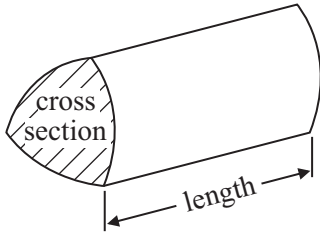


GCSE Mathematics 1MA0

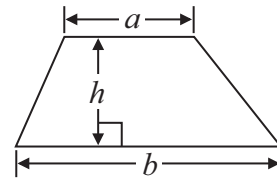
Formulae: Higher Tier

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

Volume of prism = area of cross section \times length

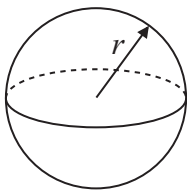


Area of trapezium = $\frac{1}{2} (a + b)h$



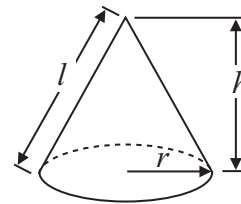
Volume of sphere = $\frac{4}{3} \pi r^3$

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

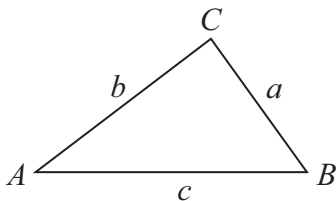


Volume of cone = $\frac{1}{3} \pi r^2 h$

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 questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

You must NOT use a calculator.

1 Work out 1.83×47

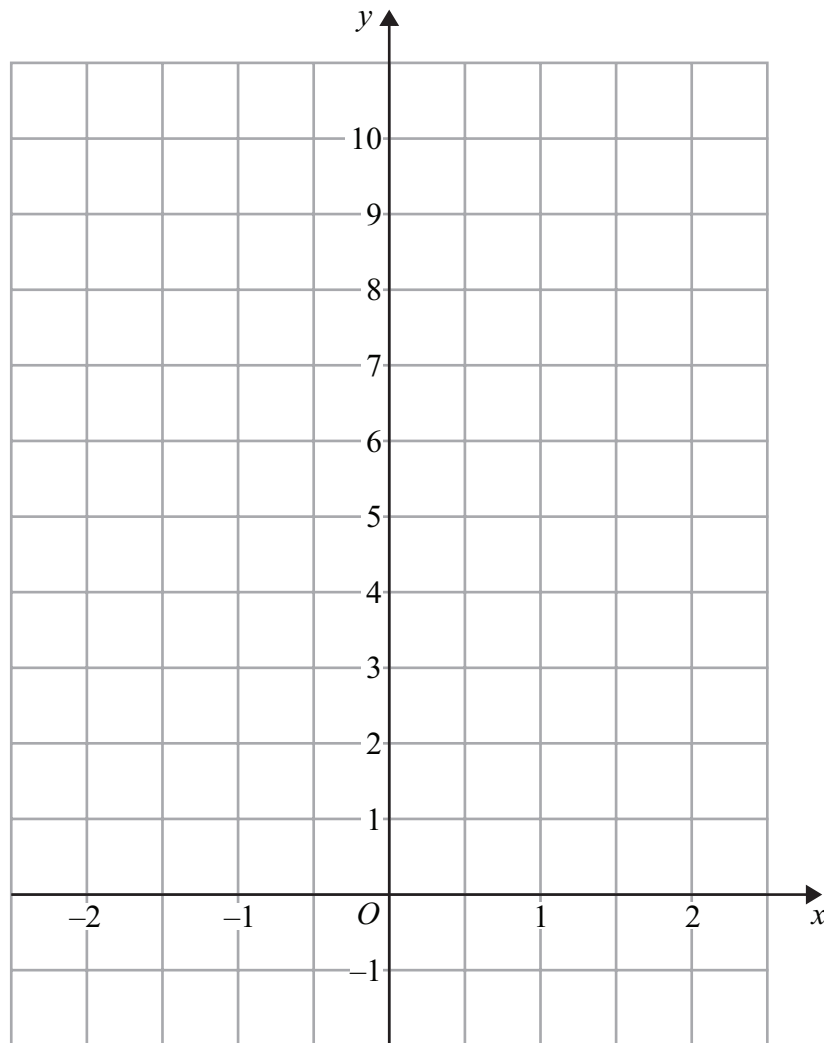
.....
(Total for Question 1 is 3 marks)

2 (a) Complete the table of values for $y = 2x + 5$

| | | | | | |
|-----|----|----|---|---|---|
| x | -2 | -1 | 0 | 1 | 2 |
| y | 1 | | 5 | | |

(2)

(b) On the grid, draw the graph of $y = 2x + 5$ for values of x from $x = -2$ to $x = 2$

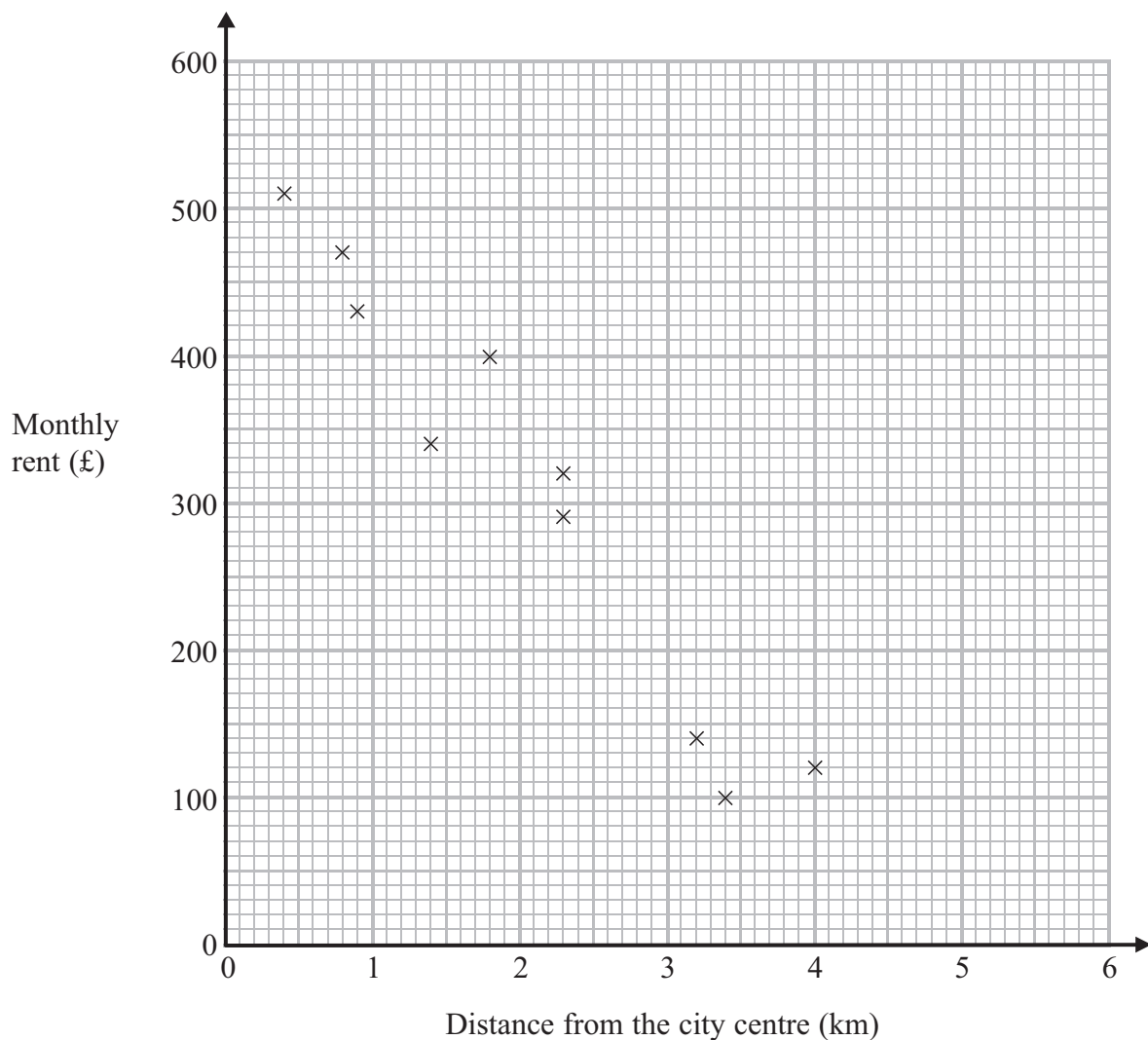


(2)

(Total for Question 2 is 4 marks)

3 The scatter graph shows information about 10 apartments in a city.

The graph shows the distance from the city centre and the monthly rent of each apartment.



The table shows the distance from the city centre and the monthly rent for two other apartments.

| | | |
|---|-----|-----|
| Distance from the city centre (km) | 2 | 3.1 |
| Monthly rent (£) | 250 | 190 |

(a) On the scatter graph, plot the information from the table.

(1)

(b) Describe the relationship between the distance from the city centre and the monthly rent.

(1)

An apartment is 2.8 km from the city centre.

(c) Find an estimate for the monthly rent for this apartment.

£
(2)

(Total for Question 3 is 4 marks)

4 Paula wants to find out how much money people spend buying CDs.

She uses this question on a questionnaire.

How much money do you spend buying CDs?

£10 – £30 £30 – £50 £50 – £70 more than £70

(a) Write down **two** things wrong with this question.

1

.....

2

.....

(2)

Paula asks 100 people in a CD store to do her questionnaire.

(b) Her sample is biased.
Explain why.

.....

.....

(1)

(Total for Question 4 is 3 marks)

5 Here are the first 5 terms of an arithmetic sequence.

3 9 15 21 27

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

.....
(2)

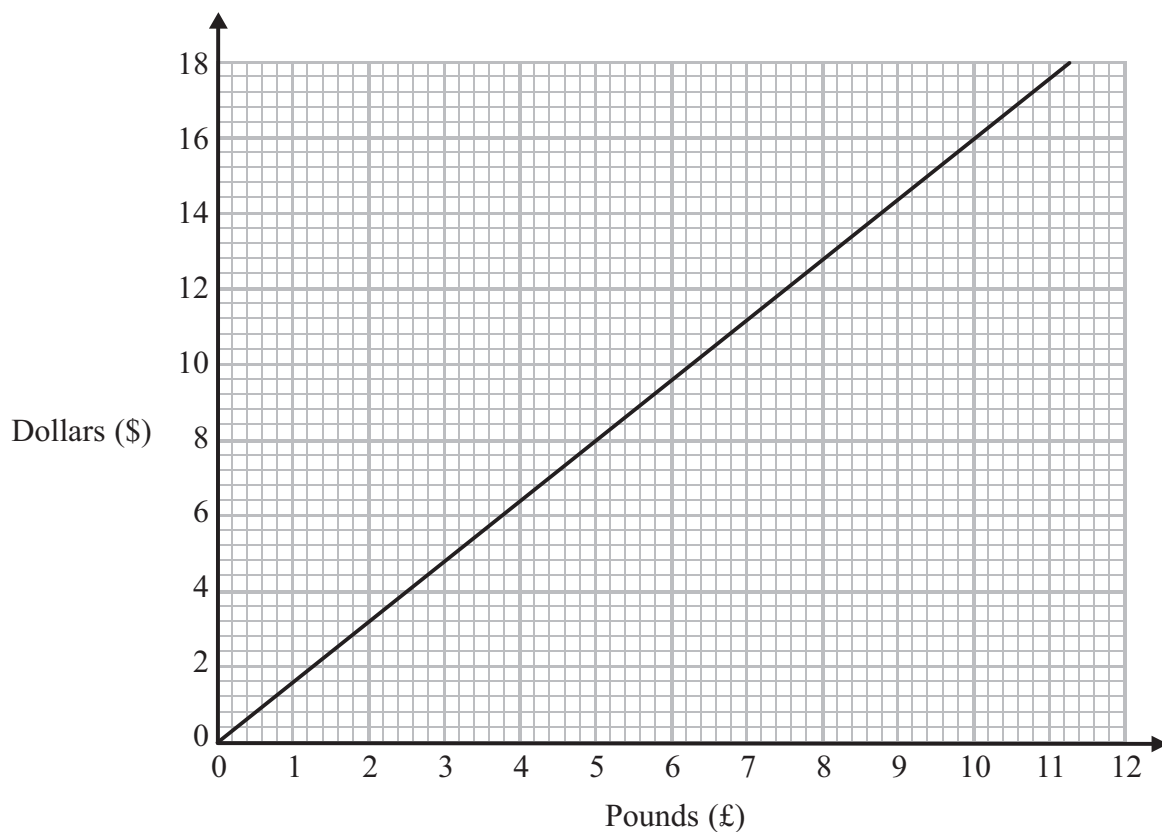
Ben says that 150 is in the sequence.

(b) Is Ben right?
You must explain your answer.

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

(Total for Question 5 is 3 marks)

6 You can use this conversion graph to change between pounds (£) and dollars (\$).



(a) Use the conversion graph to change £5 to dollars.

\$
(1)

Ella has \$200 and £800

Her hotel bill is \$600

Ella pays the bill with the \$200 and some of the pounds.

(b) Use the conversion graph to work out how many pounds she has left.

£
(4)

(Total for Question 6 is 5 marks)

7 (a) Simplify $5x + 4y + x - 7y$

.....
(2)

(b) Solve $7(x + 2) = 7$

.....
(2)

(Total for Question 7 is 4 marks)

8 Trams leave Piccadilly

to Eccles every 9 minutes

to Didsbury every 12 minutes

A tram to Eccles and a tram to Didsbury both leave Piccadilly at 9 am.

At what time will a tram to Eccles and a tram to Didsbury next leave Piccadilly at the same time?

.....
(Total for Question 8 is 3 marks)

9 (a) Simplify $a^4 \times a^5$

.....
(1)

(b) Simplify $\frac{45e^6 f^8}{5ef^2}$

.....
(2)

(c) Write down the value of $9^{\frac{1}{2}}$

.....
(1)

(Total for Question 9 is 4 marks)

*10

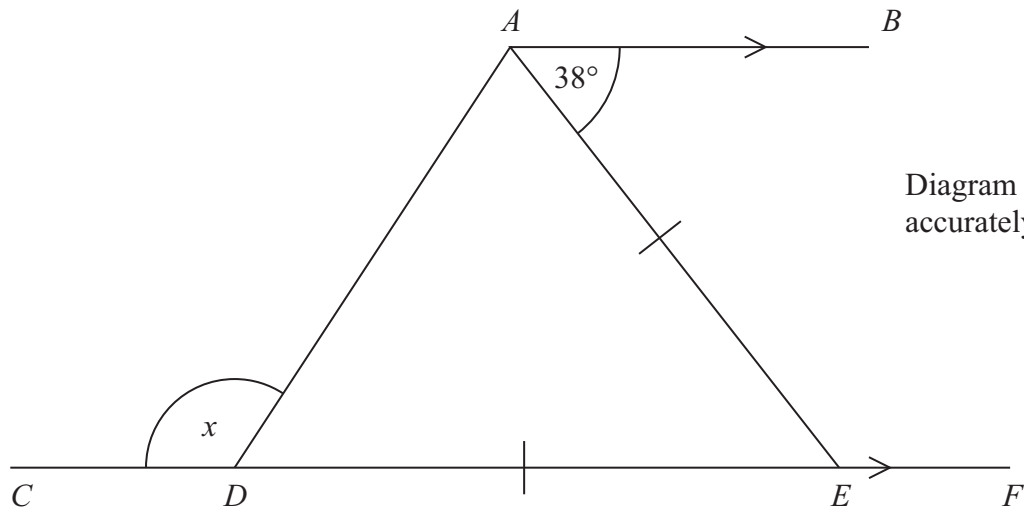


Diagram **NOT**
accurately drawn

$CDEF$ is a straight line.

AB is parallel to CF .

$DE = AE$.

Work out the size of the angle marked x .

You must give reasons for your answer.

(Total for Question 10 is 4 marks)

11 5 schools sent some students to a conference.

One of the schools sent both boys and girls.

This school sent 16 boys.

The ratio of the number of boys it sent to the number of girls it sent was 1 : 2

The other 4 schools sent only girls.

Each of the 5 schools sent the same number of students.

Work out the total number of students sent to the conference by these 5 schools.

.....
(Total for Question 11 is 4 marks)

12 Greg sells car insurance and home insurance.

The table shows the cost of these insurances.

| Insurance | car insurance | home insurance |
|------------------|---------------|----------------|
| Cost | £200 | £350 |

Each month Greg earns

£530 basic pay
5% of the cost of all the car insurance he sells
and 10% of the cost of all the home insurance he sells

In May Greg sold

6 car insurances
and 4 home insurances

Work out the total amount of money Greg earned in May.

£

(Total for Question 12 is 5 marks)

13

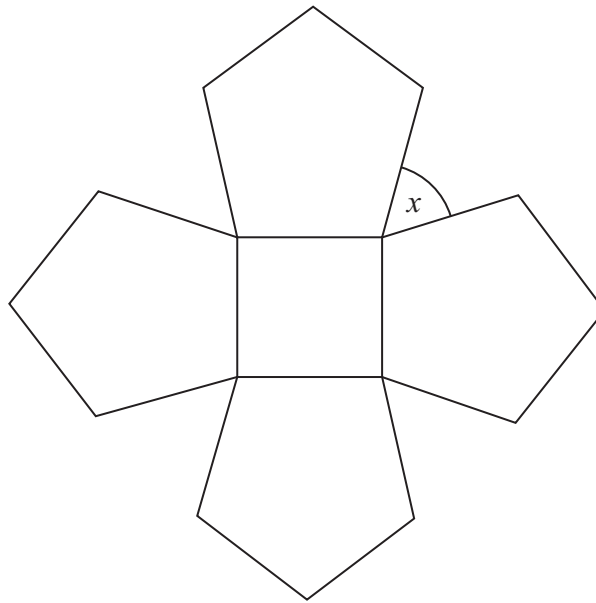


Diagram **NOT**
accurately drawn

The diagram shows a square and 4 regular pentagons.

Work out the size of the angle marked x .

.....
(Total for Question 13 is 3 marks)

14 (a) Write 8.2×10^5 as an ordinary number.

.....
(1)

(b) Write 0.000 376 in standard form.

.....
(1)

(c) Work out the value of $(2.3 \times 10^{12}) \div (4.6 \times 10^3)$
Give your answer in standard form.

.....
(2)

(Total for Question 14 is 4 marks)

15 The grouped frequency table shows information about the weekly wages of 80 factory workers.

| Weekly wage (£ x) | Frequency |
|----------------------|-----------|
| $100 < x \leq 200$ | 8 |
| $200 < x \leq 300$ | 15 |
| $300 < x \leq 400$ | 30 |
| $400 < x \leq 500$ | 17 |
| $500 < x \leq 600$ | 7 |
| $600 < x \leq 700$ | 3 |

(a) Complete the cumulative frequency table.

| Weekly wage (£ x) | Cumulative Frequency |
|----------------------|----------------------|
| $100 < x \leq 200$ | |
| $100 < x \leq 300$ | |
| $100 < x \leq 400$ | |
| $100 < x \leq 500$ | |
| $100 < x \leq 600$ | |
| $100 < x \leq 700$ | |

(1)

(b) On the grid opposite, draw a cumulative frequency graph for your table.

(2)

(c) Use your graph to find an estimate for the interquartile range.

£

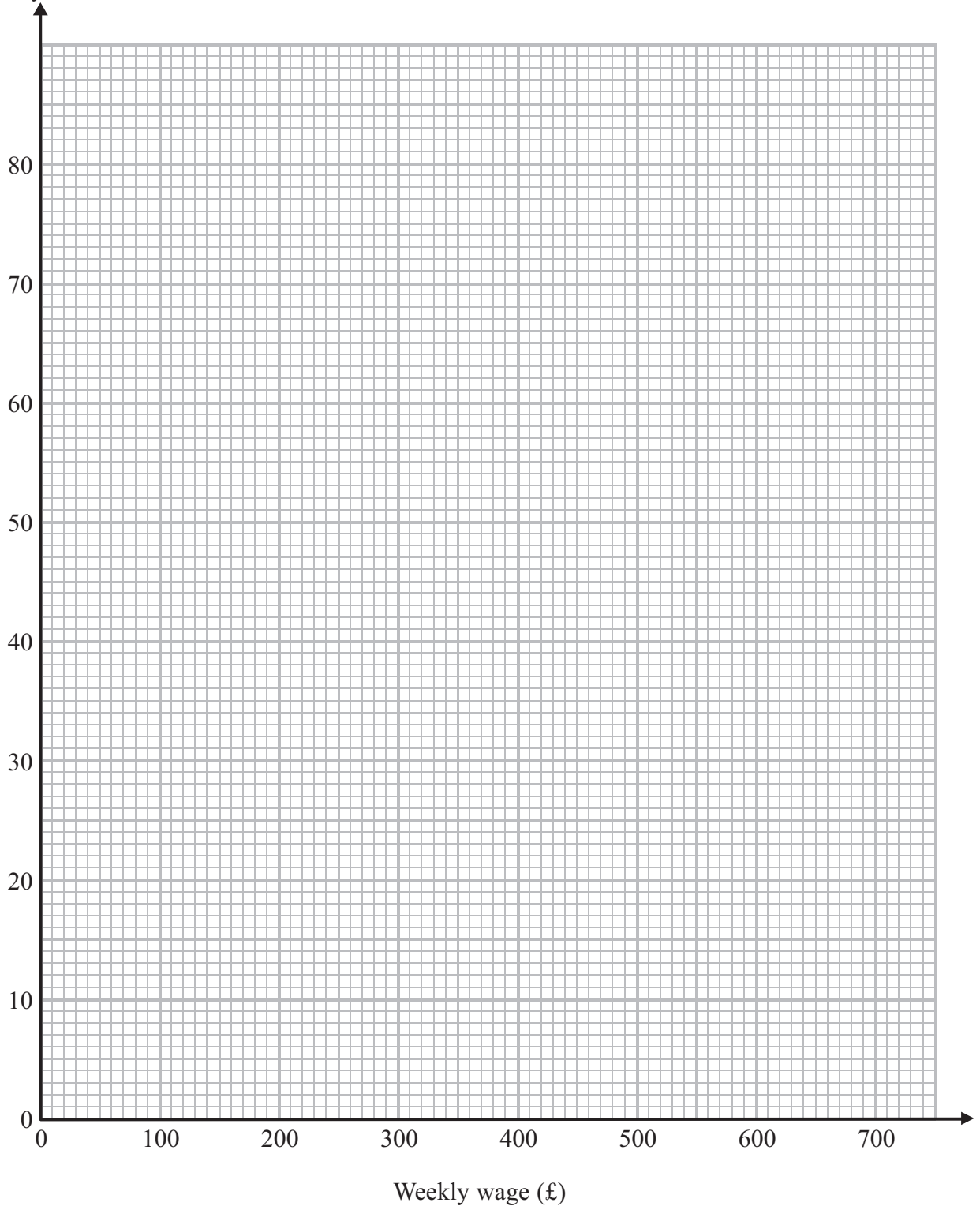
(2)

(d) Use your graph to find an estimate for the number of workers with a weekly wage of more than £530

.....

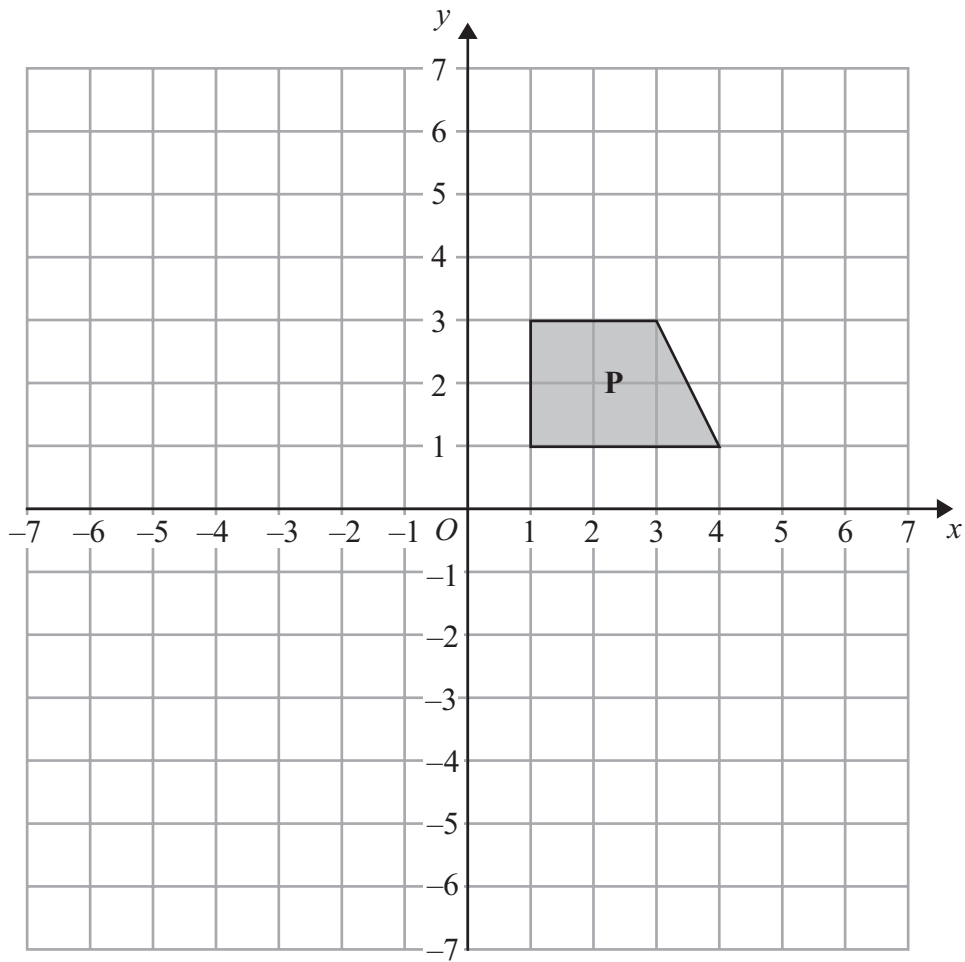
(2)

Cumulative frequency



(Total for Question 15 is 7 marks)

16



Shape **P** is reflected in the line $x = -1$ to give shape **Q**.

Shape **Q** is reflected in the line $y = 0$ to give shape **R**.

Describe fully the **single** transformation that maps shape **P** onto shape **R**.

.....

.....

(Total for Question 16 is 3 marks)

17 (a) (i) Factorise $x^2 - 12x + 27$

.....

(ii) Solve the equation $x^2 - 12x + 27 = 0$

.....

(3)

(b) Factorise $y^2 - 100$

.....

(1)

(Total for Question 17 is 4 marks)
