Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						1	3	8	0	/	3	H	Signature	

Paper Reference(s)

1380/3H

Edexcel GCSE

Mathematics (Linear) – 1380

Paper 3 (Non-Calculator)

Higher Tier

Monday 7 June 2010 – Afternoon

Time: 1 hour 45 minutes

Examiner's use only

Team Leader's use only

Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.
Tracing paper may be used.

Items included with question papers

Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
You must NOT write on the formulae page.
Anything you write on the formulae page will gain NO credit.
If you need more space to complete your answer to any question, use additional answer sheets.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 27 questions in this question paper. The total mark for this paper is 100.
There are 24 pages in this question paper. Any blank pages are indicated.
Calculators must not be used.

Advice to Candidates

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

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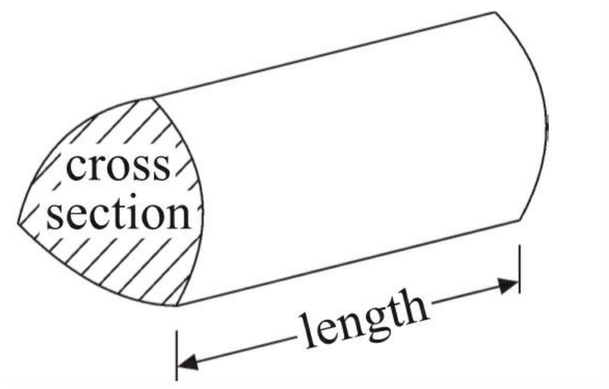
GCSE Mathematics (Linear) 1380

Formulae: Higher Tier

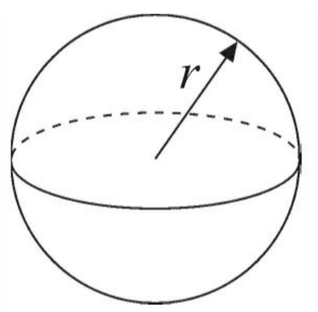
You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of a prism = area of cross section × length



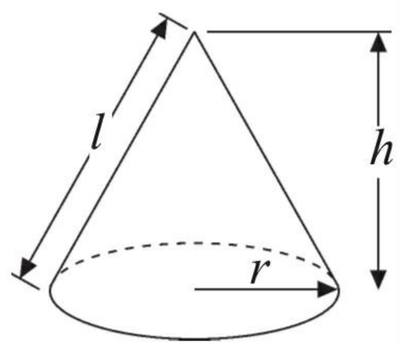
Volume of sphere $= \frac{4}{3}\pi r^3$

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

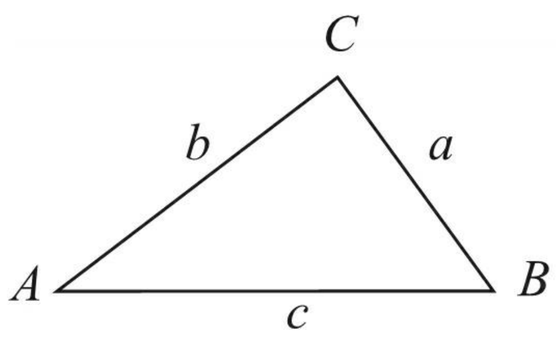


Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi r l$



In any triangle ABC



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

The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \quad \sqrt{(b^2 - 4ac)}}{2a}$$

Leave blank

Answer ALL TWENTY SEVEN questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

You must NOT use a calculator.

1. Simplify $6x + 9y + 2x - 3y$

$8x + 6y$

Q1

(Total 2 marks)

2. Here are the weights, in grams, of 16 eggs.

~~47~~ 45 ~~50~~ ~~53~~ ~~43~~ ~~61~~ ~~53~~ ~~62~~

~~58~~ ~~56~~ ~~51~~ ~~47~~ ~~55~~ ~~62~~ ~~58~~ ~~58~~

Draw an ordered stem and leaf diagram to show this information.
You must include a key.

4	3 5 7 7
5	0 3 3 5 6 7 8 8 8
6	1 2 2

Key: 4 \| 3 = 43g

Q2

(Total 3 marks)

Leave blank

3.

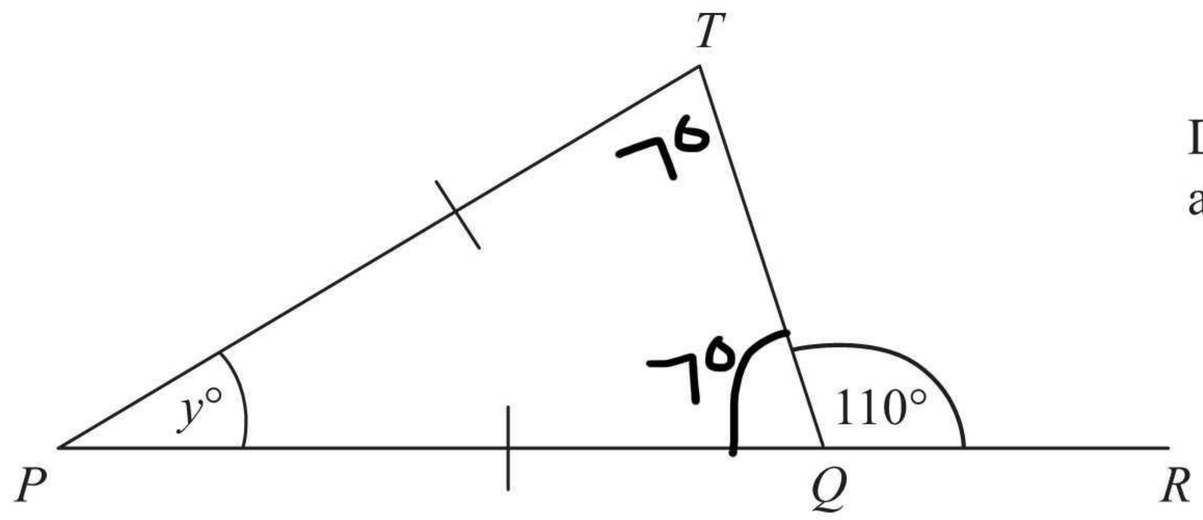


Diagram **NOT** accurately drawn

PQR is a straight line.
PT = *PQ*.

(i) Work out the value of *y*.

40°

(ii) Give reasons for your answer.

Angles on a straight line = 180°
Two angles at base of isosceles triangle are equal. Angles in a triangle = 180°

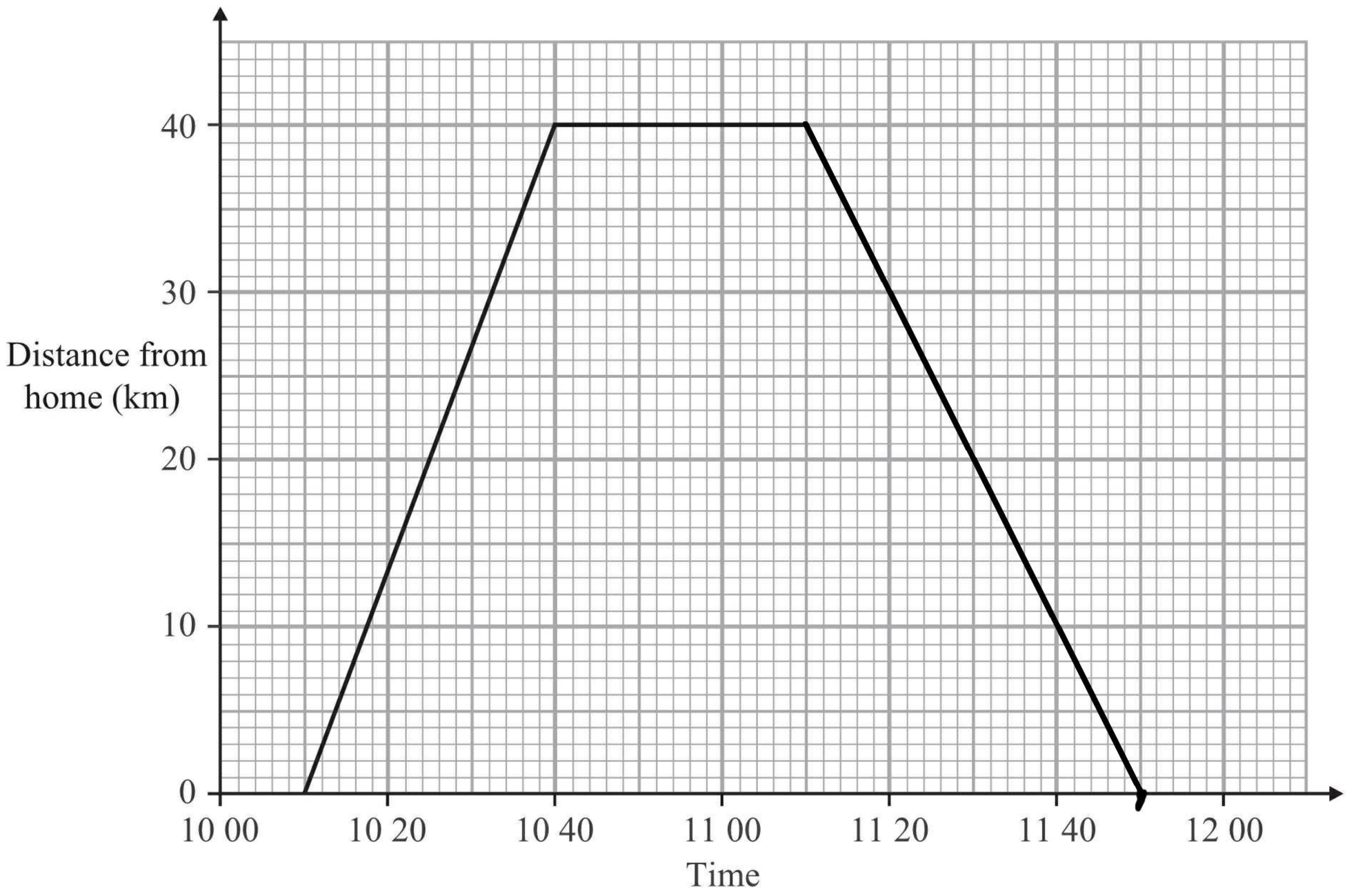
(Total 4 marks)

Q3

Leave blank

4. Nigel travelled from his home to his friend's house 40 km away.
He stayed at his friend's house for 30 minutes.
Nigel then travelled home.

Here is part of the distance-time graph for Nigel's journey.



(a) At what time did Nigel leave home?

10 10

(1)

(b) How far was Nigel from home at 10 20?

13 km

(1)

Nigel arrived home at 11 50

(c) Complete the distance-time graph.

(1)

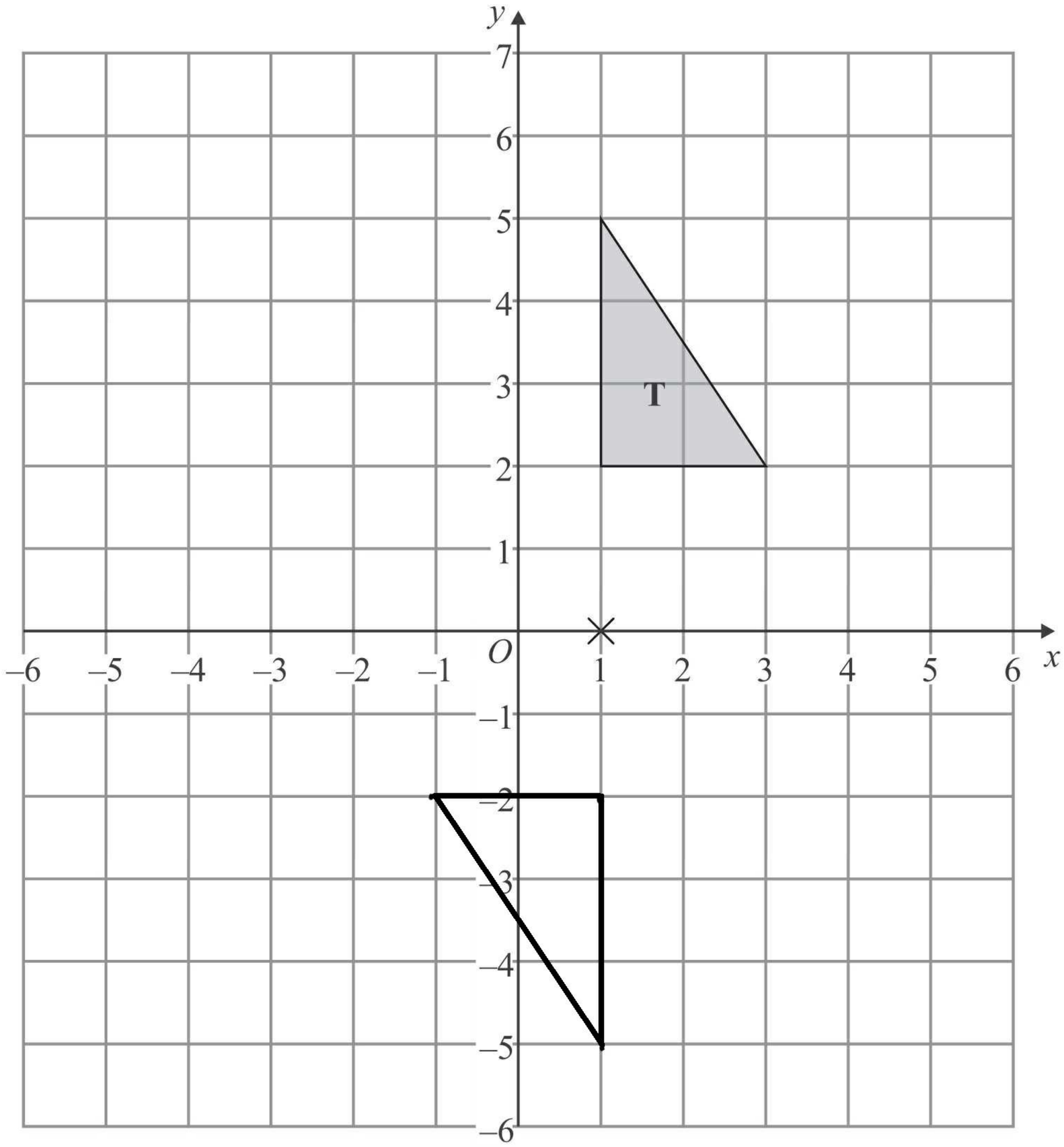
Q4

(Total 3 marks)

Turn over

Leave blank

5.



Triangle **T** has been drawn on the grid.

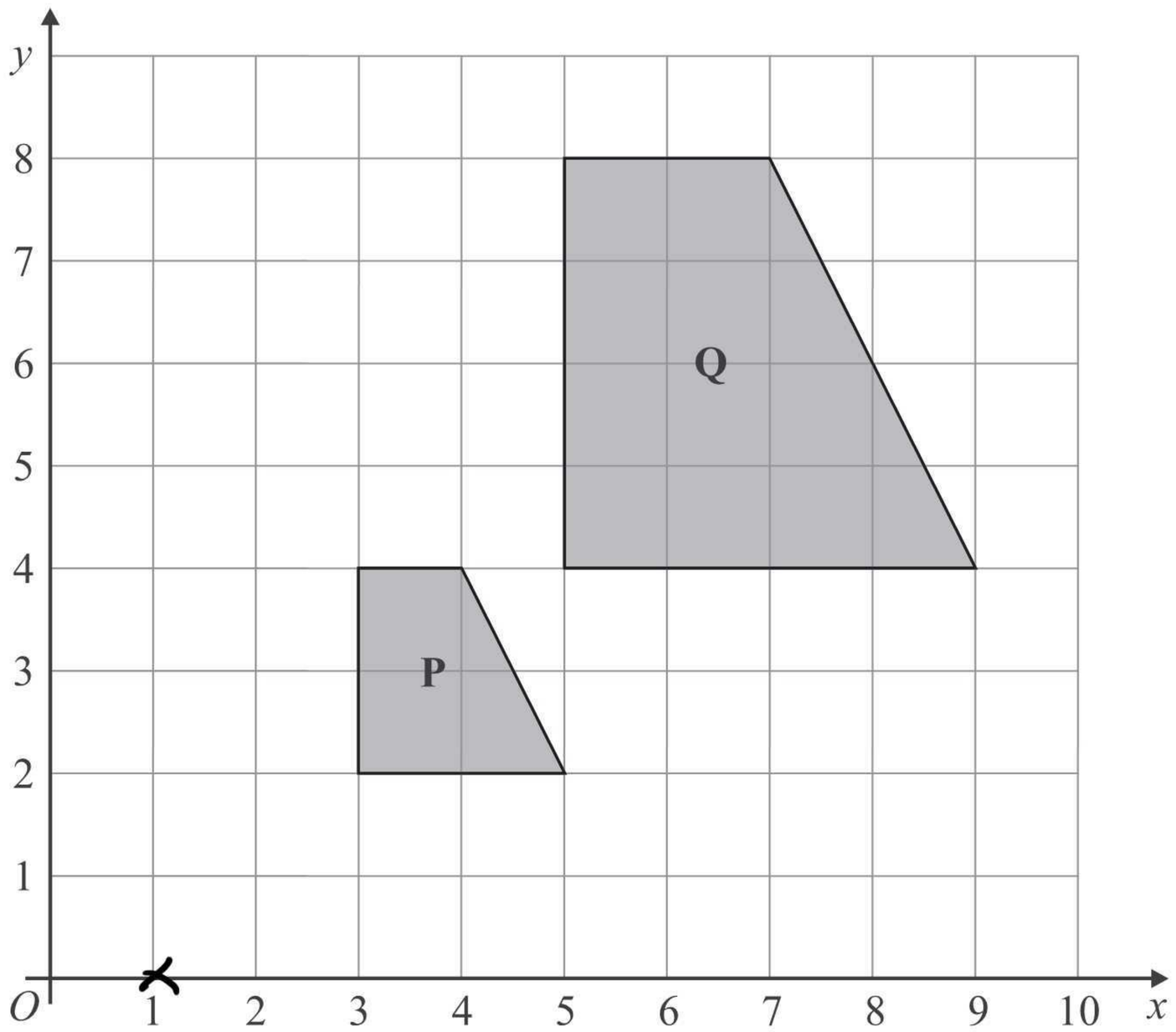
Rotate triangle **T** 180° about the point (1, 0).
Label the new triangle **A**.

Q5

(Total 2 marks)

Leave blank

6.



Describe fully the single transformation which maps shape **P** onto shape **Q**.

enlargement, scale factor 2, centre (1,0)

.....

Q6

(Total 3 marks)

7. Anna and Bill share £40 in the ratio 2 : 3

Work out how much each person gets.

5 parts

$\frac{40}{5} = 8$

Each part is £8

Anna £ 16

Bill £ 24

Q7

(Total 3 marks)

Leave blank

8. Sasha carried out a survey of 60 students.
She asked them how many CDs they each have.

This table shows information about the numbers of CDs these students have.

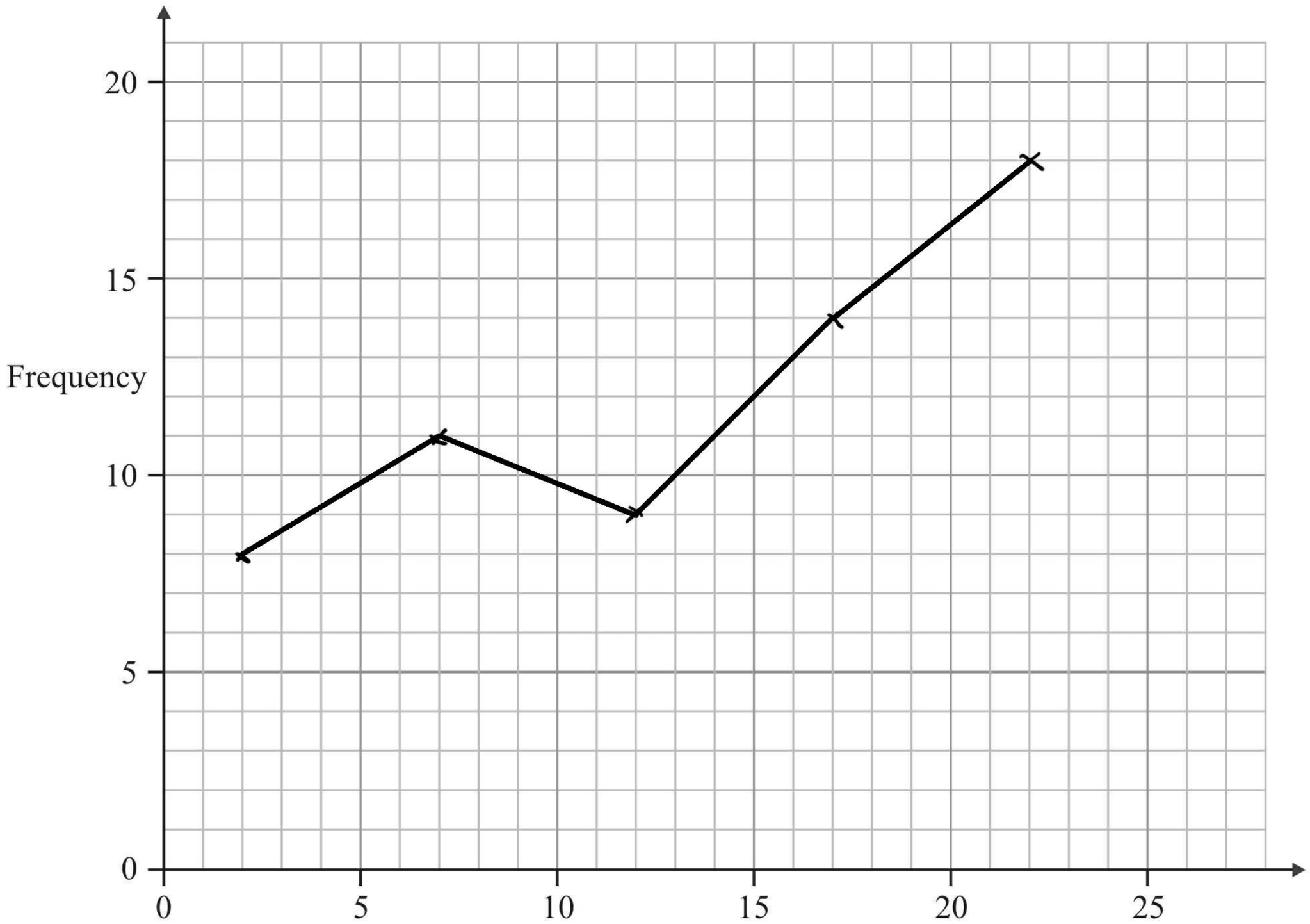
Number of CDs	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24
Frequency	8	11	9	14	18

(a) Write down the class interval containing the median.

15 – 19

(1)

(b) On the grid, draw a frequency polygon to show the information given in the table.



(2)

(Total 3 marks)

Q8

Leave blank

9.

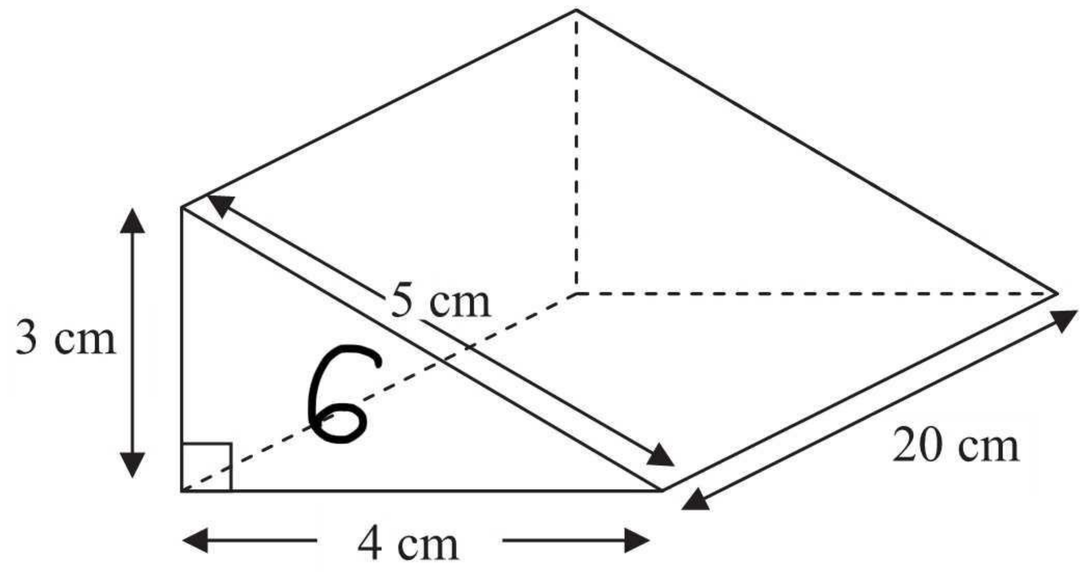


Diagram **NOT** accurately drawn

Work out the volume of the triangular prism.

volume = area of cross section x length

= 6 x 20

= 120 cm³

..... 120 ..... cm³ **Q9**

(Total 2 marks)

10. Work out 4.52×36

	400	50	2
30	12000	1500	60
6	2400	300	12

12000
2400
1500
300
60
12
16272

16.72 ..... **Q10**

(Total 3 marks)

Turn over

Leave blank

11. There are 300 people in the cinema.

$\frac{1}{6}$ of the 300 people are boys. 50

$\frac{3}{10}$ of the 300 people are girls. $\frac{1}{10} = 30$ $\frac{3}{10} = 90$

The rest of the people are adults.

Work out how many people are adults.

140 children

160

.....

(Total 4 marks)

Q11

12.

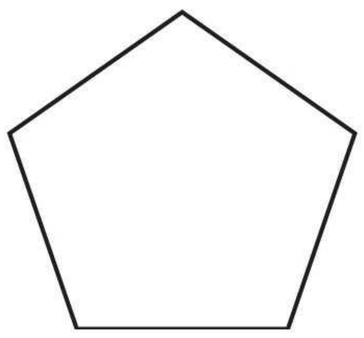


Diagram **NOT** accurately drawn

Work out the size of an exterior angle of a regular pentagon.

$\frac{360}{5} = 72$

72 °

.....

(Total 2 marks)

Q12

Leave blank

13. Anil wants to find out how many DVDs people buy.

He uses this question on a questionnaire.

How many DVDs do you buy?

☐ 1 – 5 ☐ 5 – 10 ☐ 10 – 15 ☐ 15 – 20

Write down **two** different things wrong with this question.

1 there is no timescale

2 there are gaps. No zero option and nothing over 20

Q13

(Total 2 marks)

Leave blank

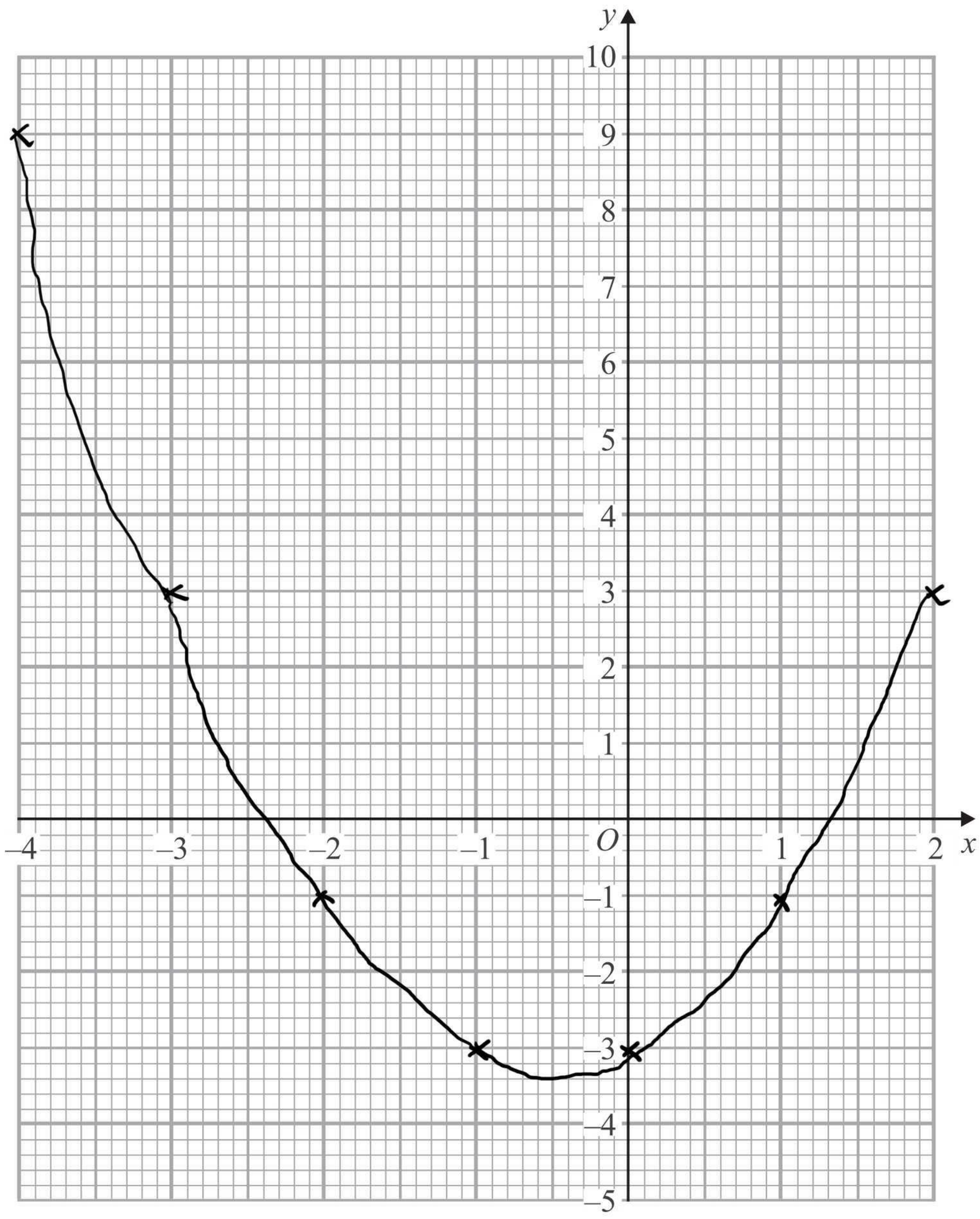
14. (a) Complete the table of values for $y = x^2 + x - 3$

x	–4	–3	–2	–1	0	1	2
y	9	3	–1	–3	–3	–1	3

(2)

(b) On the grid below, draw the graph of $y = x^2 + x - 3$ for values of x from –4 to 2

(2)



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(c) Use your graph to find estimates for the solutions of $x^2 + x - 3 = 0$

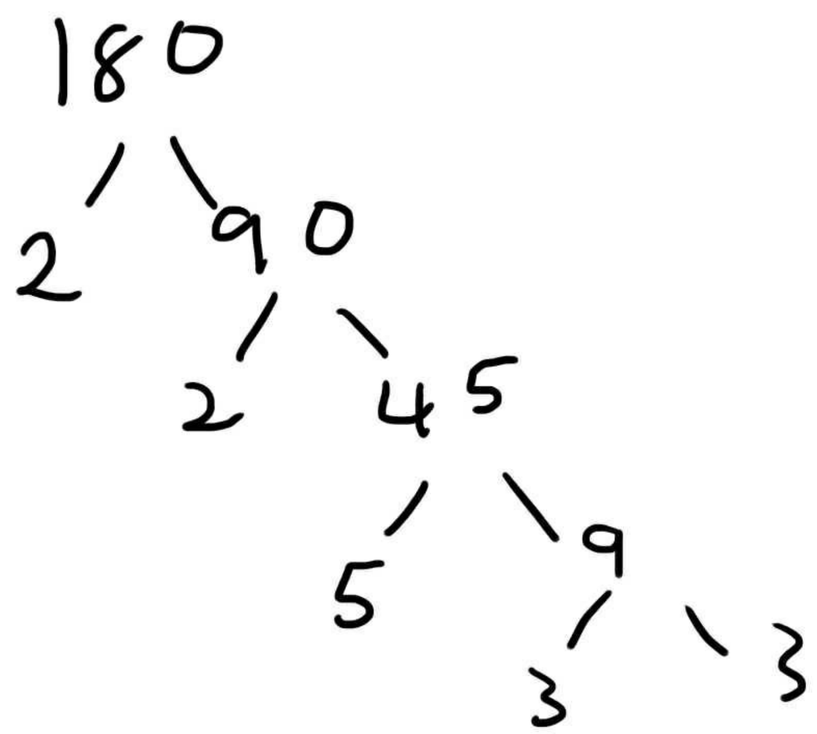
$x =$ −2.4

$x =$ 1.3

(1) **Q14**

(Total 5 marks)

15. Express 180 as a product of its prime factors.



$2^2 \times 3^2 \times 5$

(Total 3 marks) **Q15**

16. Work out $3\frac{1}{4} \times 2\frac{2}{3}$

Give your answer in its simplest form.

$\frac{13}{4} \times \frac{8}{3} = \frac{104}{12} = \frac{52}{6} = \frac{26}{3}$

$\frac{26}{3}$ or $8\frac{2}{3}$

(Total 3 marks) **Q16**

Leave blank

17. (a) Factorise $3x + 12$

$3(x+4)$

(1)

(b) Solve $4(2x - 3) = 5x + 7$

$8x - 12 = 5x + 7$

$3x - 12 = 7$

$3x = 19$

$x = \frac{19}{3}$

$x = \frac{19}{3}$

(3)

(c) Expand and simplify $(y + 4)(y + 5)$

$y^2 + 5y + 4y + 20$

$y^2 + 9y + 20$

(2)

(d) Factorise fully $8x^2 + 12xy$

$4x(2x + 3y)$

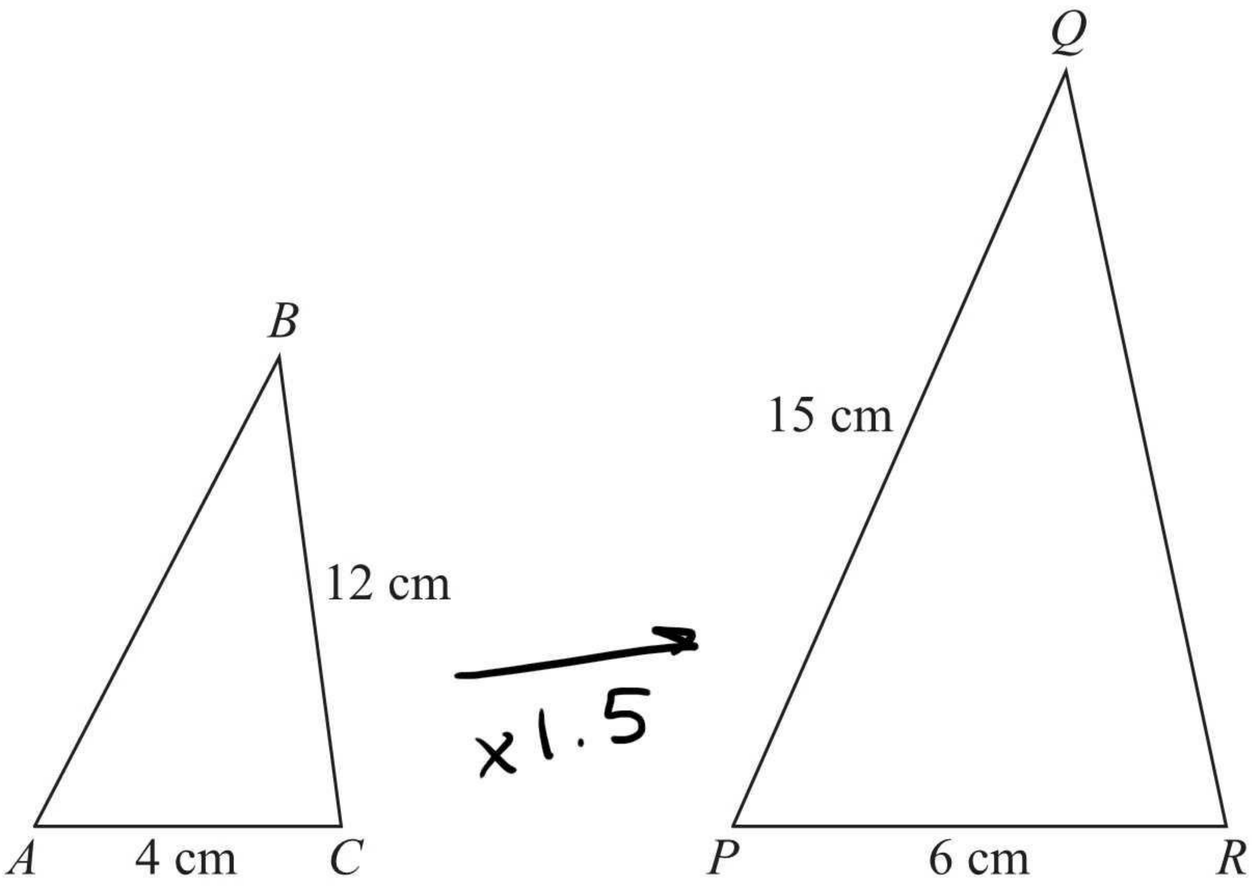
(2)

Q17

(Total 8 marks)

Leave blank

18.



Triangles ABC and PQR are mathematically similar.

Angle A = angle P.
Angle B = angle Q.
Angle C = angle R.
AC = 4 cm.
BC = 12 cm.
PR = 6 cm.
PQ = 15 cm.

(a) Work out the length of QR.

12 x 1.5

18 .....cm
(2)

(b) Work out the length of AB.

15 ÷ 1.5

10 .....cm
(2)

Q18

(Total 4 marks)

Turn over

Leave blank

19. Arwen buys a car for £4000
The value of the car depreciates by 10% each year.

Work out the value of the car after two years.

4000 x 0.9²

4000 x 0.81

3240

OR

4000
10% = 400
Yr 1 3600
10% = 360
Yr 2 = 3240

£ 3240

(Total 3 marks)

Q19

20. (a) Here are some expressions.

a^3b	$a^2(c + b)$	$4abc$	$ab + c^3$	$4\pi c^2$
	✓	✓		

The letters a, b, and c represent lengths.
π and 4 are numbers that have no dimension.

Two of the expressions could represent volumes.
Tick the boxes (✓) underneath these two expressions.

(2)

The volume of this cube is 8 m^3.

(b) Change 8 m^3 into cm^3.

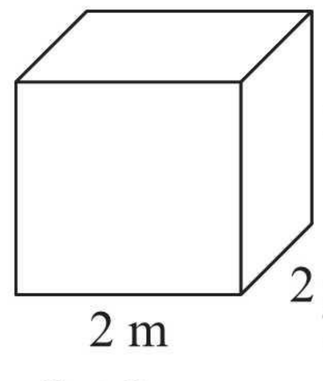


Diagram **NOT** accurately drawn

200
200
200

8000000 cm^3

(2)

Q20

(Total 4 marks)

Leave blank

21. Solve the simultaneous equations

$3x + 2y = 8$ ×2
$2x + 5y = -2$ ×3

$6x + 4y = 16$
$6x + 15y = -6$

$-11y = 22$

$y = -2$

$3x + 2(-2) = 8$

$3x - 4 = 8$

$3x = 12$

$x = 4$

$x =$ 4

$y =$ −2

Q21

(Total 4 marks)

Leave blank

22. The table gives some information about the delays, in minutes, of 80 flights.

Delay (n minutes)	**Frequency**
$0 < n \leqslant 20$	16
$20 < n \leqslant 30$	26
$30 < n \leqslant 40$	23
$40 < n \leqslant 50$	10
$50 < n \leqslant 60$	5

(a) Write down the modal class interval.

$20 < n \leqslant 30$

(1)

(b) Complete the cumulative frequency table.

Delay (n minutes)	**Cumulative Frequency**
$0 < n \leqslant 20$	16
$0 < n \leqslant 30$	42
$0 < n \leqslant 40$	65
$0 < n \leqslant 50$	75
$0 < n \leqslant 60$	80

(1)

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

(2)

(d) Use your graph to find an estimate for

(i) the median delay,

29 minutes

(ii) the interquartile range of the delays.

38 − 22

16 minutes

(3)

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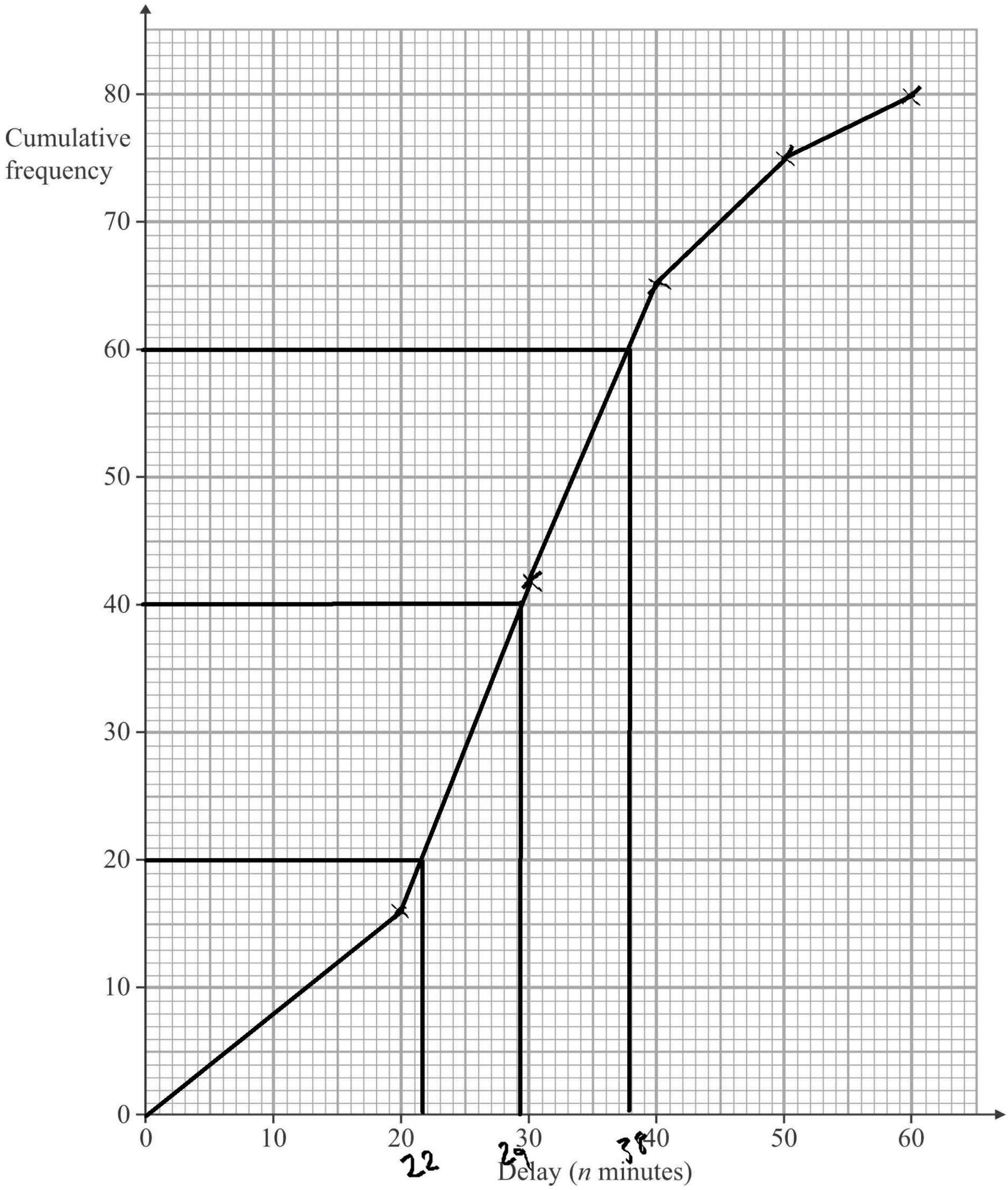

Q22

(Total 7 marks)

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23. A straight line passes through (0, –2) and (3, 10).

Find the equation of the straight line.

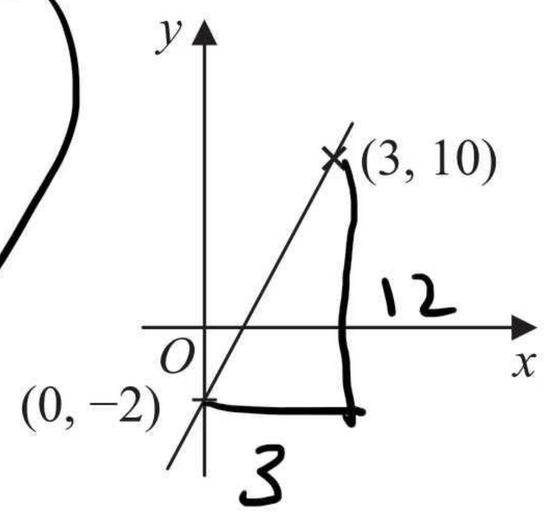

Diagram **NOT** accurately drawn

gradient = $\frac{12}{3} = 4$

$y = 4x + c$

using (3, 10)

$10 = 4(3) + c$

$16 = 12 + c$

$-2 = c$

$y = 4x - 2$

.....

Q23

(Total 3 marks)

24. Find the value of

(i) 6^0

1

.....

(ii) $64^{\frac{1}{2}}$

8

.....

(iii) $\left(\frac{27}{8}\right)^{-\frac{2}{3}}$

$\left(\frac{3}{2}\right)^{-2}$ $\left(\frac{9}{4}\right)^{-1}$

$\frac{4}{9}$

.....

Q24

(Total 4 marks)

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25.

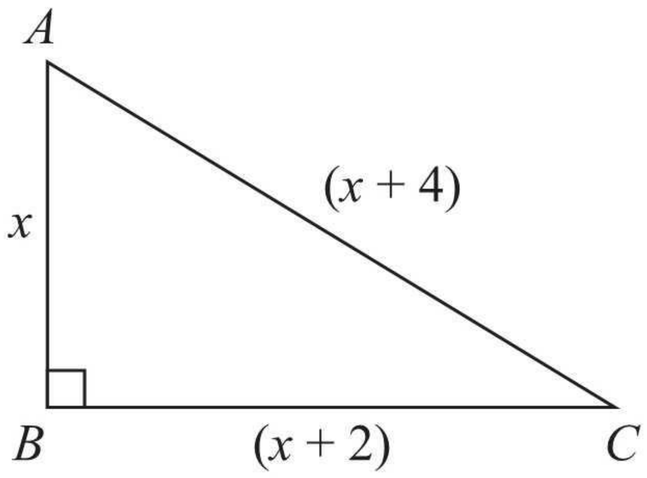

Diagram **NOT** accurately drawn

ABC is a right-angled triangle.
All the measurements are in centimetres.

$AB = x$
$BC = (x + 2)$
$AC = (x + 4)$

(a) Show that $x^2 - 4x - 12 = 0$

$x^2 + (x+2)^2 = (x+4)^2$

$x^2 + (x+2)(x+2) = (x+4)(x+4)$

$x^2 + x^2 + 2x + 2x + 4 = x^2 + 4x + 4x + 16$

$2x^2 + 4x + 4 = x^2 + 8x + 16$

$x^2 - 4x - 12 = 0$

(3)

(b) (i) Solve $x^2 - 4x - 12 = 0$

$(x - 6)(x + 2) = 0$

$x = 6$ or $x = -2$

.....

(ii) Hence, write down the length of *AC*.

$AC =$ 10 cm

(4)

Q25

(Total 7 marks)

Turn over

Leave blank

26. There are 3 orange sweets, 2 red sweets and 5 yellow sweets in a bag.

Sarah takes a sweet at random.
She eats the sweet.
She then takes another sweet at random.

Work out the probability that both the sweets are the same colour.

$P(OO) = \frac{3}{10} \times \frac{2}{9} = \frac{6}{90}$

$P(RR) = \frac{2}{10} \times \frac{1}{9} = \frac{2}{90}$

$P(YY) = \frac{5}{10} \times \frac{4}{9} = \frac{20}{90}$

$\frac{28}{90}$

.....

(Total 4 marks)

Q26

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27.

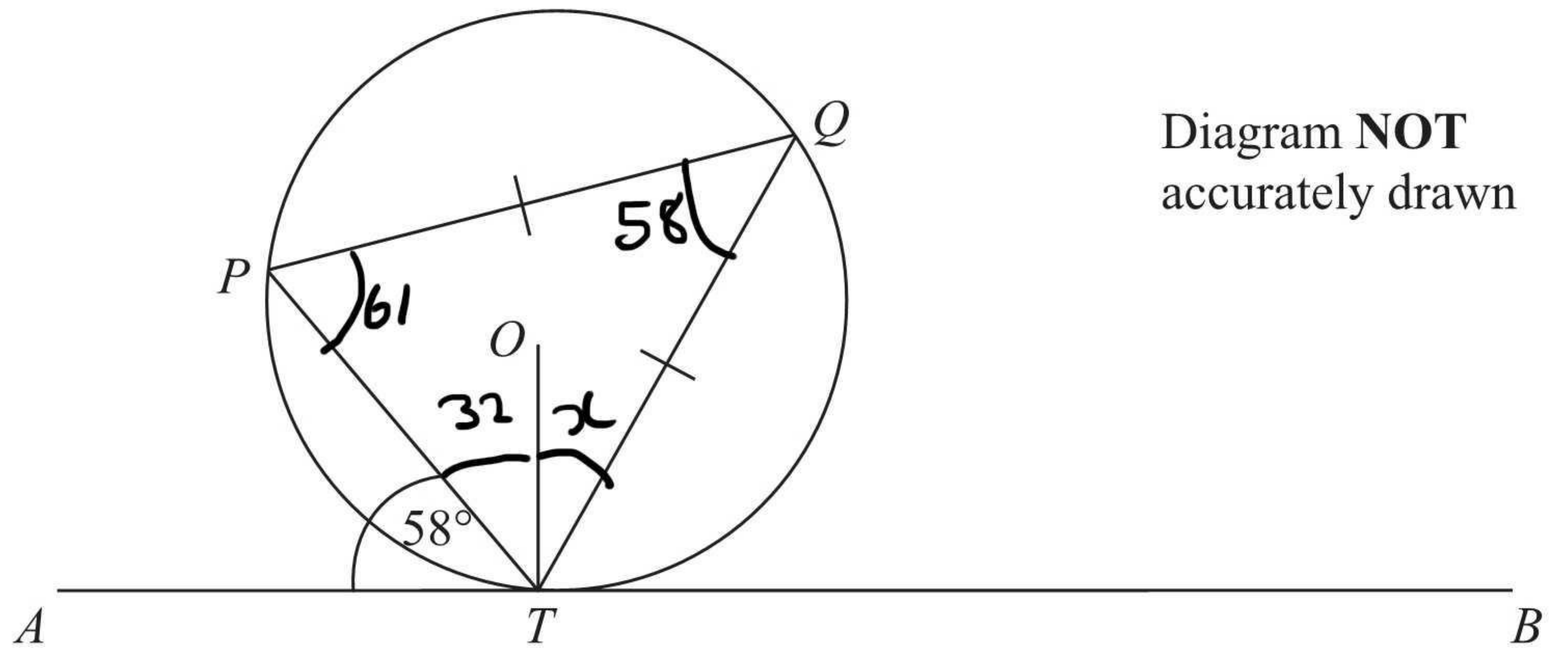

Diagram **NOT** accurately drawn

P, Q and T are points on the circumference of a circle, centre O.
The line ATB is the tangent at T to the circle.

$PQ = TQ$.
Angle $ATP = 58°$.

Calculate the size of angle OTQ.
Give a reason for each stage in your working.

ATO = 32° Tangent meets radius is 90°

PQT = 58° Alternate segment theorem

TPQ = 61° two angles at base of isosceles triangle are equal

61 − 32 = 29°

29 °

Q27

(Total 5 marks)

TOTAL FOR PAPER: 100 MARKS

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