Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

2015 Predicted Paper 1

Higher Tier

Time: 1 hour 45 minutes

Paper Reference **1MA0/1H**

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators must not be used.**

Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

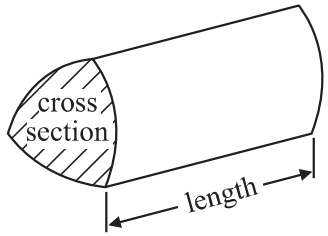
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

GCSE Mathematics

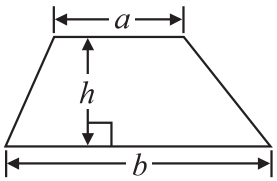
Formulae: Higher Tier

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 × length

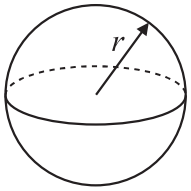


Area of trapezium = $\frac{1}{2}(a + b)h$



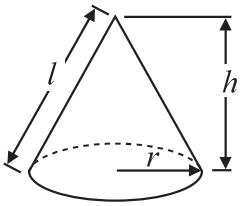
Volume of sphere = $\frac{4}{3}\pi r^3$

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

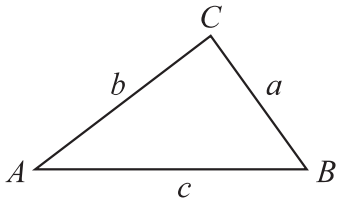


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



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 A set of tyres normally costs £500
In a sale there is a 30% discount.

Work out the sale price of the set of tyres.

10% = £50

30% = £150

500 − 150 = 350

£ 350

(Total for Question 1 is 3 marks)

2 (a) Simplify $3e + 2f - e - 3f$

2e − f

(2)

(b) Expand $2(3x + 5)$

6x + 10

(2)

(Total for Question 2 is 4 marks)

3 Tendai is doing a survey to find out how often people travel by bus.
She is going to ask 10 women leaving a railway station.

(a) This may **not** produce a good sample for Tendai's survey.
Give 2 reasons why.

Reason 1 the sample size is too small (not enough people)

Reason 2 She should not ask people at the railway station. They may be less likely to use the bus.

She should also ask men as well as women

(2)

(b) Design a suitable question for Tendai to use on a questionnaire to find out the number of times people travel by bus.

How many times do you travel by bus in a week?

☐ 0 ☐ 1-2 ☐ 3-4 ☐ 5-6 ☐ 7 or more

(2)

(Total for Question 3 is 4 marks)

4 Here are the heights, in centimetres, of 15 children.

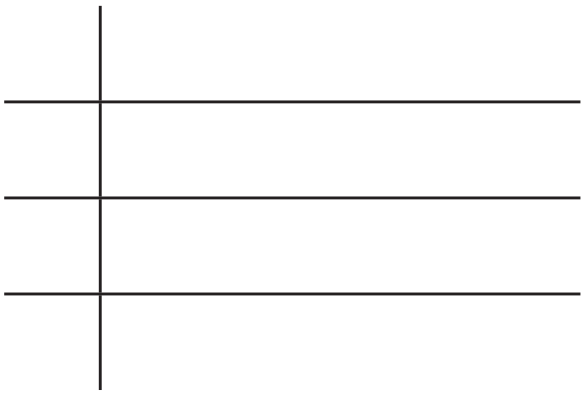
123	147	135	150	147
129	148	149	125	137
133	138	135	130	151

Show this information in an ordered stem and leaf diagram.

12	3, 5, 9
13	0, 3, 3, 5, 7, 8
14	7, 7, 8, 9
15	0, 1

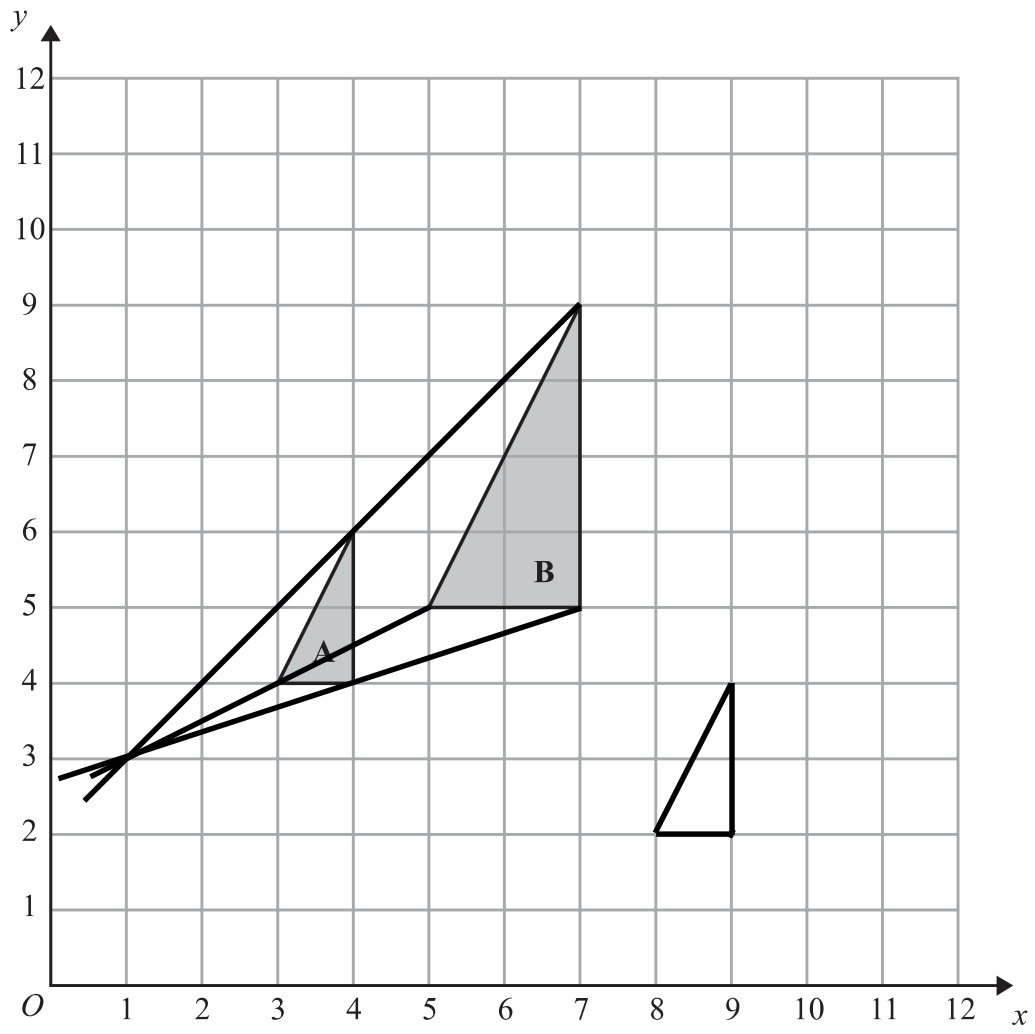
KEY:

12|3 = 123 cm



(Total for Question 4 is 4 marks)

5



(a) Describe fully the single transformation that maps triangle **A** onto triangle **B**.

enlargement, scale factor 2, centre (1, 3)

(3)

(b) On the grid, translate triangle **A** by the vector $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$

(1)

(Total for Question 5 is 4 marks)

6 Here is a list of ingredients for making a peach dessert for **6** people.

Peach dessert for **6** people.	
150 g	jelly
10	sponge fingers
500 m*l*	custard
200 g	peaches

Bob is going to make a peach dessert for **15** people.

Work out the amount of each ingredient he needs.

6 → 15
×2.5

150 × 2.5 = 375
10 × 2.5 = 25
500 × 2.5 = 1250
200 × 2.5 = 500

375 ..... g jelly

25 ..... sponge fingers

1250 ..... m*l* custard

500 ..... g peaches

(Total for Question 6 is 3 marks)

*7 140 children will be at a school sports day.
Lily is going to give a cup of orange drink to each of the 140 children.
She is going to put 200 millilitres of orange drink in each cup.

The orange drink is made from orange squash and water.
The orange squash and water are mixed in the ratio 1 : 9 by volume.

Orange squash is sold in bottles containing 750 millilitres.

Work out how many bottles of orange squash Lily needs to buy.
You must show all your working.

200 ml

1:9 (10 parts)

200 ÷ 10 = 20ml (orange squash per drink)

140 x 20 = 2800 (ml of Squash required)

750ml = 1 bottle
1500ml = 2 bottles
2250ml = 3 bottles
3000ml = 4 bottles

Lily will need to buy 4 bottles of orange squash.

(Total for Question 7 is 4 marks)

8 Sally is going to buy some packs of blue paint and some packs of white paint.

Blue paint is sold in packs of 12 tubes.
White paint is sold in packs of 15 tubes.

Sally is going to put all the tubes of paint she buys into boxes.
She is going to put 1 tube of blue paint and 1 tube of white paint in each box.

Sally wants to buy the smallest number of packs of blue paint and the smallest number of packs of white paint.

Work out the number of packs of blue paint and the number of packs of white paint she will buy.

The LCM of 12 and 15 is 60

5 x packs of blue paint

4 x packs of white paint

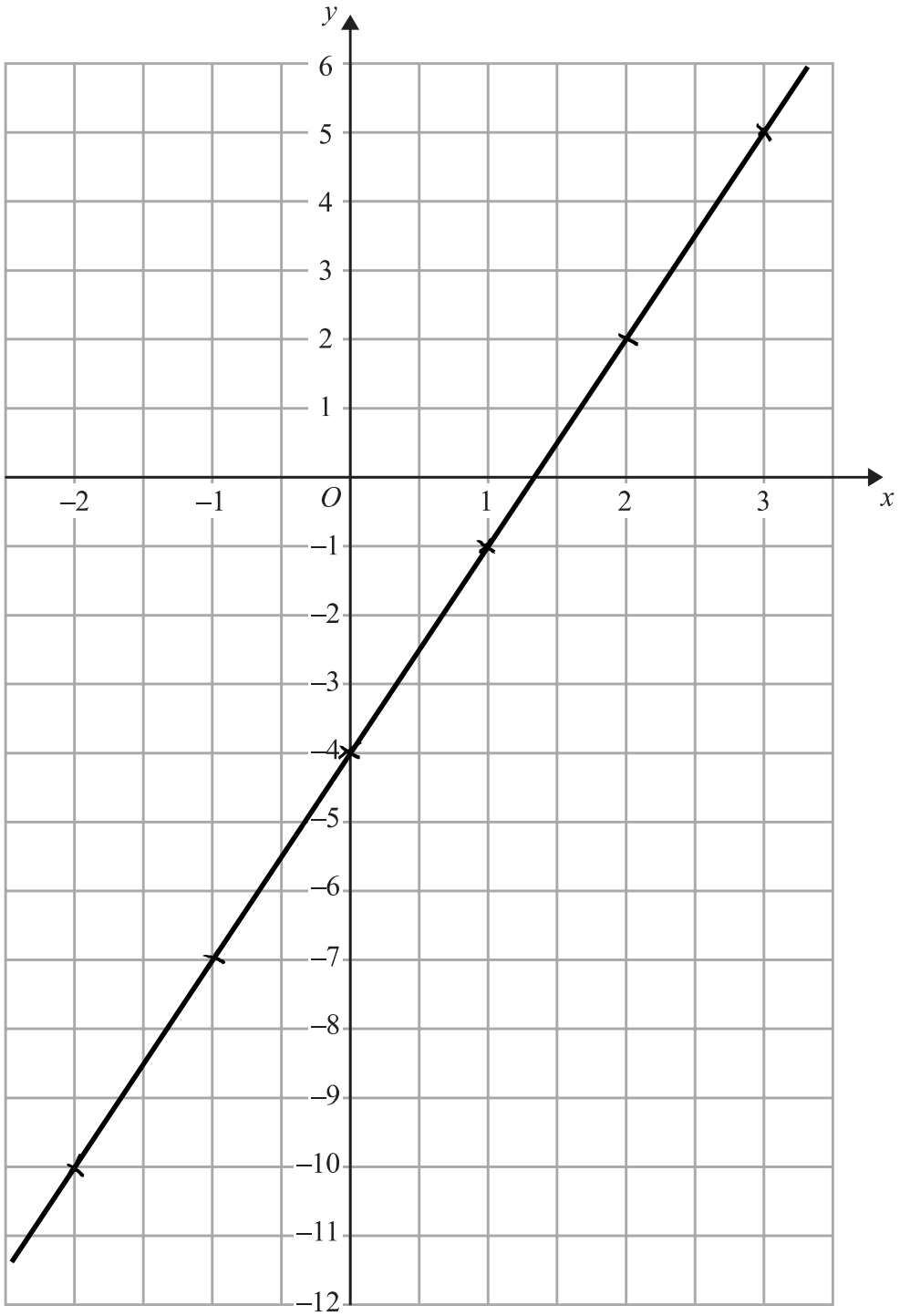
5 ..... packs of blue paint

4 ..... packs of white paint

(Total for Question 8 is 4 marks)

9 On the grid, draw the graph of $y = 3x - 4$ for values of x from –2 to 3

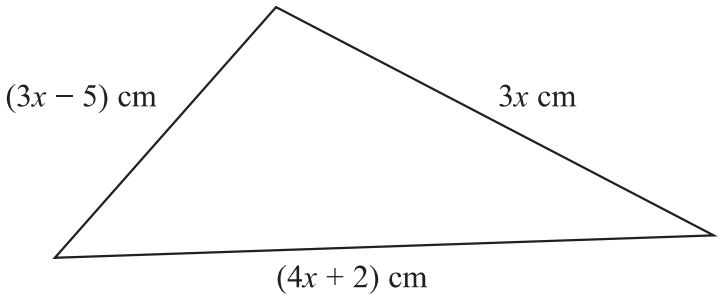
x	-2	-1	0	1	2	3
y	-10	-7	-4	-1	2	5



(Total for Question 9 is 4 marks)

10 The diagram shows a triangle.

Diagram **NOT** accurately drawn



The lengths of the sides of the triangle are $3x$ cm, $(3x - 5)$ cm and $(4x + 2)$ cm.

The perimeter of the triangle is 62 cm.

Work out the value of x.
Show clear algebraic working.

$3x + 3x - 5 + 4x + 2 = 62$

$10x - 3 = 62$

$10x = 65$

$x = 6.5$

$x =$ 6.5

(Total for Question 10 is 4 marks)

11 (a) Simplify $x^2 \times x^4$

x^6

(1)

(b) Simplify $y^8 \div y^6$

y^2

(1)

(c) Simplify $(t^2)^3$

t^6

(1)

(Total for Question 11 is 3 marks)

12 The diagram shows a prism.

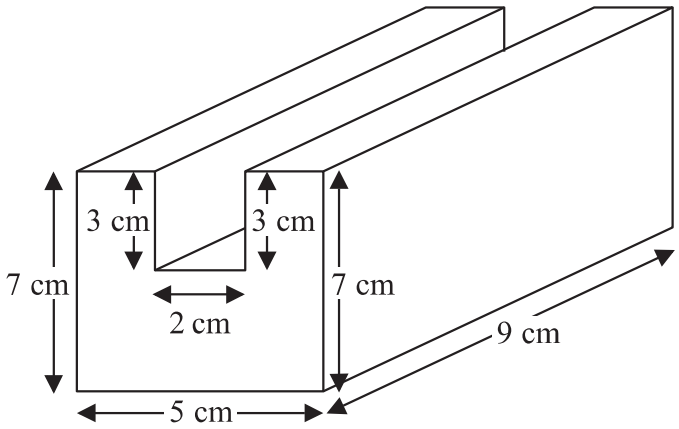
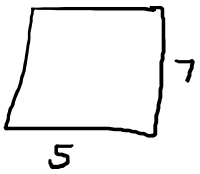


Diagram **NOT** accurately drawn

All the corners are right angles.

Work out the volume of the prism.

volume = area of front × how far back it goes

Area of front =  − 

= 35 − 6

= 29

Volume = 29 × 9

= 261 cm³

261 cm³

(Total for Question 12 is 4 marks)

13 The diagram shows two rectangles.

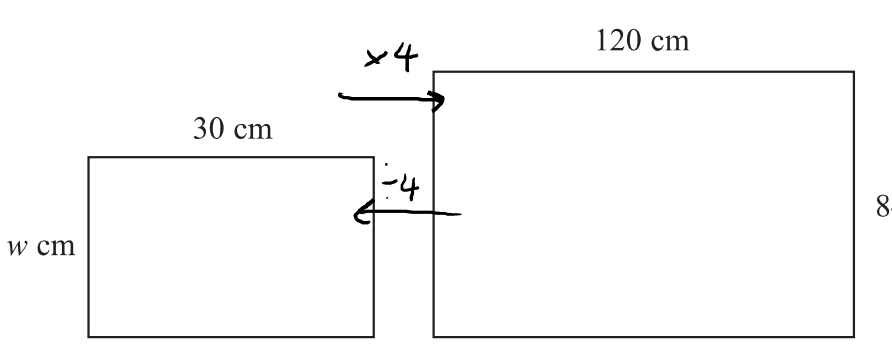


Diagram **NOT** accurately drawn

The rectangles are similar.

Work out the value of w.

$$\frac{84}{4} = \frac{42}{2} = 21$$

21 (cm)

(Total for Question 13 is 2 marks)

14 The diagram shows an accurate scale drawing of part of the boundary of a field.
The complete boundary of the field is in the shape of a quadrilateral *ABCD*.

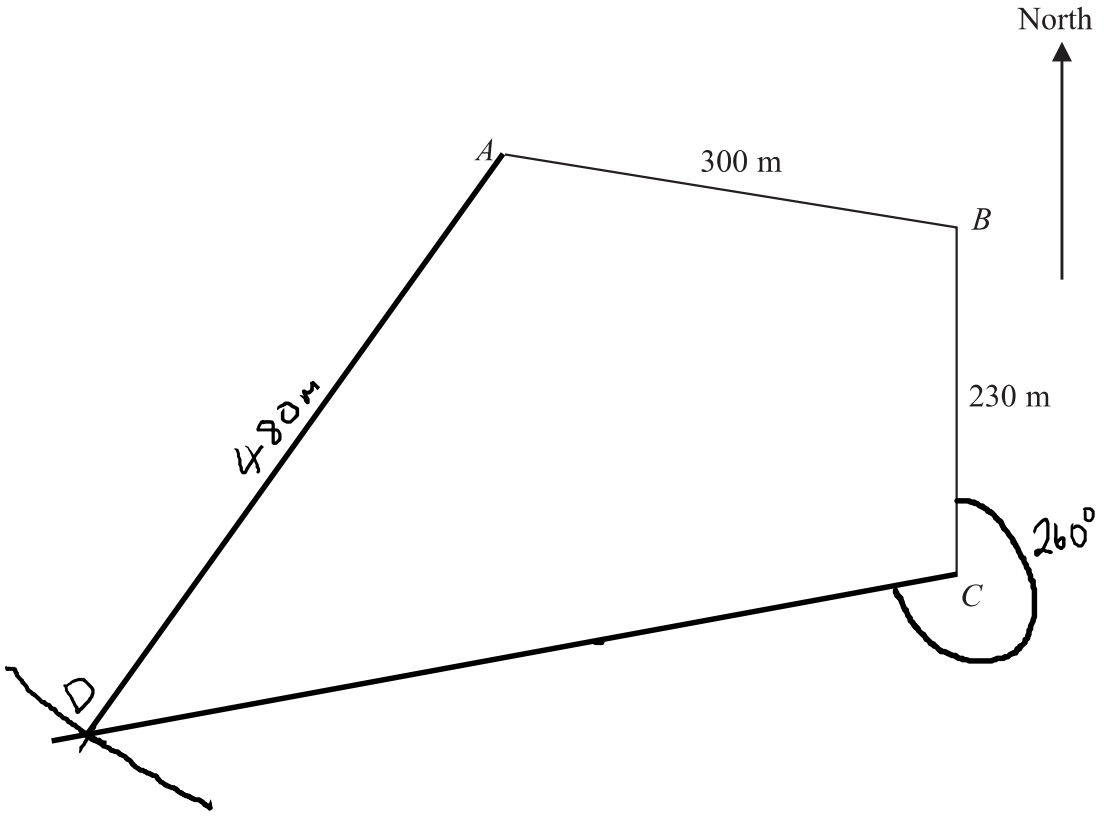
AB = 300 metres.
BC = 230 metres.
Point *B* is due north of point *C*.

The scale of the diagram is 1 cm to 50 metres.

The bearing of *D* from *C* is 260°
AD = 480 metres.

$\frac{480}{50} = 9.6\text{cm}$

Complete the scale drawing of the boundary of the field.
Mark the position of *D*.



(Total for Question 14 is 2 marks)

15 (a) Find the sum of the interior angles of a polygon with 8 sides.

$(n-2) \times 180$

$(8-2) \times 180$

6×180

1080 °

(2)

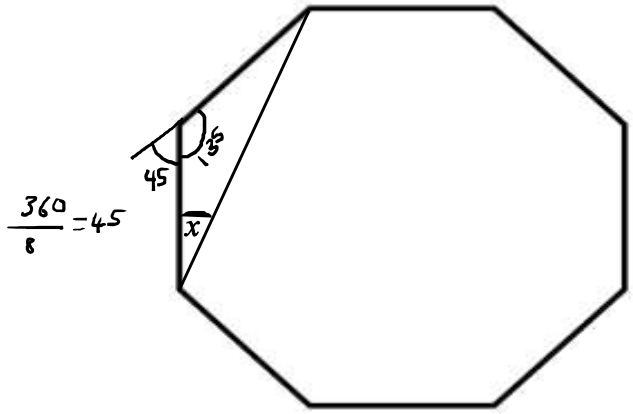


Diagram **NOT** accurately drawn

The diagram shows a regular polygon with 8 sides.

(b) Work out the value of x.

$180 - 135 = 45$

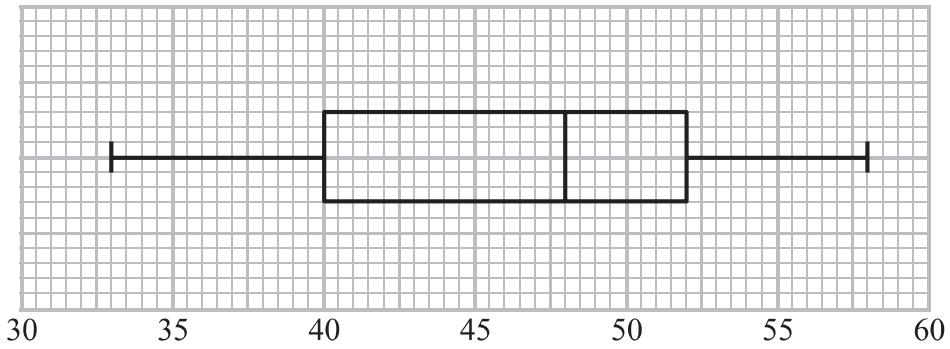
$\frac{45}{2} = 22.5°$

22.5°

(2)

(Total for Question 15 is 4 marks)

16 The box plot gives information about the weights of a group of children.



(a) Write down the median.

48 kg

(1)

(b) Work out the interquartile range.

52 - 40

12 kg

(1)

There are 80 children in the group.

(c) Work out an estimate for the number of children who weigh 52 kg or more.

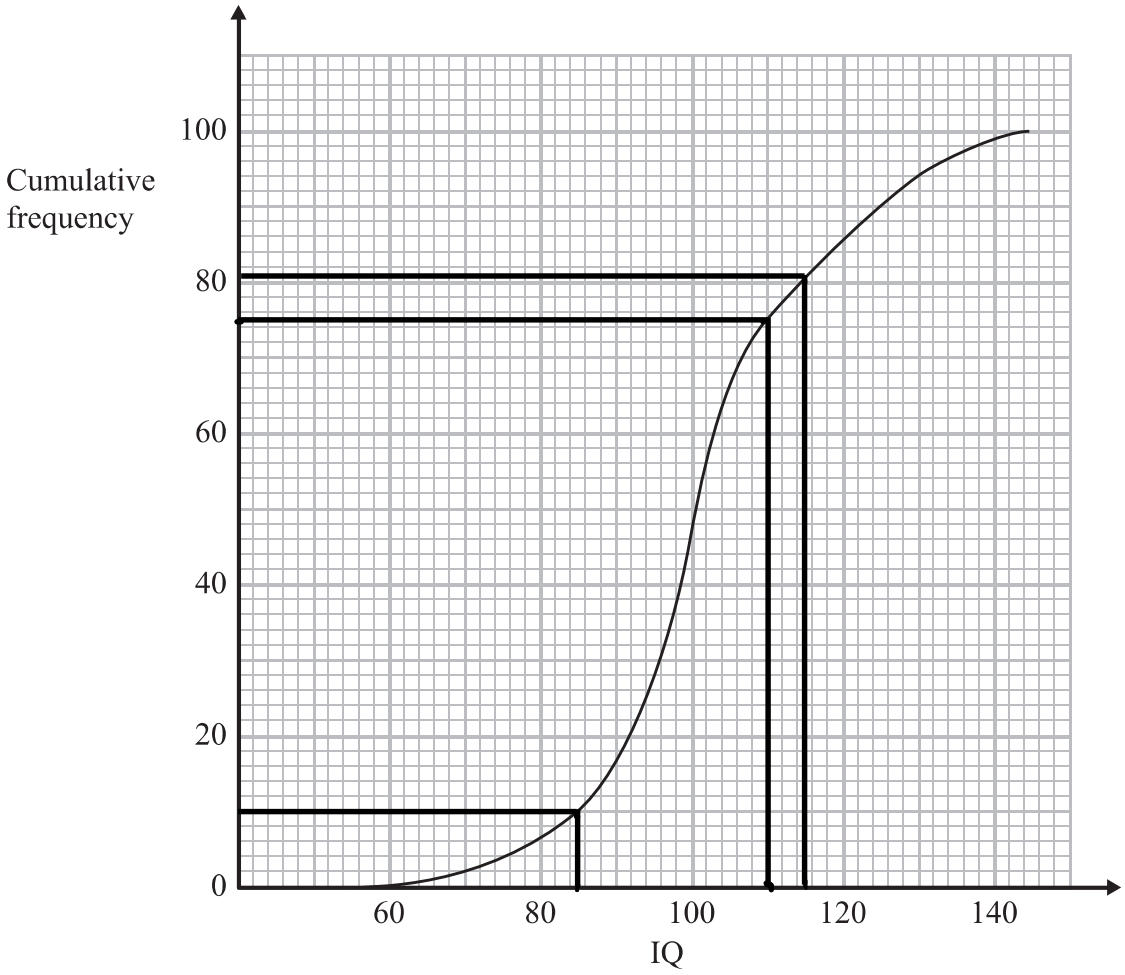
$\frac{1}{4}$

20

(2)

(Total for Question 16 is 4 marks)

17 The cumulative frequency graph gives information about the intelligence quotients (IQ) of a random sample of 100 adults.



(a) Use the cumulative frequency graph to find an estimate for the number of adults in the sample who have an IQ between 85 and 115

81 - 10

71

(2)

(b) Find an estimate for the upper quartile of the IQ of adults in the sample.

110

(2)

(Total for Question 17 is 4 marks)

***18**

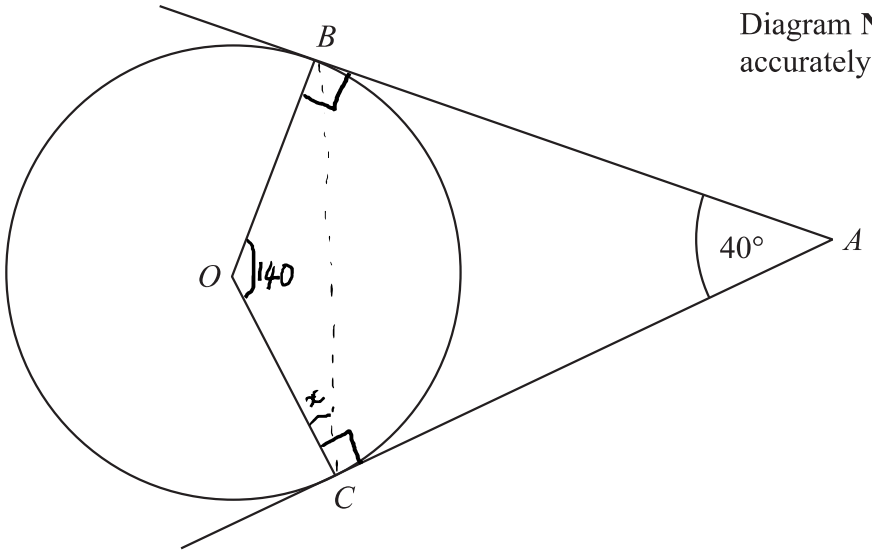


Diagram **NOT** accurately drawn

B and *C* are points on the circumference of a circle, centre *O*.
AB and *AC* are tangents to the circle.
Angle *BAC* = 40°.

Find the size of angle *BCO*.

$A\hat{C}O$ and $A\hat{B}O$ = 90° (Tangent meets radius at 90°)

$B\hat{O}C$ = 140° (Angles in quadrilateral add up to 360°)

$B\hat{C}O$ = 20° (Angles at base of isosceles triangle are equal)

$$\frac{180 - 140}{2} = 20°$$

20 °

(Total for Question 18 is 3 marks)

19 (a) Write 1.2×10^{-5} as an ordinary number.

0.000012

(1)

(b) Work out $7.9 \times 10^5 + 6 \times 10^4$

Give your answer in standard form.

$$\begin{array}{r} 790000 \\ 60000 \\ \hline 850000 \end{array}$$

or $7.9 \times 10^5 + 0.6 \times 10^5$

8.5×10^5

(2)

(Total for Question 19 is 3 marks)

---

20 Solve the simultaneous equations

$3x + 2y = 7$ $\times 4$

$4x - 3y = 15$ $\times 3$

Show clear algebraic working.

$$\begin{array}{r} 12x + 8y = 28 \\ 12x - 9y = 45 \end{array}$$

$$17y = -17$$

$$y = -1$$

$$3x + 2(-1) = 7$$

$$3x - 2 = 7$$

$$3x = 9$$

$$x = 3$$

$x =$ 3

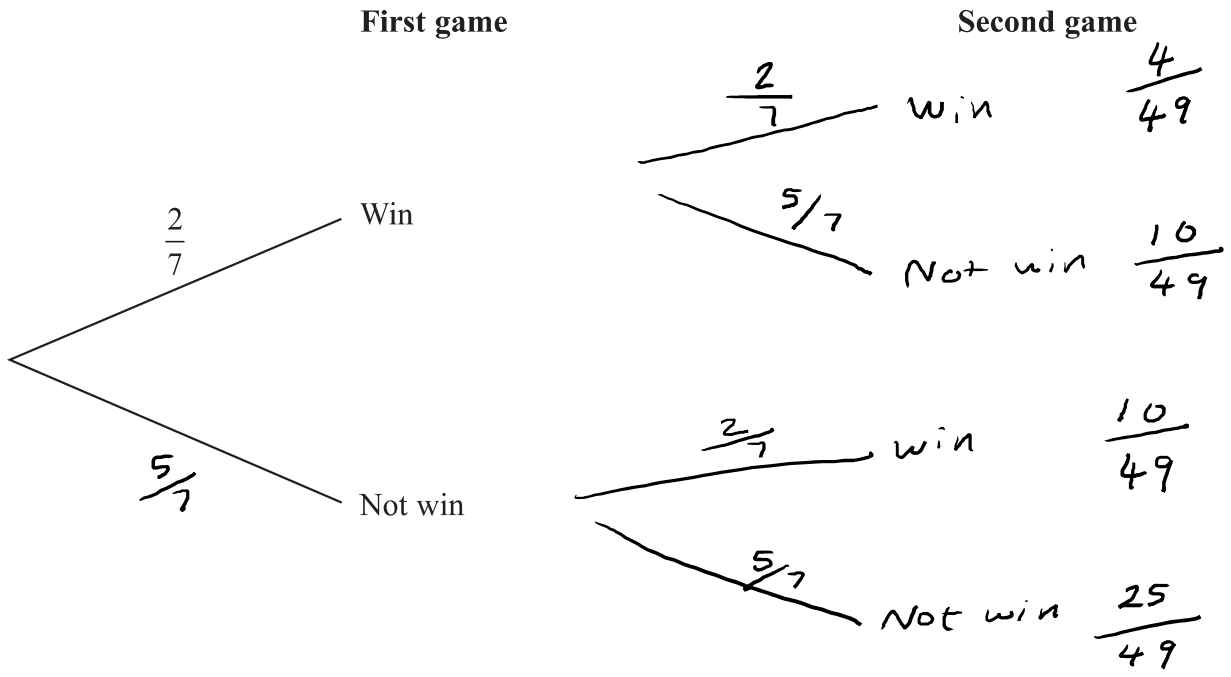
$y =$ -1

(Total for Question 20 is 4 marks)

21 Amberish plays two games of tennis.

Each time he plays a game of tennis, the probability that he will win is $\frac{2}{7}$

(a) Complete the probability tree diagram.



(3)

(b) Calculate the probability that Amberish wins at least one of the two games of tennis.

$$\frac{4}{49} + \frac{10}{49} + \frac{10}{49} = \frac{24}{49}$$

(3)

(Total for Question 21 is 6 marks)

22 (a) Factorise $c^2 - 5c$

$c(c-5)$

(2)

(b) Simplify $(2d)^0$

1

(1)

(c) Factorise $x^2 + x - 30$

$(x+6)(x-5)$

(2)

(d) Make b the subject of $P = \frac{1}{2}ab^2$

$2P = ab^2$

$\frac{2P}{a} = b^2$

$\sqrt{\frac{2P}{a}} = b$

$b = \sqrt{\frac{2P}{a}}$

(2)

(e) Solve $\frac{2x+1}{3} + \frac{x-5}{2} = 4$

Show clear algebraic working.

$\frac{2(2x+1)}{6} + \frac{3(x-5)}{6} = 4$

$\frac{2(2x+1)+3(x-5)}{6} = 4$

$\frac{4x+2+3x-15}{6} = 4$

$\frac{7x-13}{6} = 4$

$7x - 13 = 24$

$7x = 37$

$x = \frac{37}{7}$

$x = \frac{37}{7}$

(4)

(Total for Question 22 is 11 marks)

23 The straight line **L** has equation $y = 2x - 5$

Find an equation of the straight line perpendicular to **L** which passes through (–2, 3).

$m = 2$

$\therefore$ perpendicular gradient $= -\frac{1}{2}$

$y = -\frac{1}{2}x + c$

$(-2, 3)$
$x \quad y$

$3 = -\frac{1}{2}(-2) + c$

$3 = 1 + c$

$c = 2$

$y = -\frac{1}{2}x + 2$

(Total for Question 23 is 3 marks)

24

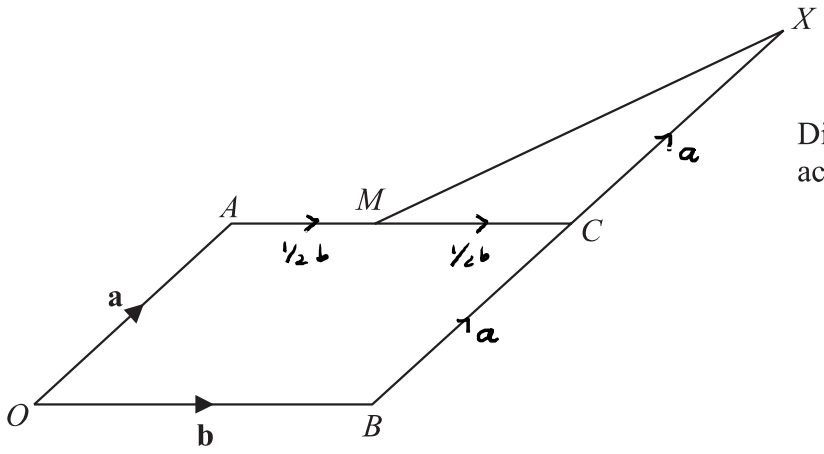


Diagram **NOT** accurately drawn

OACB is a parallelogram.

M is the midpoint of *AC*.
C is the midpoint of the straight line *BCX*.

$\overrightarrow{OA} = \mathbf{a}$ $\overrightarrow{OB} = \mathbf{b}$

Prove that *OMX* is a straight line.

$\overrightarrow{OM} = a + \frac{1}{2}b$

$\overrightarrow{OX} = b + 2a$

$2(\overrightarrow{OM}) = \overrightarrow{OX}$

$\overrightarrow{OM}$ and $\overrightarrow{OX}$ are parallel and they both pass through O. Therefore OMX is a straight line

(Total for Question 24 is 4 marks)

25 A trapezium $ABCD$ has an area of $5\sqrt{6}$ cm^2.

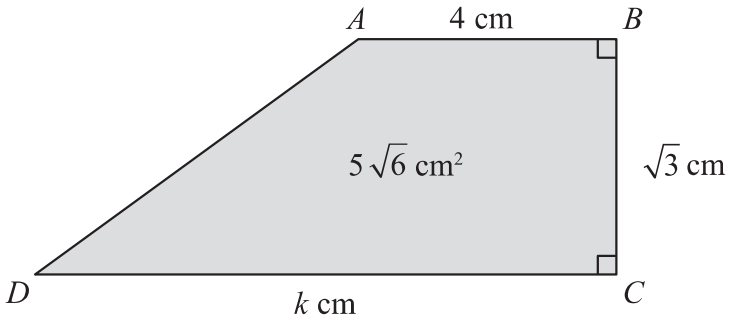


Diagram **NOT** accurately drawn

$AB = 4$ cm.
$BC = \sqrt{3}$ cm.
$DC = k$ cm.

Calculate the value of k, giving your answer in the form $a\sqrt{b} - c$ where a, b and c are positive integers.
Show each step in your working.

$\frac{1}{2}(4+k) \times \sqrt{3} = 5\sqrt{6}$

$(2 + \frac{1}{2}k)\sqrt{3} = 5\sqrt{6}$

$2 + \frac{1}{2}k = \frac{5\sqrt{6}}{\sqrt{3}}$

$2 + \frac{1}{2}k = 5\sqrt{2}$

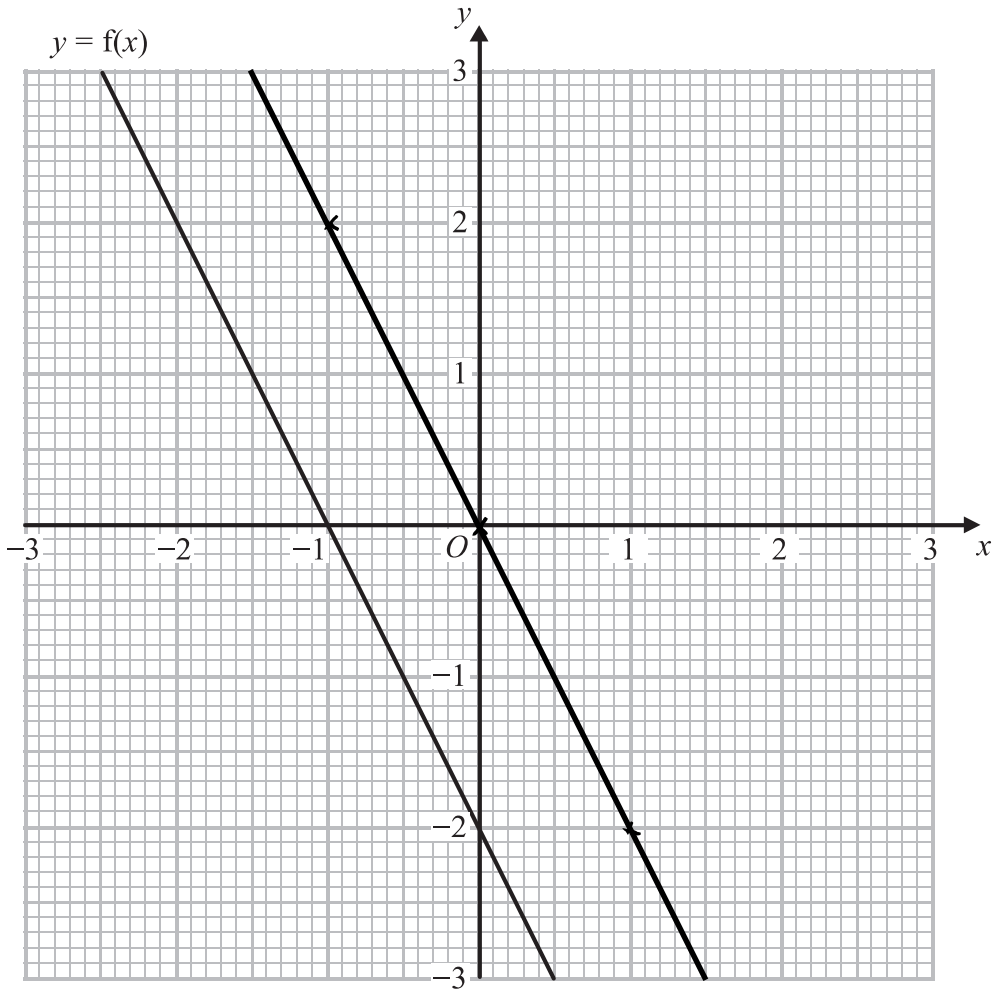
$\frac{1}{2}k = 5\sqrt{2} - 2$

$k = 10\sqrt{2} - 4$

$k = 10\sqrt{2} - 4$

(Total for Question 25 is 3 marks)

26 Here is the graph of $y = f(x)$.



(a) Write down the coordinates of the point where the graph of $y = \frac{1}{2}f(x)$ meets the y-axis.

(0 , −1)

(1)

(b) On the grid, draw the graph of $y = f(x - 1)$.

(2)

(Total for Question 26 is 3 marks)

TOTAL FOR PAPER IS 100 MARKS