

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										



General Certificate of Secondary Education
Higher Tier

Mathematics (Linear) B

4365/2H

Paper 2 Calculator

Practice Paper 2012 Specification (Set 2)

H

<p>For this paper you must have:</p> <ul style="list-style-type: none"> a calculator mathematical instruments. 	
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Time allowed

- 2 hours

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- If your calculator does not have a π button, take the value of π to be 3.14 unless another value is given in the question.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 105.
- The quality of your written communication is specifically assessed in questions 3, 4(a), 18(c) and 20. These questions are indicated with an asterisk (*).
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer booklet.
- Use a calculator where appropriate.

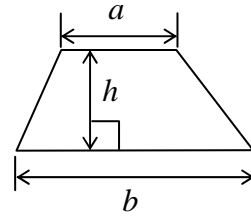
Advice

- In all calculations, show clearly how you work out your answer.

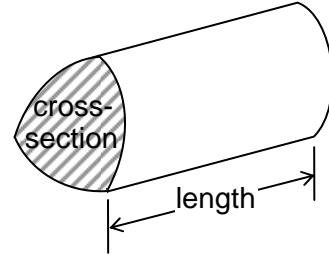
For Examiner's Use	
Pages	Mark
3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
14 – 15	
16 – 17	
18 – 19	
20 – 21	
22 – 23	
24	
TOTAL	

Formulae Sheet: Higher Tier

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

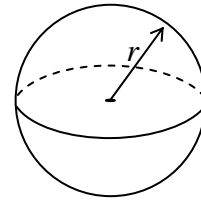


Volume of prism = area of cross-section \times length



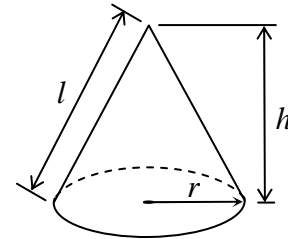
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

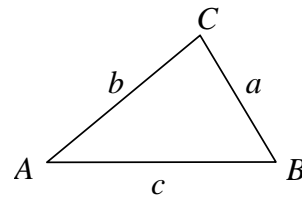


In any triangle ABC

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

Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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



The Quadratic Equation

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

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Answer **all** questions in the spaces provided

1

Work out the value of $\frac{3.11 \times 8.76}{4.23 - 2.71}$

Give your answer to one decimal place.

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.....

Answer (2 marks)

2

Danielle tosses a coin and rolls a dice.

If the coin shows heads, the score is three times the number on the dice.

If the coin shows tails, the score is the square of the number on the dice.

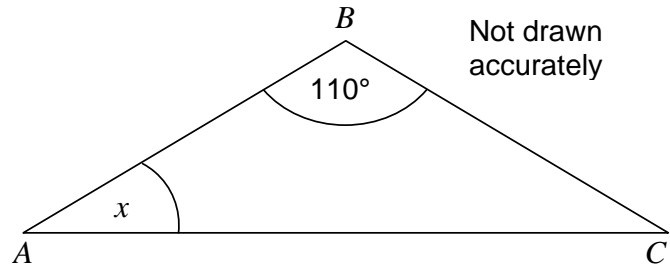
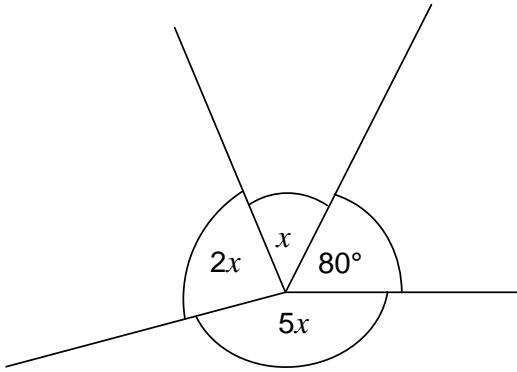
Show that there is a 50% chance of a score more than 10.

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(4 marks)

Turn over for the next question

*3 ABC is a triangle.



Show that ABC is an isosceles triangle.

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(5 marks)

* 4 (a) Mark wants to book a holiday for two adults and one child. He sees this advert.

Adult price £340
Child price £250
Special offer 15% off

Mark has £800.

Can he afford to book this holiday?
Tick a box.

Yes

No

You **must** show your working.

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(5 marks)

4 (b) Mark changes £400 to Euros.
The exchange rate in the UK is £1 = 1.15 Euro
He comes back to the UK with 105.80 Euros

What percentage of the £400 did he spend?

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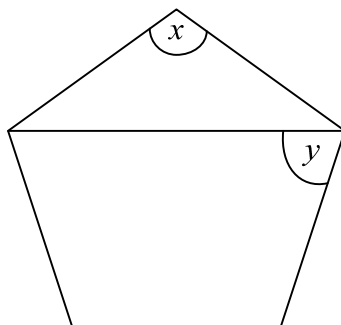
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Answer% (4 marks)

- 5** The diagram shows a regular pentagon.



Not drawn
accurately

- 5 (a)** Work out the size of angle x .

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Answer degrees (2 marks)

- 5 (b)** Work out the size of angle y .

.....
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Answer degrees (2 marks)

- 6** Amy wants to know how often people in her village go out for a meal. She writes this question and response section.

How many times do you go out for a meal?			
Never	1 or 2	3	More than 4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 6 (a)** Give **one** criticism of Amy's question.

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(1 mark)

- 6 (b)** Give **one** criticism of Amy's response section.

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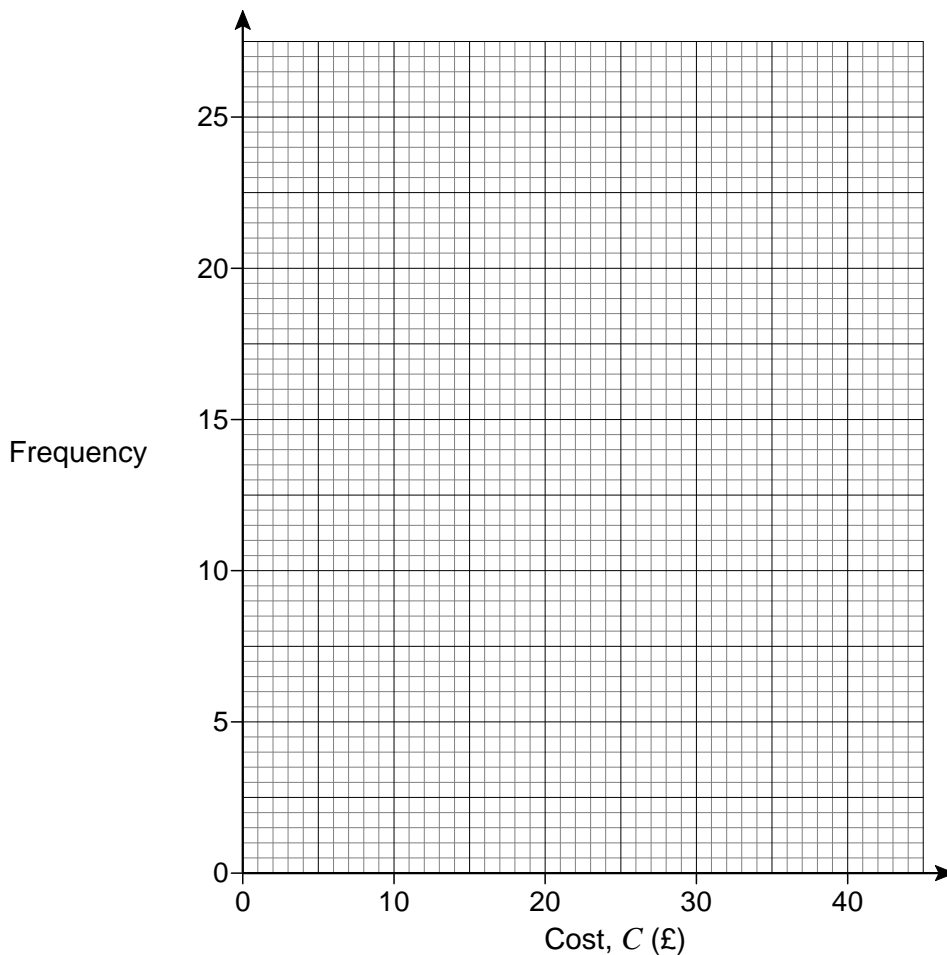
(1 mark)

Turn over for the next question

7 Here are the results of a survey about how much money 60 people pay for their meal.

Cost of a meal, C , (£)	$0 < C < 10$	$10 < C < 20$	$20 < C < 30$	$30 < C < 40$
Frequency	7	19	24	10

7 (a) Draw a frequency polygon to represent the results.



(2 marks)

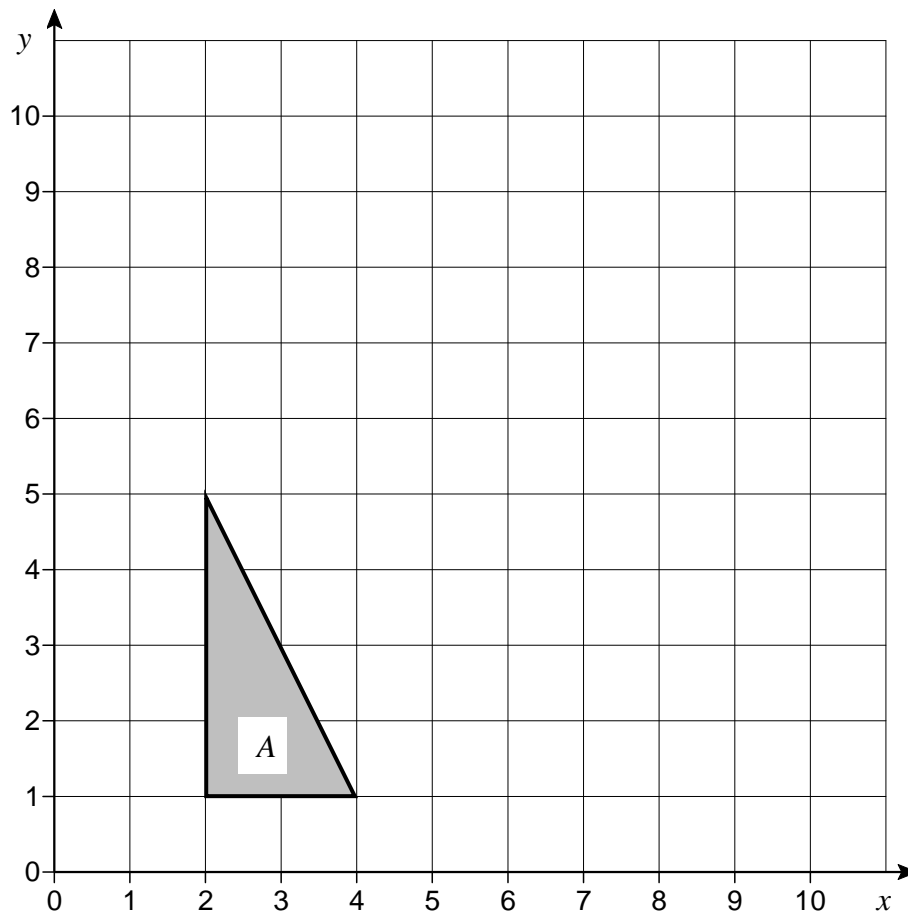
7 (b) What proportion of the 60 people spend more than £20 on the meal?

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Answer (2 marks)

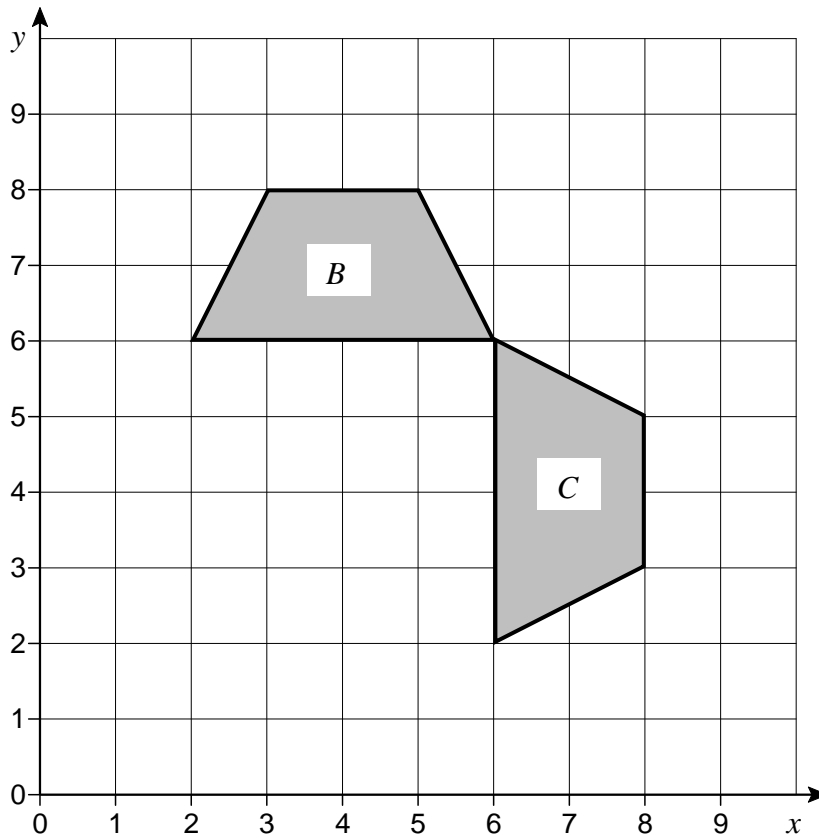
8 (a) Reflect shape *A* in the line $y = 5$



(2 marks)

Question 8 continues on the next page

8 (b) Describe fully the **single** transformation that takes shape *B* to shape *C*.



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(3 marks)

- 9 Dan runs 15 marathons.
Here is a summary of his times.

Time, t , (minutes)	Frequency		
$200 < t < 220$	1		
$220 < t < 240$	5		
$240 < t < 260$	6		
$260 < t < 280$	2		
$280 < t < 300$	1		

Ella also runs 15 marathons.
Her mean time is 4 hours 17 minutes.

Dan says that on average he is faster.

Show that he is correct.

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(5 marks)

- 10 A and B are on the line $y = x$
The midpoint of AB has coordinates $(4, 4)$.
The x -coordinate of B is three times the x -coordinate of A .

Work out the coordinates of A and B .

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A (.....,

B (.....,

(2 marks)

11 Here is a formula to convert Fahrenheit (°F) to Celsius (°C).

$$F = \frac{9}{5} C + 32$$

11 (a) Maria telephones her friend Jenny in Spain.
 Maria says, "The temperature here is 78°F."
 Jenny says, "It is warmer here because the temperature is 25°C."

Is Jenny correct?
 Tick a box.

Yes

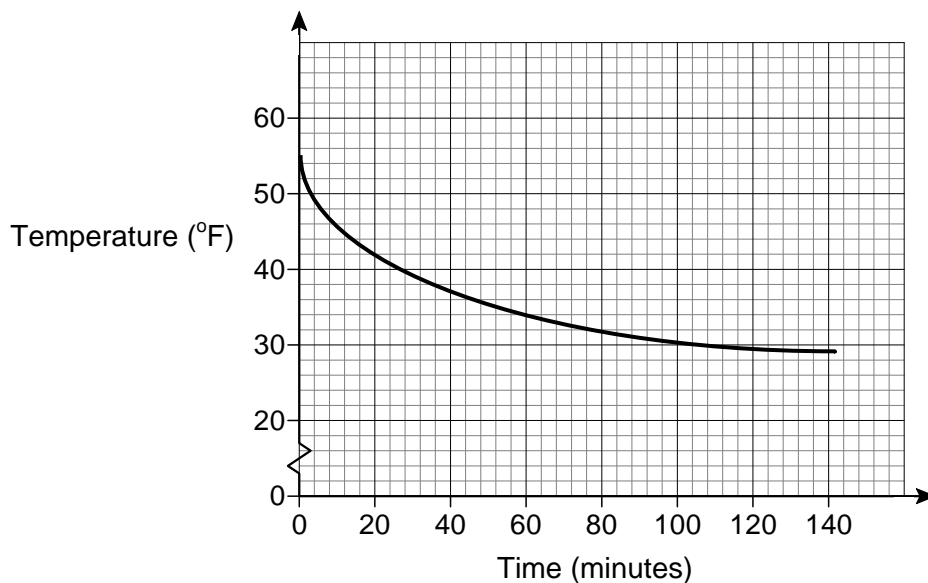
No

You **must** show your working.

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(2 marks)

11 (b) The graph shows the temperature of a water bottle in a freezer.



Water starts to freeze at 0 °C.

How long does it take for the water to start freezing?

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Answer minutes (2 marks)

12 (a) Solve $0.7a - 2 = 0.2a + 3$

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Answer $a =$ (3 marks)

12 (b) Expand $4(b - 2)$

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Answer (1 mark)

12 (c) Simplify $2c^2d^3 \times c^4d^2$

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Answer (2 marks)

12 (d) Factorise fully $4x^2 + 6xy$

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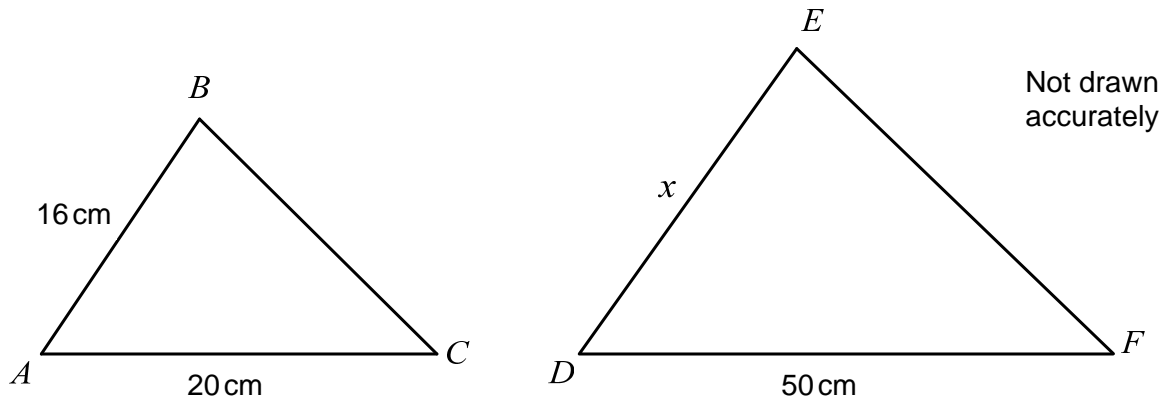
Answer (2 marks)

12 (e) Simplify $(c^{0.5})^6$

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Answer (1 mark)

- 13 ABC and DEF are similar triangles.



Work out the value of x .

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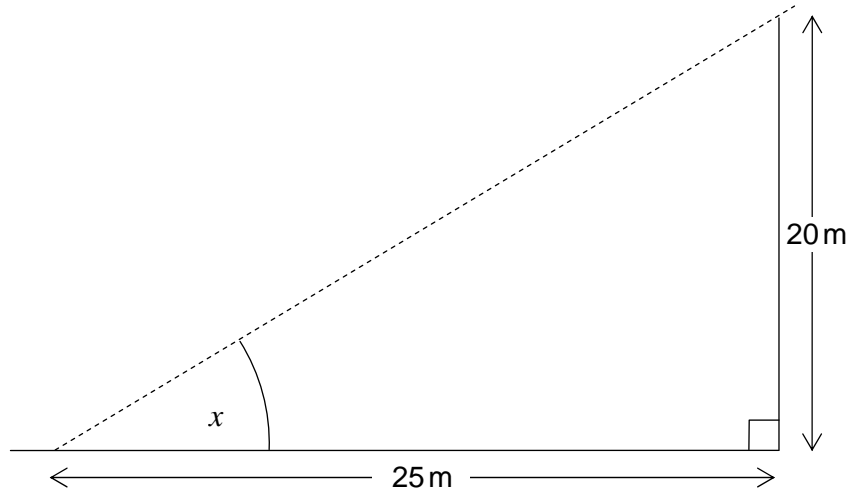
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Answer cm (3 marks)

14

A light is fixed on horizontal ground, 25 metres away from a vertical wall. The height of the wall is 20 metres.

When the light is switched on, the beam just clears the top of the wall.



Work out the size of the angle x .

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Answer degrees (3 marks)

Turn over for the next question

15 Solve the inequality $5n - 7 < 3n + 16$

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Answer (3 marks)

16 A football crowd has 27 000 adults and 5000 children.
A stratified sample of adults and children of size 40 is to be taken.
Work out the number of adults and the number of children in the sample.

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Answer Adults.....

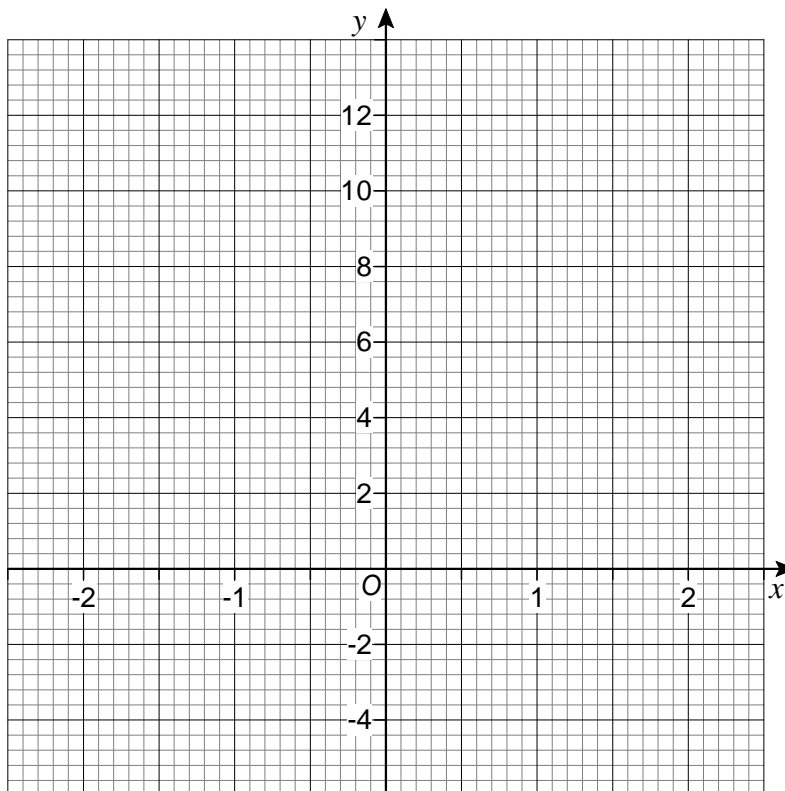
Children..... (3 marks)

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

x	-2	-1	0	1	2
y	12		4	3	

(2 marks)

17 (b) On this grid, plot the graph of $y = 4 - x^3$ for $-2 < x < 2$



(2 marks)

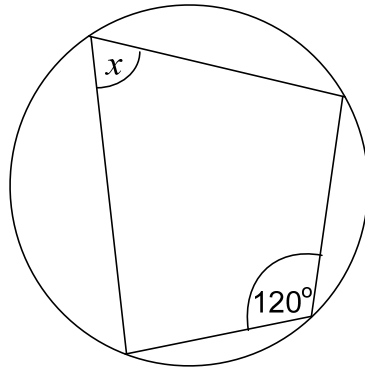
17 (c) Use your graph or an algebraic method to solve $4 - x^3 = 0$

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(1 mark)

18 (a) Work out the size of angle x .



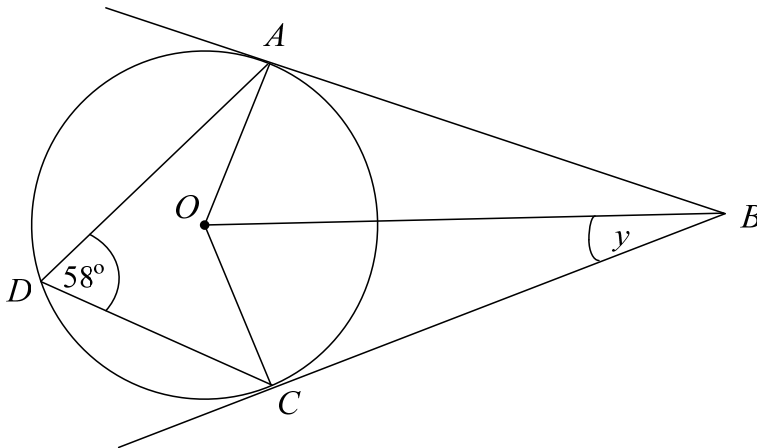
Not drawn
accurately

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Answer degrees (1 mark)

18 (b) In the diagram, BA and BC are two tangents to the circle, centre O .



Not drawn
accurately

Work out the size of angle y .

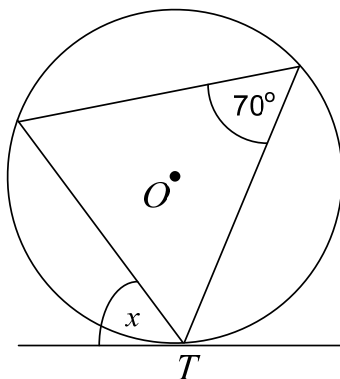
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Answer degrees (3 marks)

*18 (c) The diagram shows a circle with centre O and a tangent at T .



Not drawn
accurately

Write down the value of angle x .
Give a reason for your answer.

Answerdegrees

Reason.....

(2 marks)

Turn over for the next question

- 19** Connor has three oak trees in his garden.
He measures the height and diameter of the shortest tree.
The results are shown in this table.

Height, H (metres)	1.65
Diameter, d (metres)	0.1

- 19 (a)** Connor knows that the height of a tree is directly proportional to the square of its diameter.

Work out an equation connecting H and d .

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Answer (3 marks)

- 19 (b)** Connor wants to know the height of the tallest tree.
He measures the diameter and gets 0.25 metres.

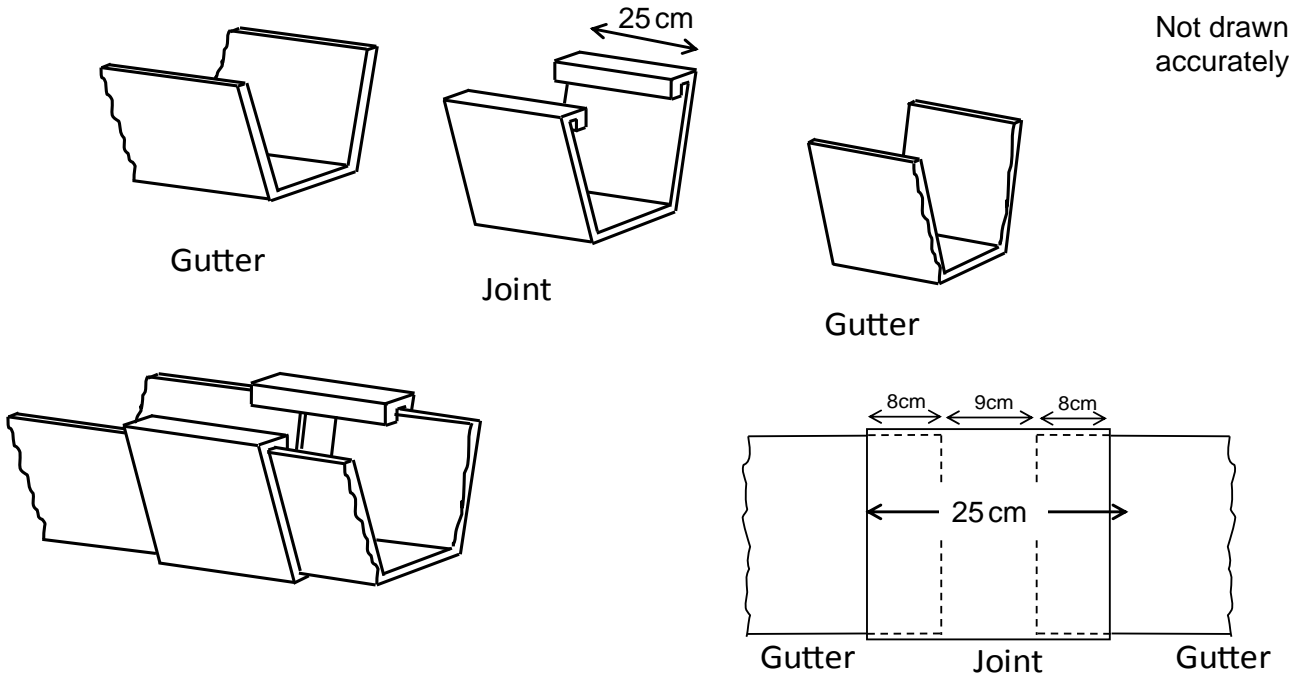
Work out the height of the tree.

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Answer m (2 marks)

***20** The diagrams show how guttering is joined together.
 Joints are exactly 25 cm long.
 Gutter and joints overlap by exactly 8 cm on each side as shown.



A roof measures 18 metres to the nearest 10 centimetres.

Pieces of guttering measure 6 metres to the nearest 10 centimetres.

Will three pieces of guttering and two joints be enough to make a piece to fit the length of the roof?

Tick a box.

Yes No Cannot tell

You **must** show your working.

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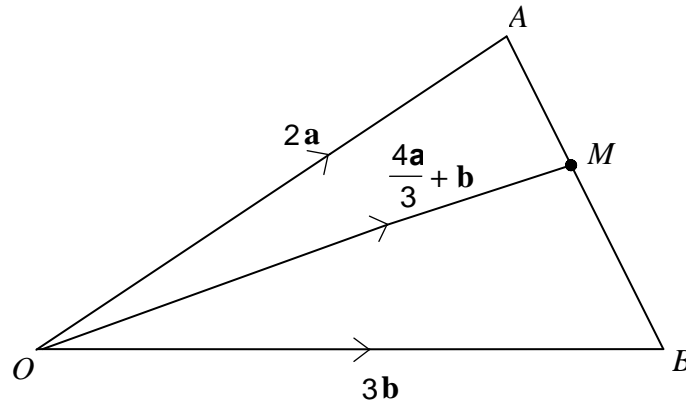
(6 marks)

21

 OAB is a triangle.

$$\vec{OA} = 2\mathbf{a}$$

$$\vec{OB} = 3\mathbf{b}$$

 M is a point on AB such that $\vec{OM} = \frac{4\mathbf{a}}{3} + \mathbf{b}$ Not drawn
accuratelyCompare the lengths of AM and MB .

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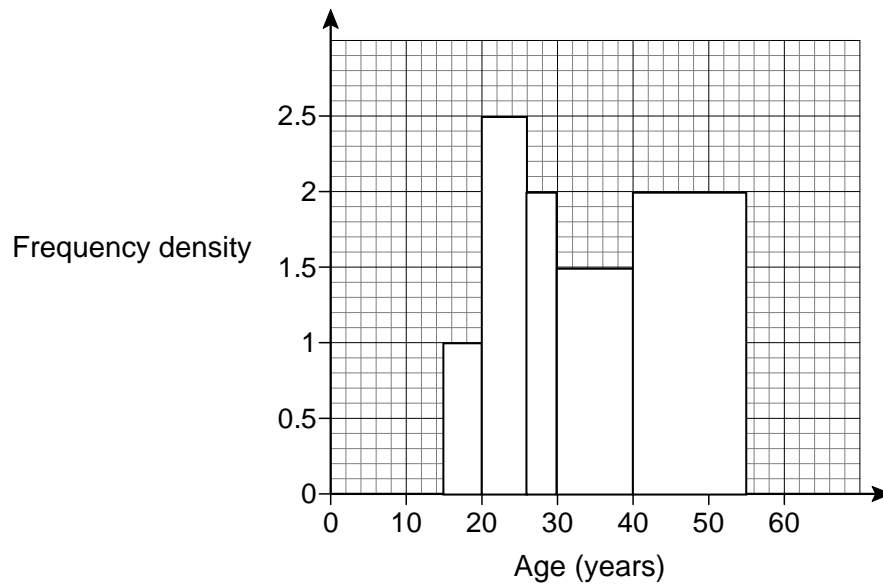
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(5 marks)

- 22 The histogram shows information about the age of 73 snooker players.



Estimate the number of players who are older than 32 years.

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Answer (3 marks)

Turn over for the next question

23 (a) Expand and simplify $(x + 1)(x - 3)$

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Answer (2 marks)

23 (b) The diagram shows a rectangle and a square.



$x + 1$



$x - 1$

Not drawn
accurately

Their perimeters are equal.
 The area of the rectangle is 12 square centimetres.

Use an algebraic method to work out the value of x .

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Answer cm (6 marks)

8

END OF QUESTIONS