Write your name here

Surname		Other names

Pearson
Edexcel GCSE

Centre Number

Candidate Number

Mathematics A
Paper 2 (Calculator)

Higher Tier

Friday 7 November 2014 – Morning	Paper Reference
Time: 1 hour 45 minutes	**1MA0/2H**

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. 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 may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

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.

Turn over ►

**PEARSON**

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 × length
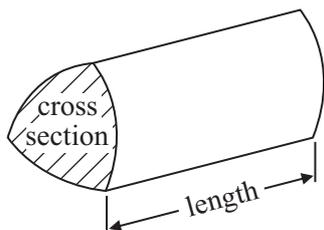
Area of trapezium $= \dfrac{1}{2}(a + b)h$
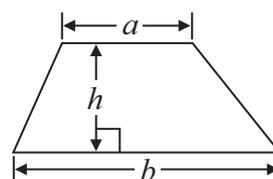
Volume of sphere $= \dfrac{4}{3}\pi r^3$

Surface area of sphere $= 4\pi r^2$
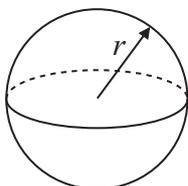
Volume of cone $= \dfrac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi r l$
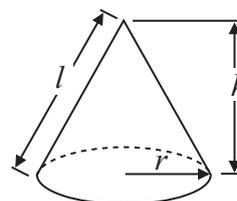
In any triangle *ABC*
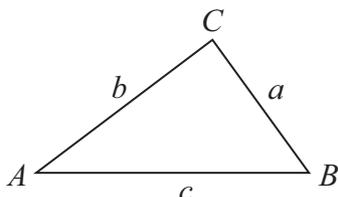
The Quadratic Equation
The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

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

Sine Rule $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

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

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

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Here are the ingredients needed to make 10 pancakes.

> **Pancakes**
>
> Ingredients to make **10** pancakes
>
> 300 m*l* of milk
> 120 g   of flour
>   2   eggs

Matthew makes 30 pancakes.

(a) Work out how much flour he uses.

....g

(2)

Tara makes some pancakes.
She uses 750 m*l* of milk.

(b) Work out how many pancakes she makes.

....

(2)

(Total for Question 1 is 4 marks)

2 The scatter graph shows some information about ten pine cones from the same tree.
It shows the length and the width of each pine cone.
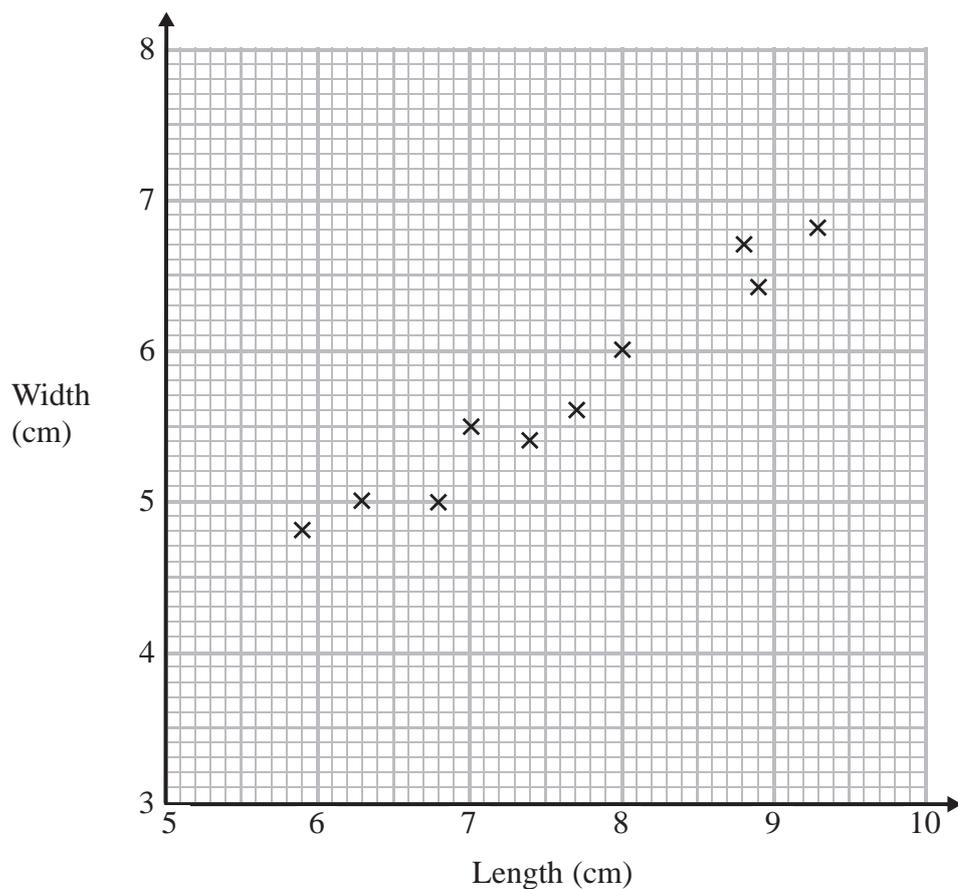
Length (cm)

(a) Describe the relationship between the length and the width of a pine cone.

....

....

(1)

Another pine cone from this tree has a length of 8.4 cm.

(b) Estimate the width of this pine cone.

....cm

(2)

(Total for Question 2 is 3 marks)

3 $f = 3g + 7h$

(a) Work out the value of f when $g = -5$ and $h = 2$

$f =$ ....
(2)

(b) Factorise $\quad 3x + 6$

....
(1)

(c) Expand and simplify $\quad 5(y - 2) + 2(y - 3)$

....
(2)

(d) Simplify $\quad m^5 \times m^3$

....
(1)

(e) Simplify $\quad \dfrac{p^6}{p^2}$

....
**(1)**

(Total for Question 3 is 7 marks)

4
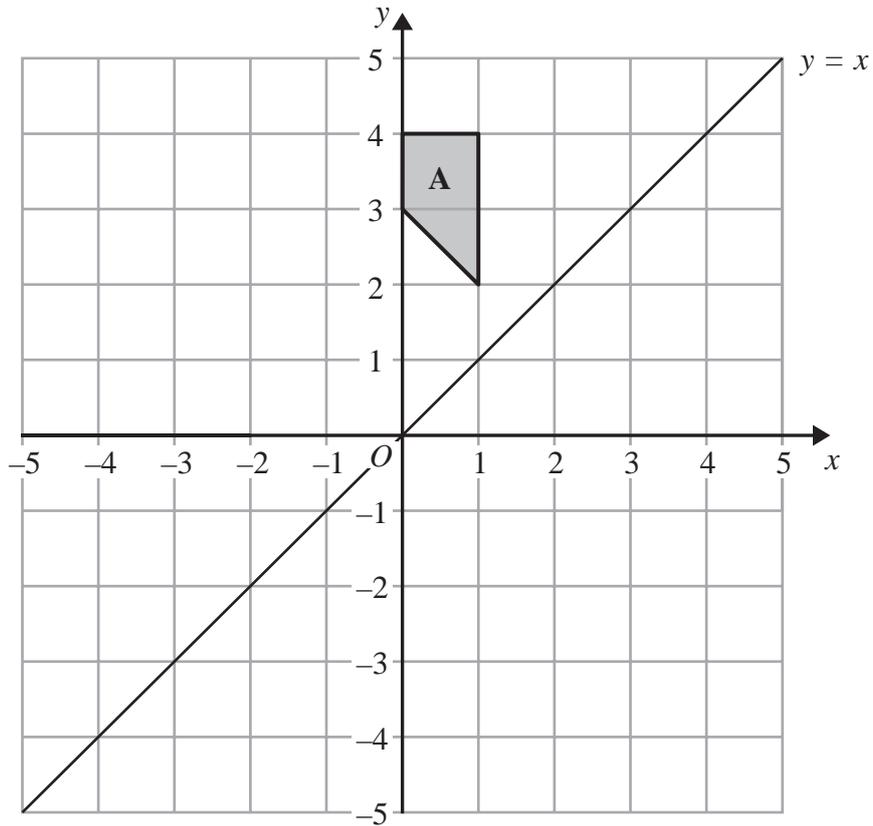
(a) On the grid, reflect shape **A** in the line $y = x$.

(2)
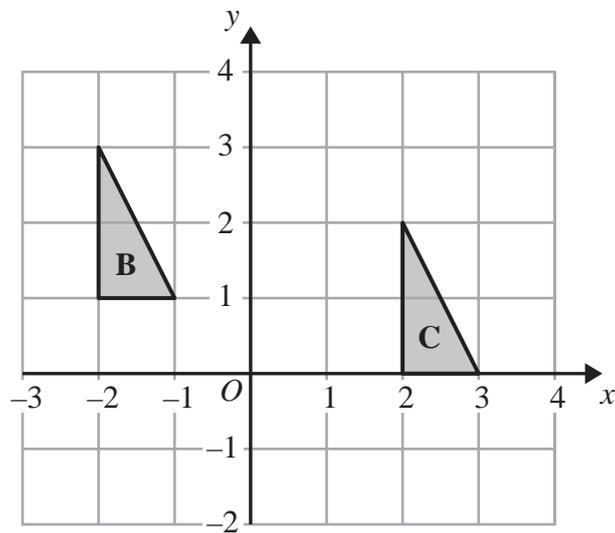
(b) Describe fully the single transformation that maps triangle **B** onto triangle **C**.

....

....

(2)

(Total for Question 4 is 4 marks)

5 There are some green counters, some yellow counters, some blue counters and some red counters in a bag.

The table shows the probabilities that a counter taken at random from the bag will be green or yellow or red.

Colour	Green	Yellow	Blue	Red
Probability	0.16	0.4		0.24

Mary takes at random a counter from the bag.

(a) Work out the probability that the counter will be blue.

....
(2)

Mary puts the counter back into the bag.
There are 125 counters in the bag.

(b) Work out the number of green counters in the bag.

....
(2)

(Total for Question 5 is 4 marks)

6 Margaret is on holiday in France.

She buys an English newspaper.
The cost of the newspaper is 5 euros.
In England, the cost of the same newspaper is £2.50

The exchange rate is £1 = 1.16 euros.

Work out the difference between the cost of the newspaper in France and the cost of the newspaper in England.

....

(Total for Question 6 is 3 marks)

7 Here are the first five terms of an arithmetic sequence.

<div align="center">2   6   10   14   18</div>

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

....

(2)

*(b) Is 86 a term in the sequence?
    You must give a reason for your answer.

(1)

(Total for Question 7 is 3 marks)

8 The frequency table gives information about the heights of some people.

Height (*h* cm)	Frequency
$160 < h \leqslant 165$	2
$165 < h \leqslant 170$	5
$170 < h \leqslant 175$	10
$175 < h \leqslant 180$	21
$180 < h \leqslant 185$	16
$185 < h \leqslant 190$	4

Draw a frequency polygon for this information.
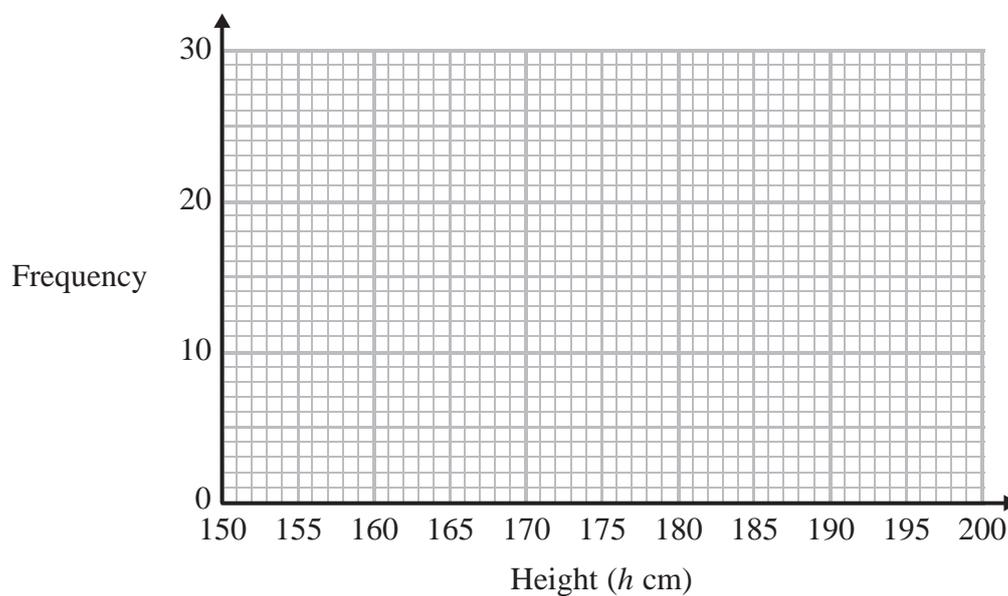
(Total for Question 8 is 2 marks)

*9 The table gives some information about student attendance at a school on Friday.

Year	Number of students		
	Present	**Absent**	**Total**
Year 7	192	16	208
Year 8	219	22	241
Year 9	234	28	262
Year 10	233	28	261
Year 11	214	24	238

The school has a target of 94% of students being present each day.

Did the school meet its target on Friday?

(Total for Question 9 is 3 marks)

10 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 10 is 4 marks)

*11   Saphia is organising a conference.
      People at the conference will sit at circular tables.

140 cm

Diagram **NOT**
accurately drawn

Each table has a diameter of 140 cm.
Each person needs 60 cm around the circumference of the table.

There are 12 of these tables in the conference room.
A total of 90 people will be at the conference.

Are there enough tables in the conference room?

(Total for Question 11 is 4 marks)

P 4 4 5 8 7 A 0 1 2 2 8

12 On the grid, draw the graph of $y = 2x - 3$ for values of x from -2 to 3
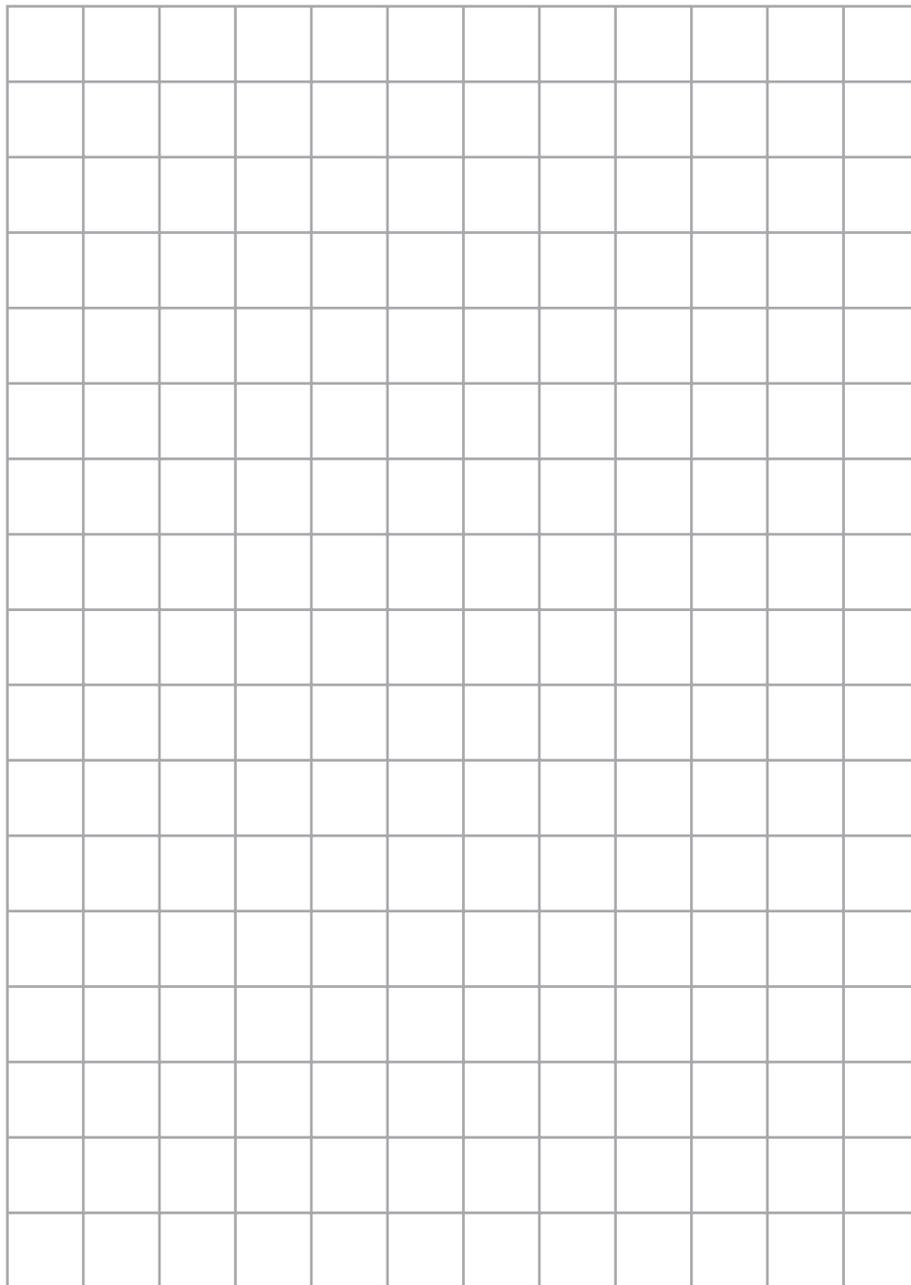
(Total for Question 12 is 4 marks)

**13** The diagram shows a swimming pool in the shape of a prism.
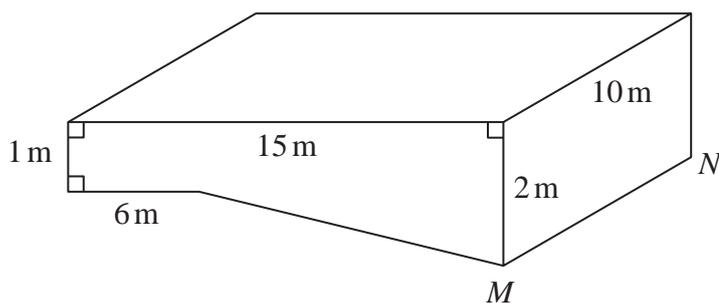
Diagram **NOT** accurately drawn

1 m
15 m
10 m
6 m
2 m
M
N

The swimming pool is empty.

The swimming pool is filled with water at a constant rate of 50 litres per minute.

(a) Work out how long it will take for the swimming pool to be completely full of water.
Give your answer in hours.
($1\,\text{m}^3 = 1000$ litres)

.... hours

(5)

Here are four graphs.

A

depth

O   time

B

depth

O   time

C

depth

O   time

D

depth

O   time
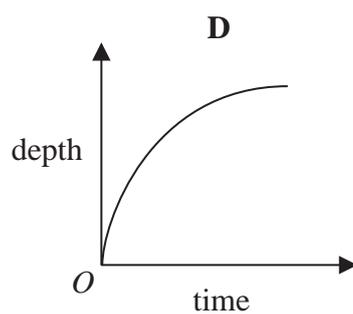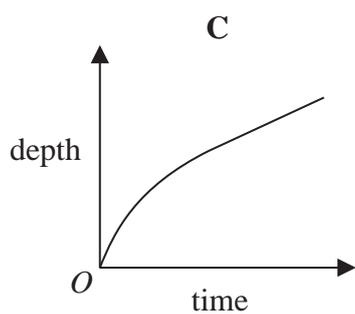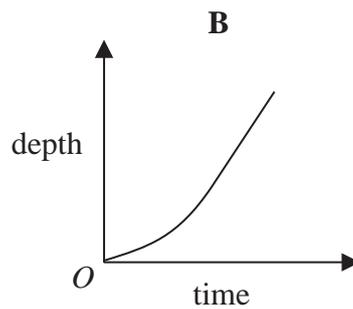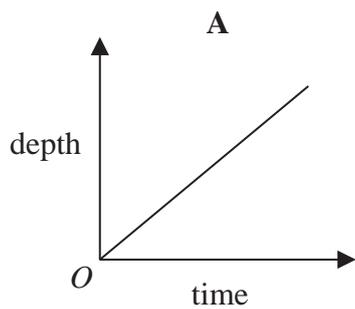
(b) Write down the letter of the graph that best shows how the depth of the water in the pool above the line *MN* changes with time as the pool is filled.

....

(1)

(Total for Question 13 is 6 marks)

*14 Peter has £20 000 to invest in a savings account for 2 years.

He finds information about two savings accounts.

<div style="text-align:center">

Bonus Saver

Compound interest

4% for the first year
then
1.5% each year

</div>

<div style="text-align:center">

Fixed Rate

Compound interest

2.5% each year

</div>

Peter wants to have as much money as possible in his savings account at the end of 2 years.

Which of these savings accounts should he choose?

(Total for Question 14 is 4 marks)

15 A cinema sells adult tickets and child tickets.

The total cost of 3 adult tickets and 1 child ticket is £30
The total cost of 1 adult ticket and 3 child tickets is £22

Work out the cost of an adult ticket and the cost of a child ticket.

adult ticket £.......................................

child ticket £.......................................

(**Total for Question 15 is 4 marks**)

16 The diagram represents a metal frame.

5 m

A   *B*

Diagram **NOT**
accurately drawn

3 m

D

C
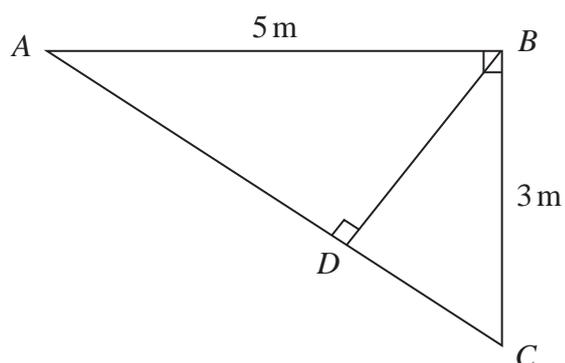
The frame is made from four metal bars, *AB*, *AC*, *BC* and *BD*.

Angle *ABC* = angle *ADB* = 90°
AB = 5 m
BC = 3 m

Work out the total length of the four metal bars of the frame.
Give your answer correct to 3 significant figures.

.... m

(Total for Question 16 is 5 marks)

17
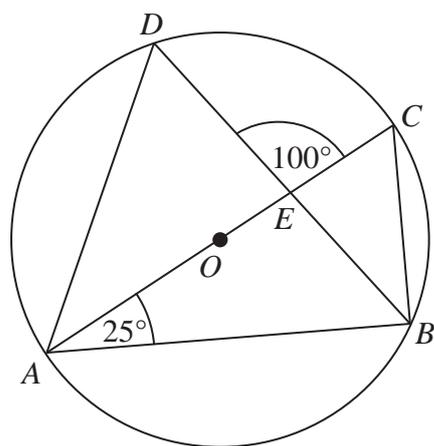
Diagram **NOT** accurately drawn

A, *B*, *C* and *D* are points on the circumference of a circle, centre *O*.
AC is a diameter of the circle.
AC and *BD* intersect at *E*.

Angle *CAB* = 25°
Angle *DEC* = 100°

Work out the size of angle *DAC*.
You must show all your working.

....°

(Total for Question 17 is 4 marks)

18 The table gives some information about the lengths of time, in hours, that some adults watched TV last week.

Length of time (*t* hours)	Frequency
$0 \leqslant t < 10$	8
$10 \leqslant t < 15$	15
$15 \leqslant t < 20$	11
$20 \leqslant t < 30$	10
$30 \leqslant t < 50$	6

(a) Work out an estimate for the mean length of time.

.... hours

(4)

(b) Draw a histogram for the information in the table.

Length of time (*t* hours)

(3)
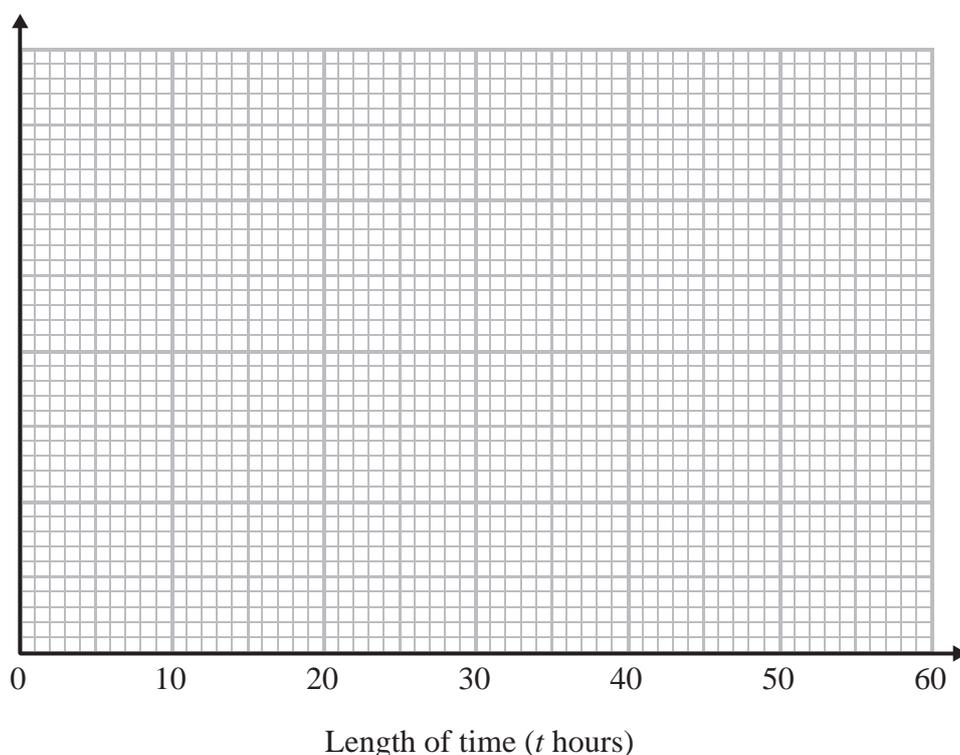
(Total for Question 18 is 7 marks)

19 Louise makes a spinner.

The spinner can land on green or on red.
The probability that the spinner will land on green is 0.7

Louise spins the spinner twice.

(a) Complete the probability tree diagram.

First spin   **Second spin**

                                              0.7   green

                        green
            0.7   .... red

                                              .... green

            .... red

                                              .... red

(2)

(b) Work out the probability that the spinner lands on two different colours.

....

(3)

(Total for Question 19 is 5 marks)

20 Solve $3x^2 - 5x - 1 = 0$

Give your solutions correct to 3 significant figures.

....

(Total for Question 20 is 3 marks)

21

B

Diagram **NOT**
accurately drawn

7.4 cm

45°   80°

A D 5.8 cm C
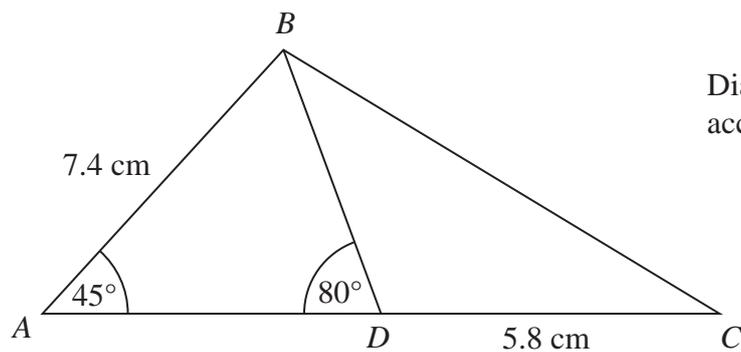
ABC is a triangle.
D is a point on *AC*.
Angle *BAD* = 45°
Angle *ADB* = 80°
AB = 7.4 cm
DC = 5.8 cm

Work out the length of *BC*.
Give your answer correct to 3 significant figures.

.... cm

(Total for Question 21 is 5 marks)

22 (a) Simplify fully $\dfrac{2x^2 - 5x + 3}{x^2 + 5x - 6}$

....

(3)

(b) Make *m* the subject of

$$\frac{m}{v} - \frac{t}{b} = \frac{m - t}{R}$$

....

(4)

(Total for Question 22 is 7 marks)

*23 A road is 4530 m long, correct to the nearest 10 metres.
Kirsty drove along the road in 205 seconds, correct to the nearest 5 seconds.

The average speed limit for the road is 80 km/h.

Could Kirsty's average speed have been greater than 80 km/h?
You must show your working.

(Total for Question 23 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

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P 4 4 5 8 7 A 0 2 8 2 8