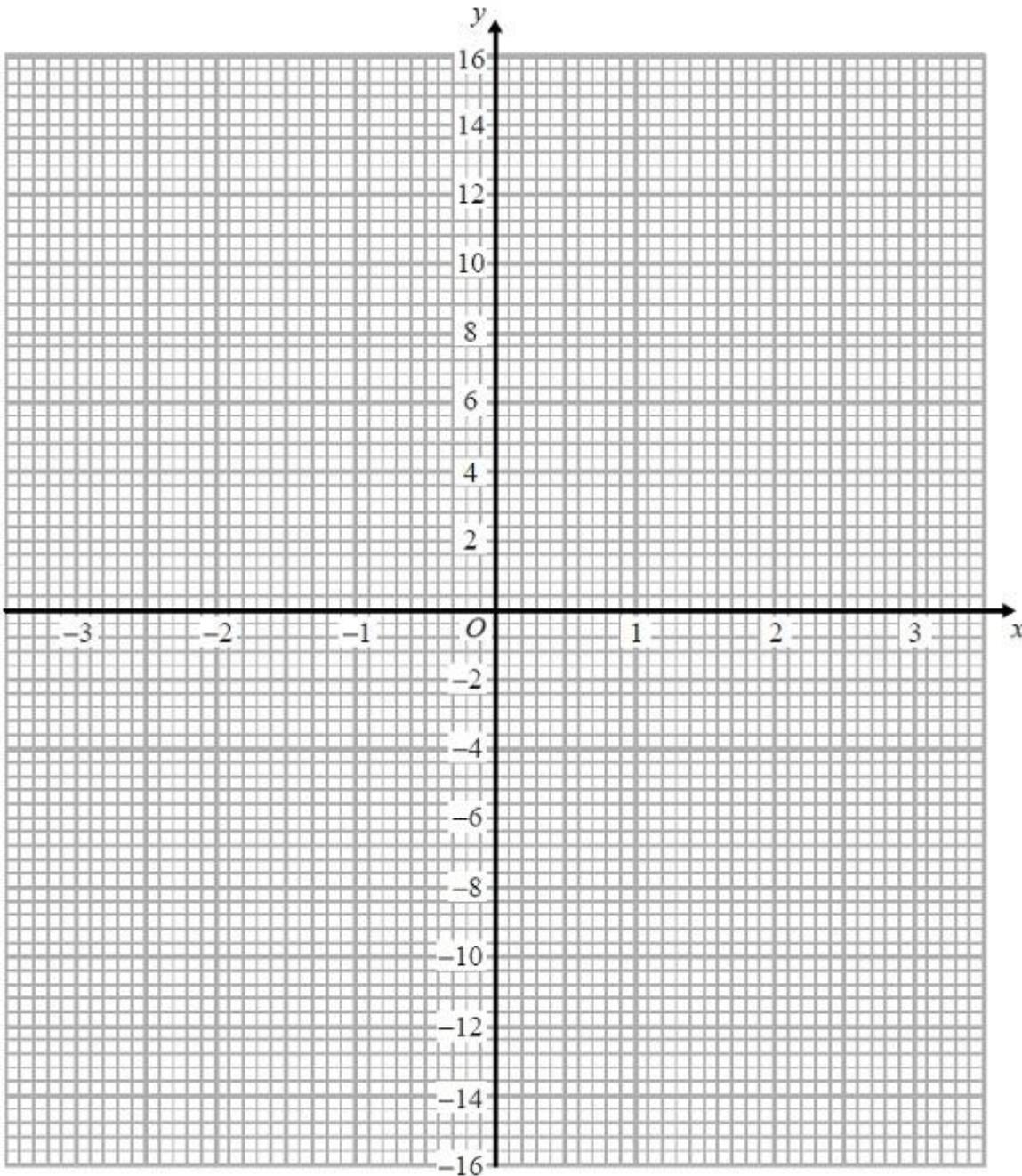
(Total for Question is 4 marks)
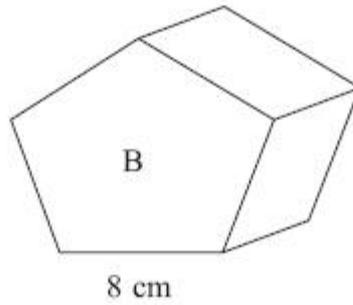
Q26.

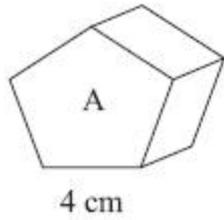The diagram shows two similar solids, A and B.

Diagram **NOT** accurately drawn

Solid A has a volume of 80 cm^3.

(a) Work out the volume of solid B.

....cm^3

(2)

Solid B has a total surface area of 160 cm^2.

(b) Work out the total surface area of solid A.

....cm^2

(2)

(Total for Question is 4 marks)

Q27.

(a) Write down an equation of a straight line that is parallel to the straight line $y = 3x - 5$

....

(1)

A straight line, L, is perpendicular to the straight line $y = 3x - 5$ and passes through the point (6, 5)
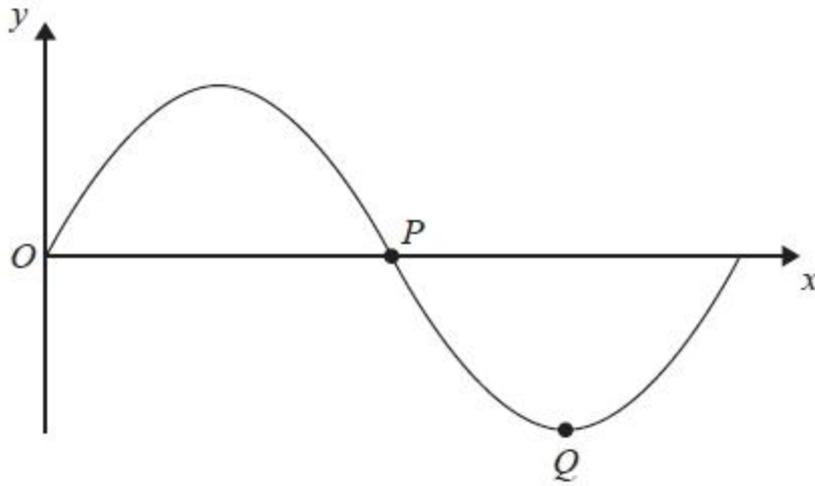
(b) Find an equation of L.

....

(Total for Question is 4 marks)

Q28.

The diagram shows part of a sketch of the curve $y = \sin x°$.

(a) Write down the coordinates of the point P.

(.............................. , ...)

(1)

(b) Write down the coordinates of the point Q.

(.............................. , ...)

(1)

Here is a sketch of the curve $y = a \cos bx° + c$, $0 \le x \le 360$
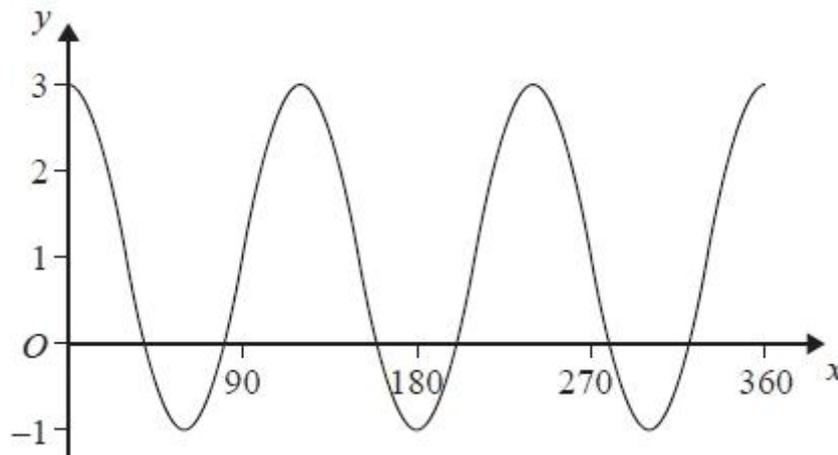
(c) Find the values of a, b and c.

a =..

b =..

c =..

(3)

(Total for Question is 5 marks)