Write your name here

Surname		Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9 - 1)

Centre Number

Candidate Number

Mathematics
Paper 2 (Calculator)

Higher Tier

Mock Set 3 – Autumn 2017
Time: 1 hour 30 minutes

Paper Reference
1MA1/2H

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.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **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 80
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

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.
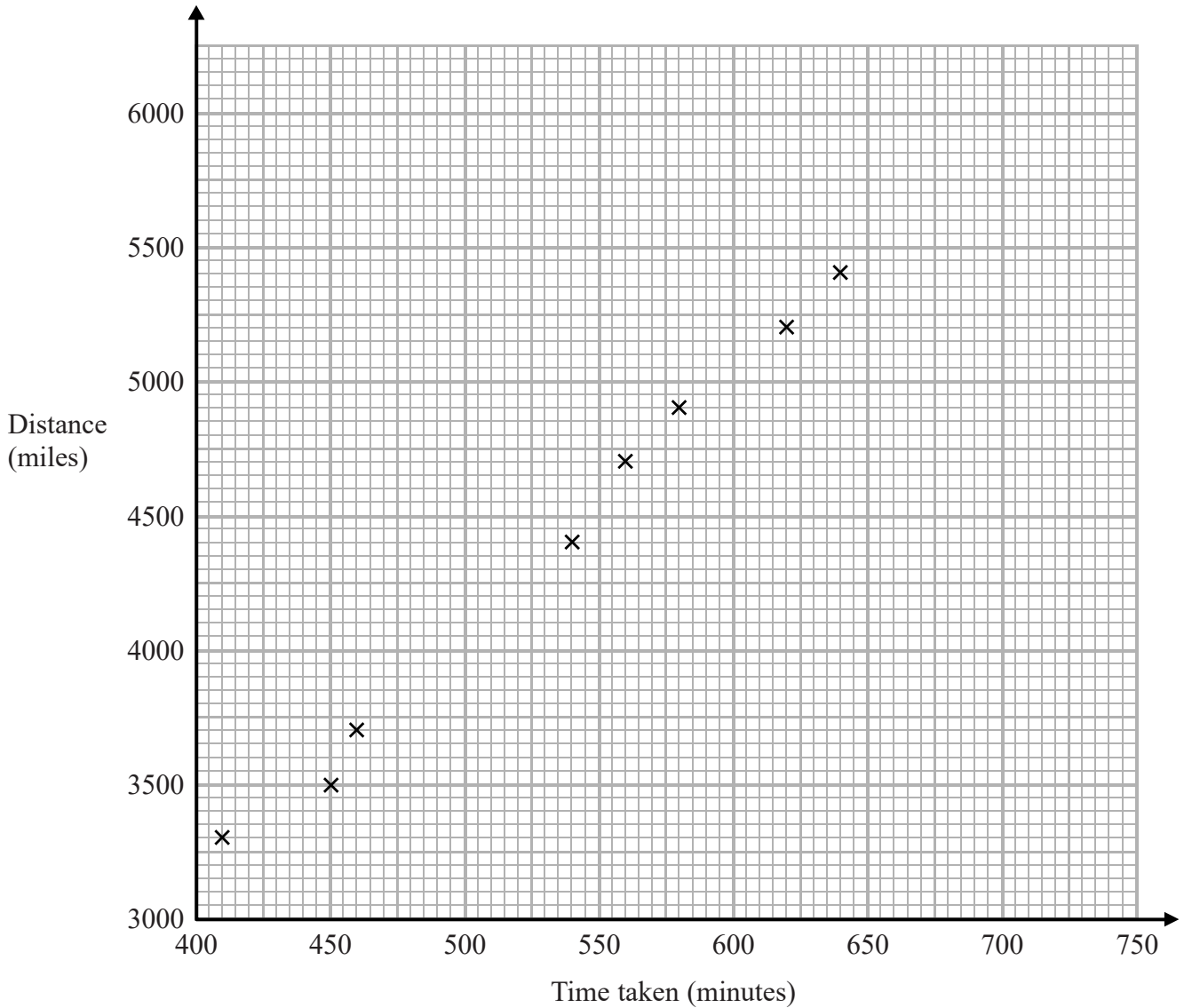
Turn over

Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1   Oliver records the distance from London to each of eight cities in the USA.
    He also records the time taken to fly from London to each of these cities.

    The scatter graph shows this information.

Chicago is a city in the USA.
Chicago is 4000 miles from London.

(a) (i) By drawing a line of best fit, find an estimate for the time taken to fly from London to Chicago.

....minutes

(2)

(ii) Why is your answer to part (i) only an estimate?

....

....

(1)

(b) (i) Calculate the gradient of your line of best fit.

....

(2)

(ii) Give an interpretation of the gradient of your line of best fit.

....

....

(1)

(Total for Question 1 is 6 marks)

2
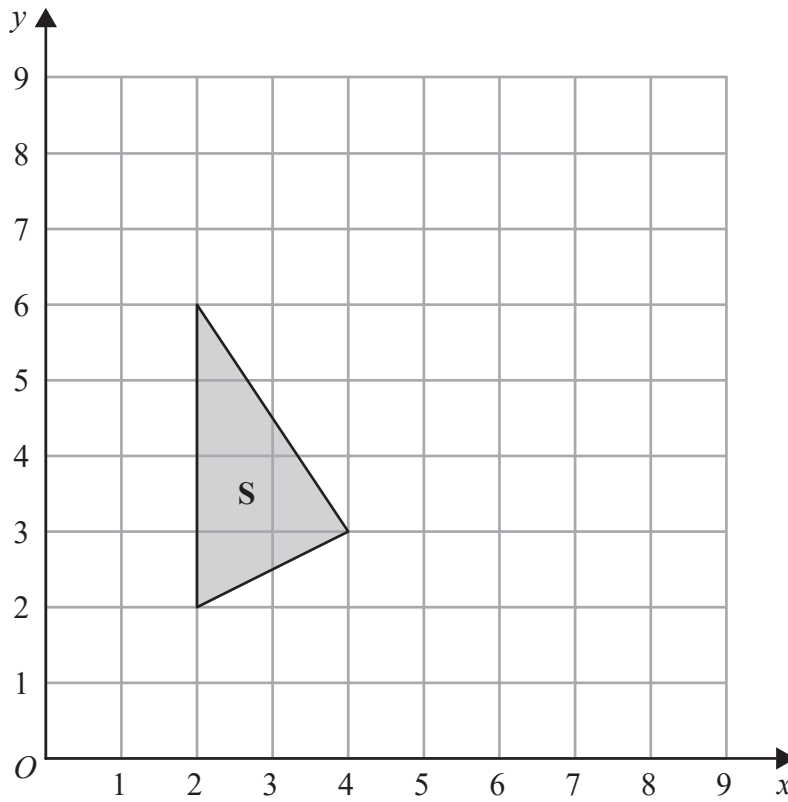
(a) Rotate shape **S** 90° clockwise, centre (5, 4)
Label your image **T**.

(2)

(b) Describe fully the single transformation that will map shape **T** onto shape **S**.

....

(1)

(Total for Question 2 is 3 marks)

3 Here are two rectangles.

$2x - 3$

$4x$

A	2.5

B	7
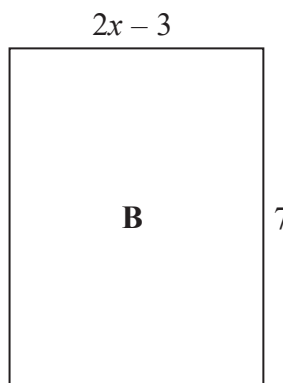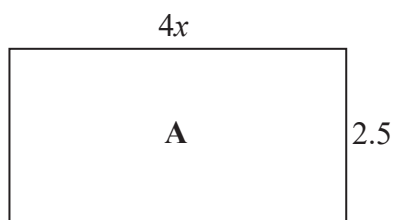
All measurements are in centimetres.

The area of rectangle **A** is equal to the area of rectangle **B**.

Work out the perimeter of rectangle **B**.
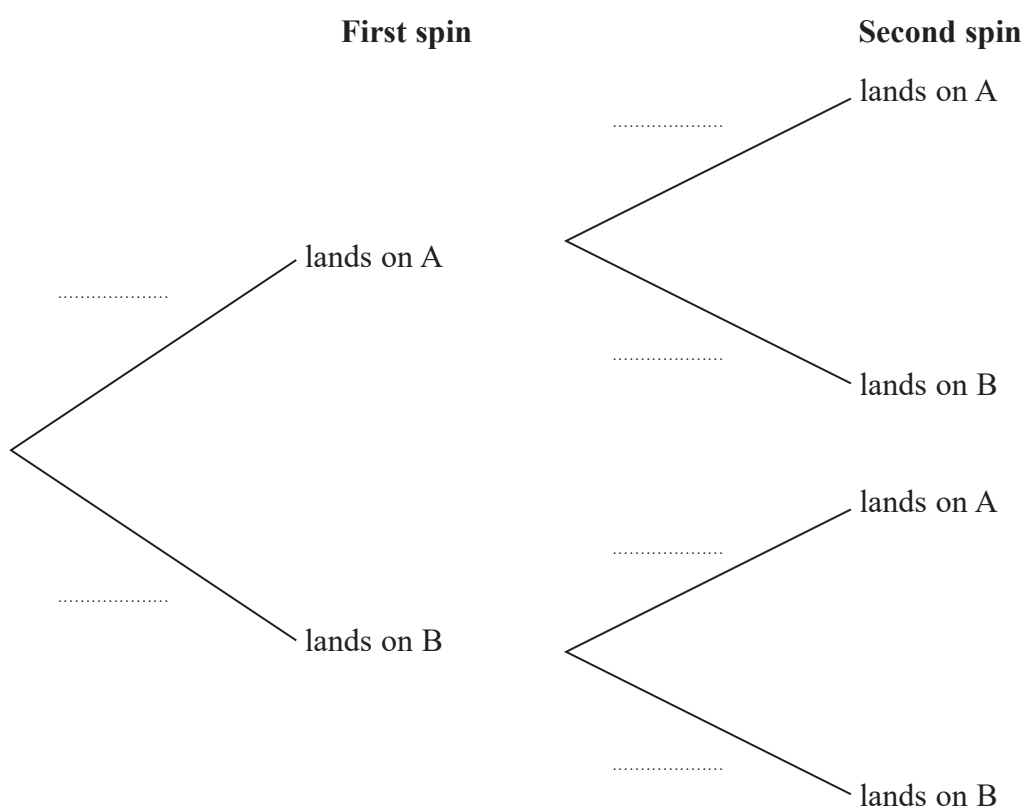
....cm

(Total for Question 3 is 5 marks)

4 The diagram shows a fair 4-sided spinner.
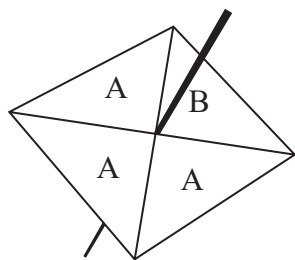
Hasmeet is going to spin the spinner twice.

(a) Complete the probability tree diagram.

First spin   **Second spin**

lands on A

lands on A

lands on B

lands on A

lands on B

lands on B

(2)

(b) Work out the probability that the spinner will land on A on the first spin and will land on B on the second spin.

....

(2)

(Total for Question 4 is 4 marks)

5 $S = \pi^2(b^2 - a^2)$

$a = 8$, $b = 10$

Calculate the value of S.
Give your answer correct to 3 significant figures.

....

(Total for Question 5 is 2 marks)

6 Only blue vans and white vans are made in a factory.

The ratio of the number of blue vans to the number of white vans is 4 : 3

(a) Write down the fraction of vans that are blue.

....

(1)

For blue vans,

the number of small vans : the number of large vans = 3 : 5

(b) Work out the fraction of the number of vans made in the factory that are blue and large.

....

(3)

(Total for Question 6 is 4 marks)

7 (a) Find the reciprocal of 5

....

(1)

(b) Use your calculator to work out $\sqrt[3]{5\tan 60° + 1}$
Write down all the figures on your calculator display.

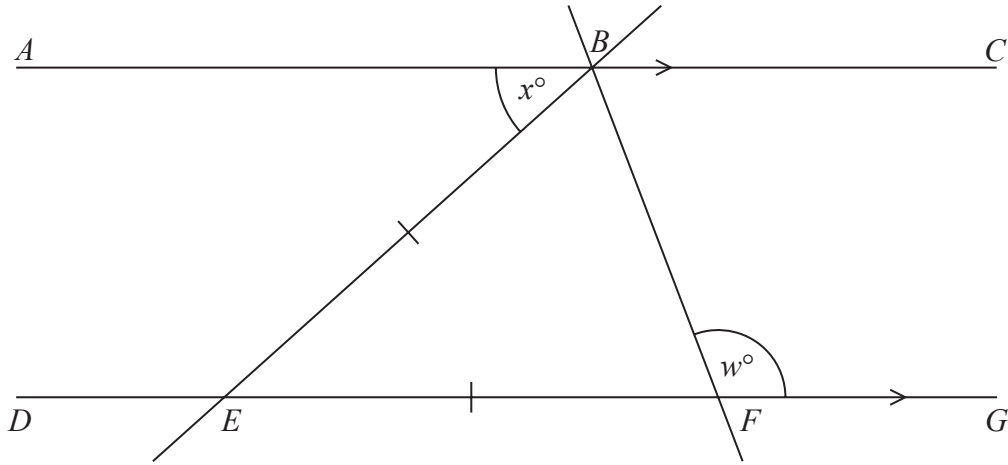...

(2)

(Total for Question 7 is 3 marks)

8 Make t the subject of $p = \sqrt{a + \dfrac{t}{2}}$

....

(Total for Question 8 is 3 marks)

In the diagram ABC and $DEFG$ are parallel lines.

Angle $ABE = x°$

$EB = EF$

Show that $w = 90 + \dfrac{1}{2}x$

Give a reason for each stage of your working.

(Total for Question 9 is 4 marks)

10 In 2016 the population of the UK was 6.5×10^7

Laura wants to calculate an estimate for the population of the UK in 2020
She assumes that the population increases by 0.6% each year.

(a) Using Laura's assumption, calculate an estimate for the population of the UK in 2020

....

(2)

Kieran also assumes that the population of the UK increases by 0.6% each year.

He says that it will take over 80 years for the population to increase by 50% because $\dfrac{50}{0.6} = 83.\dot{3}$

Kieran's method is wrong.

(b) Explain what is wrong with his method.

....

....

(1)

Assuming that the population of the UK increases by 0.6% each year,

(c) show that the population of the UK each year forms a geometric progression.

(2)

(Total for Question 10 is 5 marks)

11 Anna and Bill share some money in the ratio 2 : 5

Anna gets £A
Bill gets £B

Carl and Donna share twice as much money as Anna and Bill share.
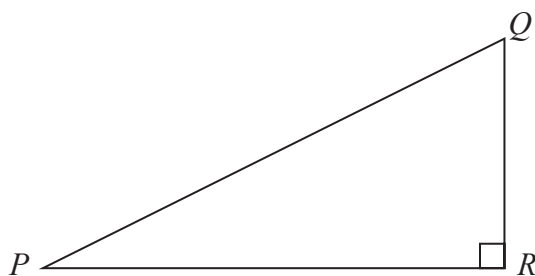They share the money in the ratio 3 : 1

Carl gets £C
Donna gets £D

Find $A : B : C : D$
Give your answer in its simplest form.

....

(Total for Question 11 is 3 marks)

S57494A01124

12 Here is triangle *PQR*.

The length of *QR* is 60% of the length of *PR*.

Find the value of sin *QPR*.
Give your answer correct to 3 significant figures.

....

(Total for Question 12 is 3 marks)

13 Here are five graphs.
Each graph shows either direct proportion or inverse proportion.

A

B

C

D

E
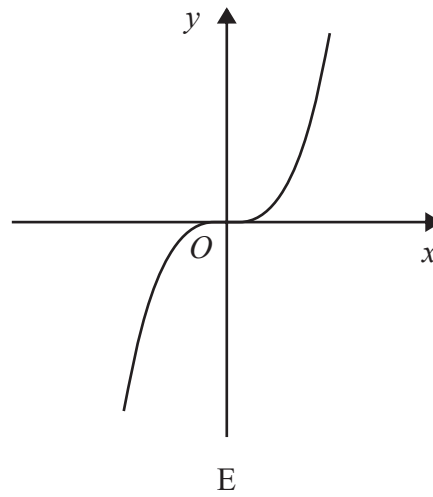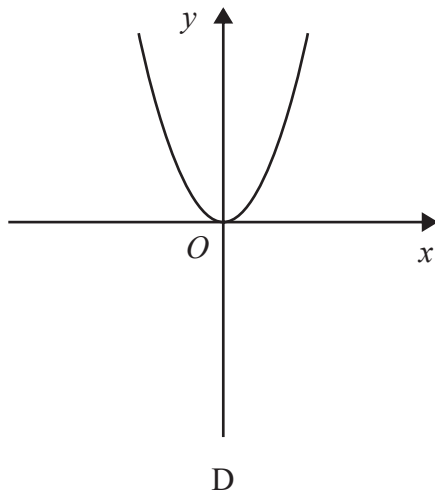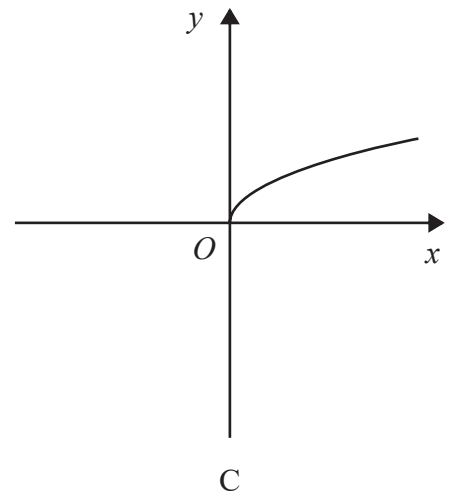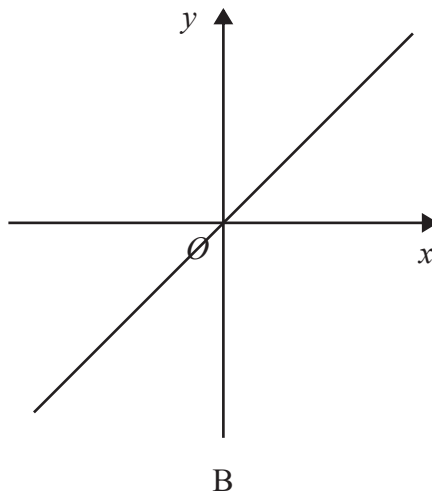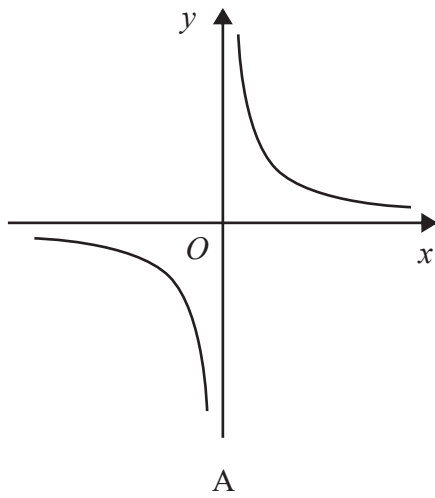
The table shows five equations.

Equation	Graph
$y = kx^3$	....
$y = k\sqrt{x}$	....
$y = kx^2$	....
$y = \dfrac{k}{x}$	....
$y = kx$	....

Match the letter of each graph to its equation.

(Total for Question 13 is 3 marks)

14 A cafe owner sells 10 different types of sandwich.

Rayheem buys a different type of sandwich on Monday, on Tuesday and on Wednesday.

In how many ways can he do this?

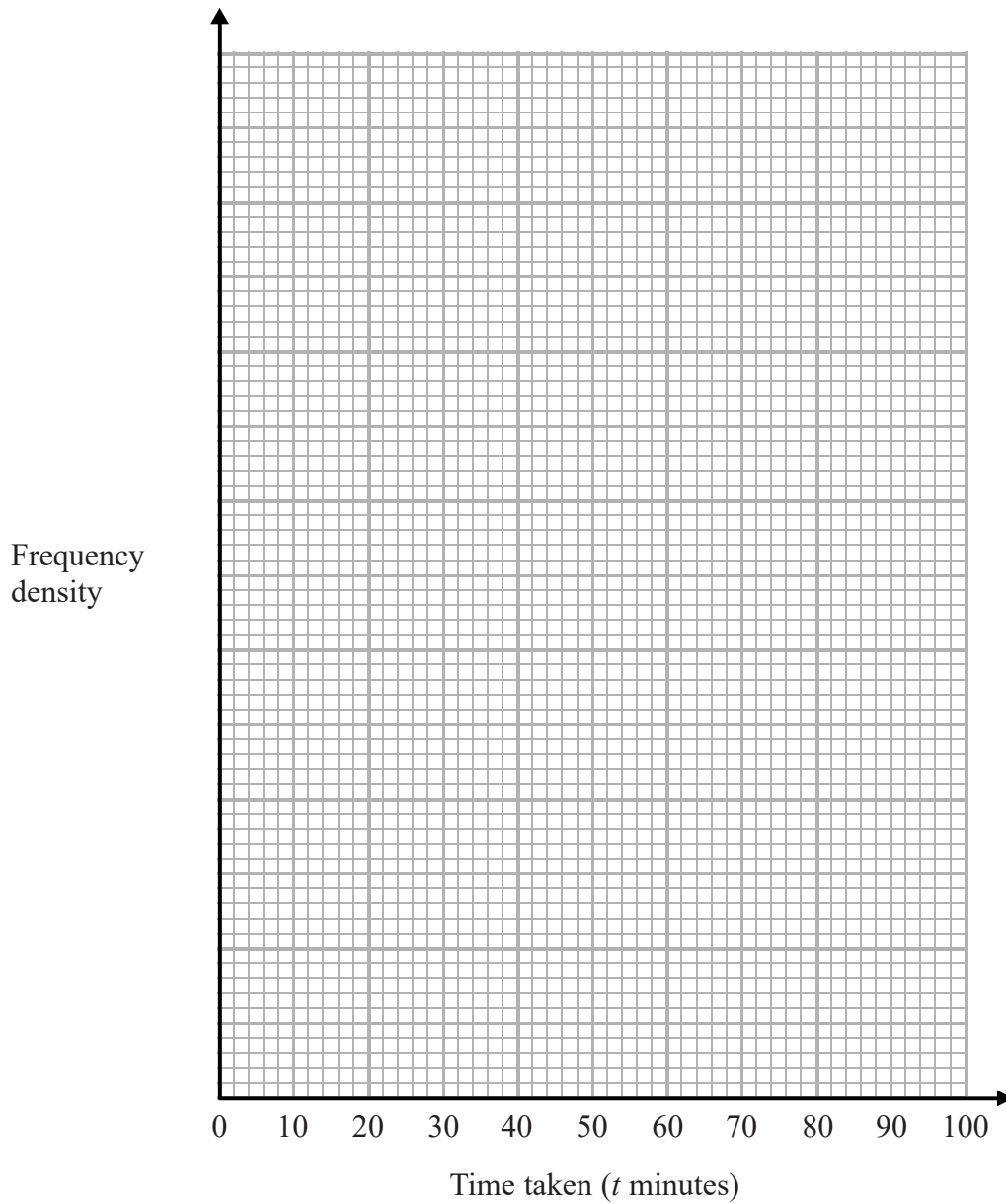...

(Total for Question 14 is 2 marks)

15 The table shows information about the times a group of students took to do a park run.

Time taken (*t* minutes)	Frequency
$0 < t \leqslant 25$	20
$25 < t \leqslant 45$	35
$45 < t \leqslant 60$	45
$60 < t \leqslant 75$	87
$75 < t \leqslant 85$	10
$85 < t \leqslant 95$	8

Draw a histogram for this information.

Frequency density

Time taken (*t* minutes)

(Total for Question 15 is 3 marks)

16 (a) Show that the equation $x^3 - 3x^2 + 3 = 0$ has a solution between $x = 2$ and $x = 3$

(2)

(b) Show that the equation $x^3 - 3x^2 + 3 = 0$ can be rearranged to give $x = \sqrt[3]{3x^2 - 3}$

(1)

(c) Starting with $x_0 = 2$, use the iteration formula $x_{n+1} = \sqrt[3]{3x_n^2 - 3}$ to find the value of x_2
Give your answer correct to 3 decimal places.

....

(3)

(Total for Question 16 is 6 marks)

17 A factory makes ice cream tubs in two sizes, small and large.

5 cm
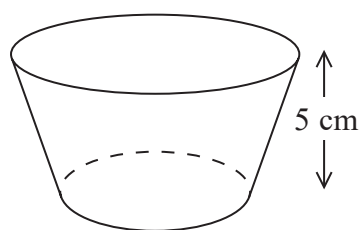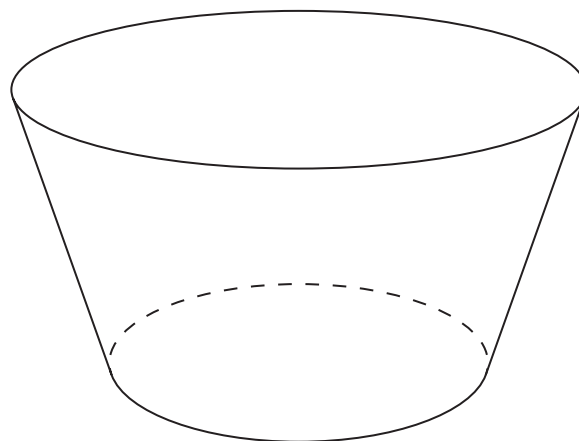
small

large

The tubs are similar in shape.

The height of the small tub is 5 cm

The volume of the small tub is 150 cm³
The volume of the large tub is 500 cm³

Work out the height of the large tub.
Give your answer correct to 3 significant figures.

....cm

(Total for Question 17 is 2 marks)

18 $(x - 8)(x + 4) = (x - a)^2 + b$ for all values of x.

Find the value of a and the value of b.

$a =$ ....

$b =$ ....

(Total for Question 18 is 3 marks)

19 The diagram shows a sector of a circle of radius 9 cm.

9 cm

9 cm

$x°$
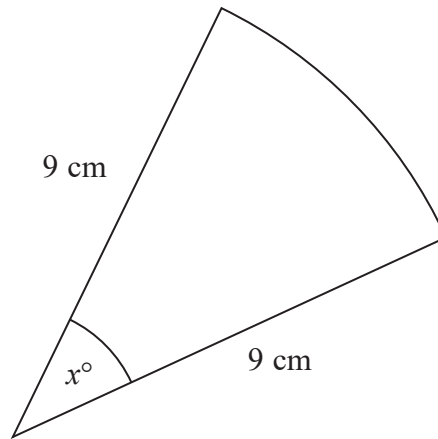
The sector has a perimeter of 25 cm.

Work out the value of x.
Give your answer correct to 1 decimal place.

....

(Total for Question 19 is 4 marks)

20 $m = \dfrac{1}{ps}$

$p = 5.37$ correct to 2 decimal places.
$s = 2.9$ correct to 1 decimal place.

Calculate the upper bound for the value for m.
You must show your working.

....

(Total for Question 20 is 3 marks)
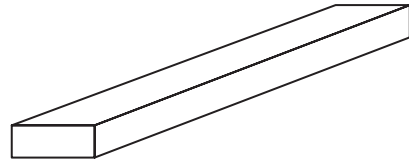
21 The diagram shows an acute-angled triangle ABC.
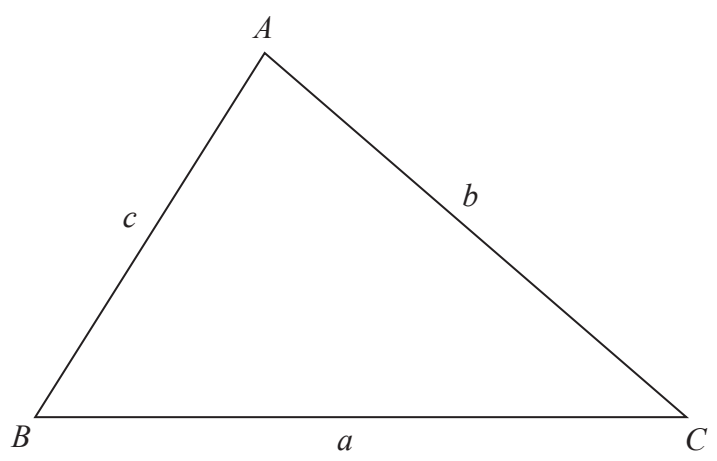
Prove that   area of triangle $ABC = \dfrac{1}{2}ab\sin C$

(Total for Question 21 is 3 marks)

22 A solid cuboid has a volume of $40\,\text{cm}^3$
The cuboid has a total surface area of $100\ \text{cm}^2$
One edge of the cuboid has length $2\,\text{cm}$.

Find the length of a diagonal of the cuboid.
Give your answer correct to 3 significant figures.

....cm

(Total for Question 22 is 6 marks)

TOTAL FOR PAPER IS 80 MARKS

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