**Pearson
Edexcel GCSE**

Mathematics A
Paper 2 (Calculator)

Higher Tier

Thursday 8 June 2017 – Morning
Time: 1 hour 45 minutes

Paper Reference
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

Formulae: Higher Tier
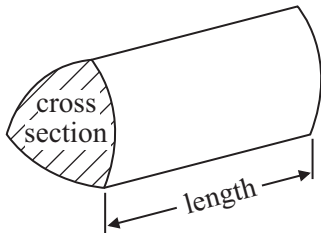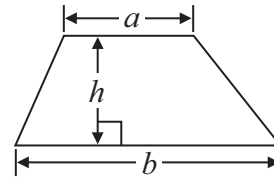
You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

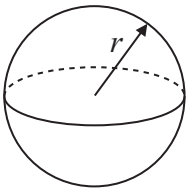**Volume of prism** = area of cross section × length

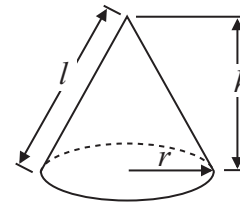**Area of trapezium** = $\frac{1}{2}(a+b)h$

Volume of sphere = $\frac{4}{3}\pi r^3$
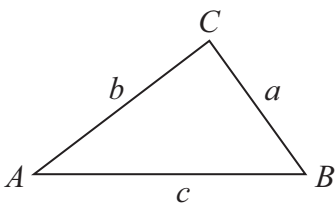
Surface area of sphere = $4\pi r^2$

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

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

In any triangle *ABC*

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

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

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

P 5 3 4 4 2 A 0 2 2 8

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Anna wants to find out how often people travel by train.
   She is going to use a questionnaire.

   Design a suitable question for Anna to use on her questionnaire.

(Total for Question 1 is 2 marks)

2 30% of the people at a concert are female.
   1295 of the people at the concert are male.

   Work out the number of people at the concert who are female.

   ....

(Total for Question 2 is 3 marks)

3 Identical pairs of boots are sold in London, in Geneva and in Paris.

These boots have a price of

> £115 in London
> 189 Swiss francs in Geneva
> 174 euros in Paris

The exchange rates are

> £1 = 1.39 Swiss francs
> £1 = 1.27 euros

Are the boots the best value for money in London or in Geneva or in Paris?
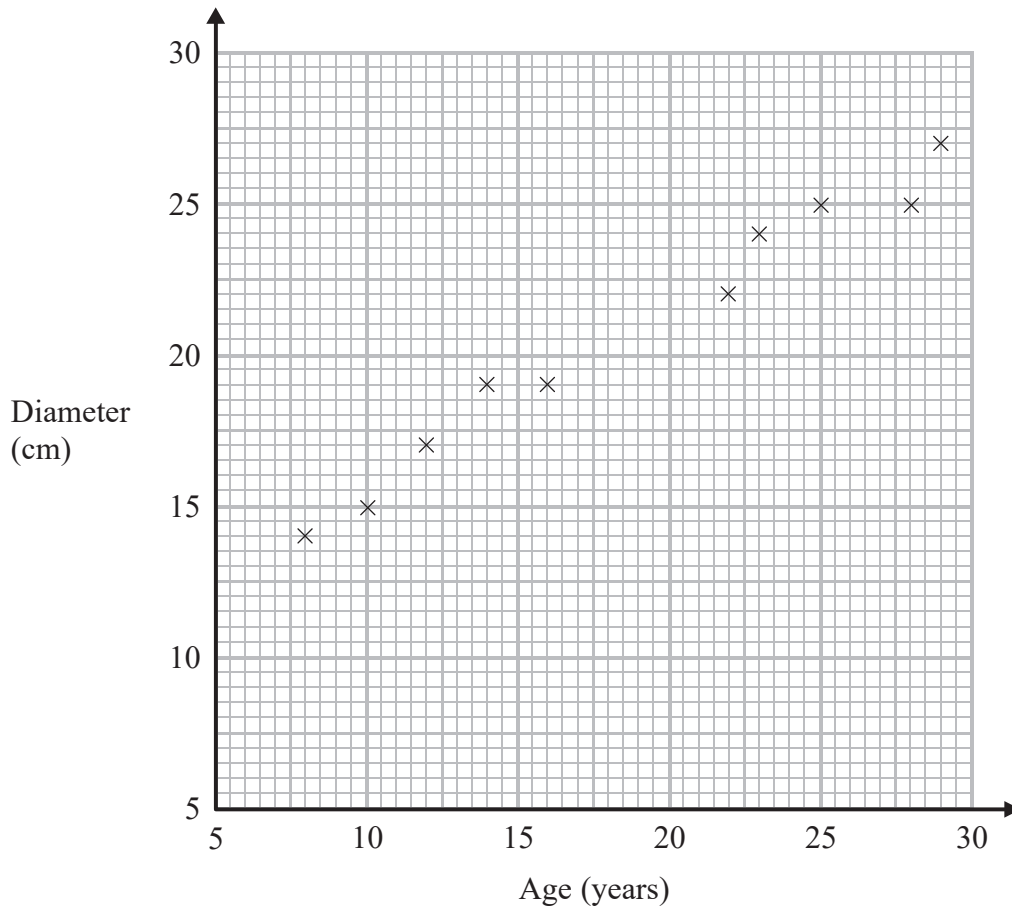You must show how you get your answer.

....

(Total for Question 3 is 3 marks)

4 The scatter graph shows information about ten trees of the same type.
It shows the age and the diameter of the trunk of each tree.

(a) What type of correlation does this scatter graph show?

....

(1)

Another tree of the same type has a trunk with diameter 21 cm.

(b) Estimate the age of this tree.

.... years

(2)

(Total for Question 4 is 3 marks)
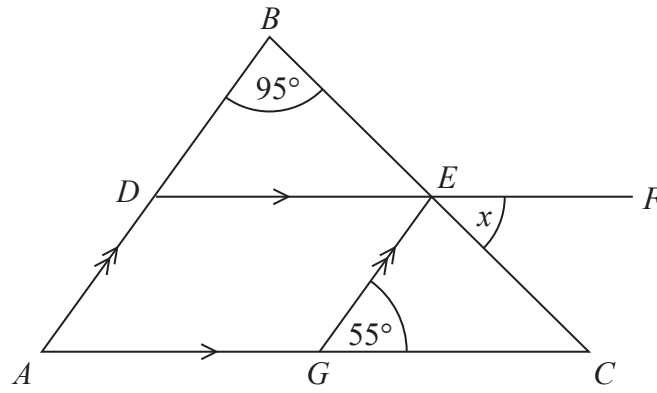
*5

Diagram **NOT**
accurately drawn

AGC and *DEF* are parallel lines.
ADB and *GE* are parallel lines.
BEC is a straight line.

Angle *DBE* = 95°
Angle *CGE* = 55°

Work out the size of the angle marked *x*.
Give reasons for each stage of your working.

(Total for Question 5 is 4 marks)

6 George wants to watch all 23 games that a football team will play at home next season.

He can buy
a season ticket costing £425
or 23 separate tickets costing £24 each ticket.

What percentage of the total cost of 23 separate tickets does George save by buying a season ticket?
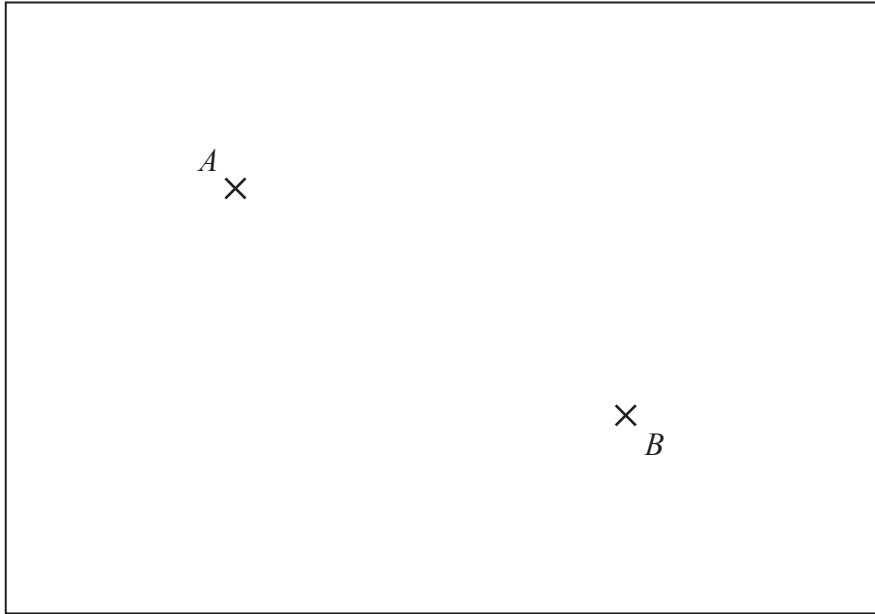
....%

(Total for Question 6 is 3 marks)

P 5 3 4 4 2 A 0 7 2 8

7 Here is a map.
The map shows two airports, *A* and *B*.

A ×

× B

Scale: 1 cm represents 10 km

Sophie is going to have a hotel built.

The hotel
  will be closer to airport *A* than to airport *B*
  will be less than 40 km from airport *B*

On the map, shade the region where the hotel can be built.

(Total for Question 7 is 3 marks)

8 (a) Simplify $ab - 5g + 5ab - 2g$

....

(2)

(b) Factorise $6m - 9$

....

(1)

(c) Simplify $t^8 \div t^3$

....

(1)

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

....

(2)

(e) Expand and simplify $(w - 5)^2$

....

(2)

(Total for Question 8 is 8 marks)

9 The diagram shows the position of two churches, *A* and *B*.

N

×
A

N

×
B
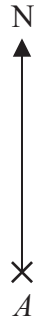
Church *C* is on a bearing of 130° from church *A*.
Church *C* is on a bearing of 245° from church *B*.

In the space above, draw an accurate diagram to show the position of church *C*.

Mark the position of church *C* with a cross (×).
Label it *C*.

(Total for Question 9 is 3 marks)

10 Gemma has the same number of sweets as Betty.

Gemma gives 24 of her sweets to Betty.
Betty now has 5 times as many sweets as Gemma.

Work out the total number of sweets that Gemma and Betty have.
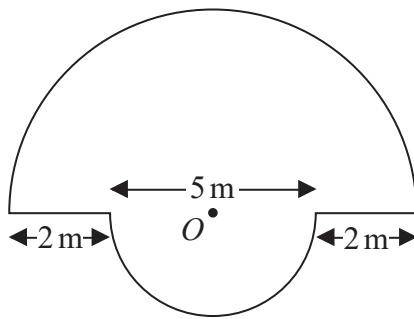
....

(Total for Question 10 is 4 marks)

*11 The diagram shows a plan of Brian's lawn.

Diagram **NOT**
accurately drawn

The edge of the lawn consists of two semicircles and two straight lines.
Each semicircle has centre O.
The diameters of the semicircles are 9 m and 5 m.

Brian is going to put lawn edging around the edge of the lawn.
Lawn edging is sold in 2.4 metre rolls.

Brian has £35

Has Brian got enough money to buy all the rolls of lawn edging he needs?
You must show all your working.

| **Lawn edging** |
| £3.99 per roll |
| or |
| 3 rolls for £10 |

(Total for Question 11 is 5 marks)

12 The table gives information about the heights of 35 girls.

Height (*h* metres)	Frequency
$1.30 \leqslant h < 1.40$	11
$1.40 \leqslant h < 1.50$	9
$1.50 \leqslant h < 1.60$	7
$1.60 \leqslant h < 1.70$	6
$1.70 \leqslant h < 1.80$	2

(a) Find the class interval that contains the median.

....
(1)

(b) Work out an estimate for the mean height.

.... m
(4)

(Total for Question 12 is 5 marks)

Turn over

13 The equation

$$x^3 + x = 21$$

has a solution between 2 and 3

Use a trial and improvement method to find this solution.
Give your answer correct to 1 decimal place.
You must show all your working.

....

(Total for Question 13 is 4 marks)

*14 Jack has £15 000 to invest in a savings account for 3 years.

He finds information about two savings accounts.

Simple	**Compound**
Simple interest	Compound interest
2.3% each year	2.15% each year

Jack wants to have as much money as possible in his savings account at the end of the 3 years.

Which of these two savings accounts should he choose?

(Total for Question 14 is 4 marks)

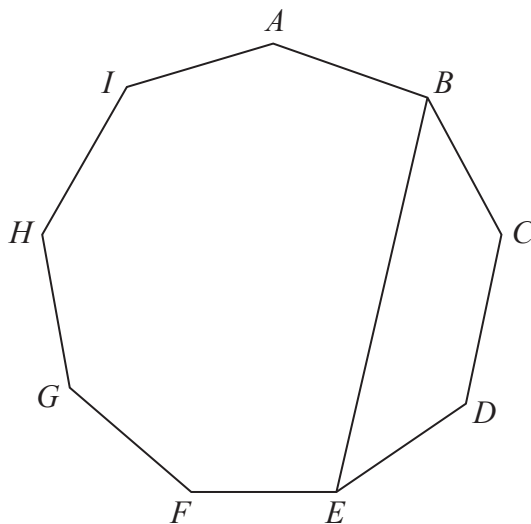**15** *ABCDEFGHI* is a regular 9-sided polygon.

Diagram **NOT**
accurately drawn

The vertices *B* and *E* are joined with a straight line.

Work out the size of angle *BEF*.
You must show how you get your answer.

.... °

(Total for Question 15 is 4 marks)

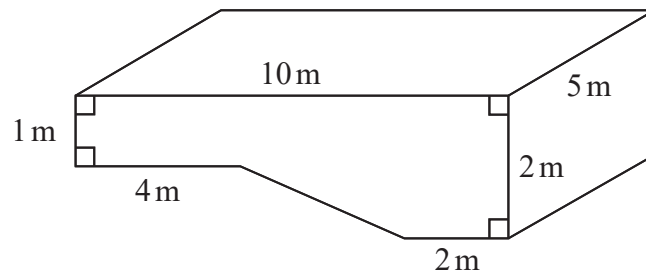***16** The diagram shows a swimming pool in the shape of a prism.

Diagram **NOT** accurately drawn

The swimming pool is empty.

Water from 3 water tankers is going to be put into the pool.
There are 20 000 litres of water in each water tanker.

Sam thinks that the surface of the water in the pool will be 10 cm below the top of the pool.

Is Sam correct?
You must show how you get your answer.
($1 m^3 = 1000$ litres)

(Total for Question 16 is 5 marks)

Turn over ▶

17 (a) Simplify $\dfrac{3(x + 1)}{(x + 1)^2}$

....
(1)

(b) Solve $\dfrac{15 - x}{5} = 3x + 11$

$x =$ ....
(3)

(c) Make m the subject of the formula $v = \sqrt{\dfrac{2E}{m}}$

....
(3)

(Total for Question 17 is 7 marks)

18 Ibrar mixes 74 g of lead and 126 g of tin to make 200 g of an alloy.

Lead has a density of 11.34 g/cm^3.
Tin has a density of 7.31 g/cm^3.

Work out the density of the alloy.
Give your answer correct to 1 decimal place.

.... g/cm^3

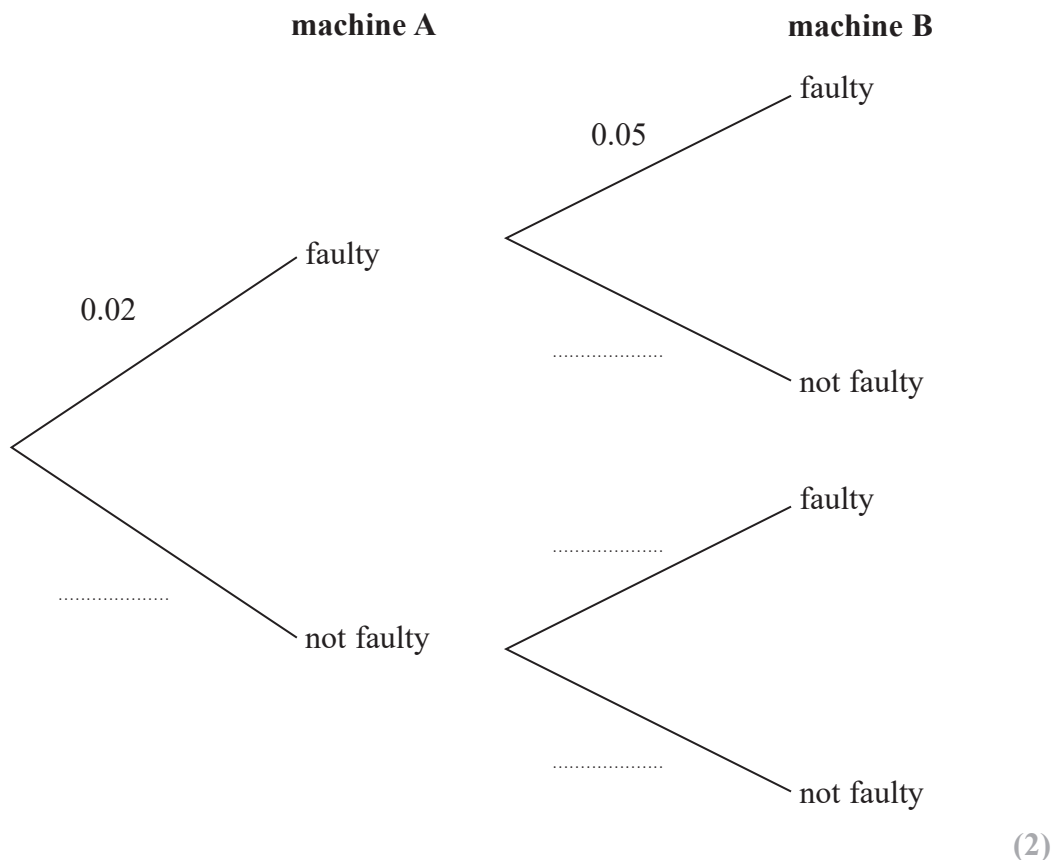**(Total for Question 18 is 3 marks)**

Turn over ▶

19 Machine A and machine B make bottles.

The probability that a bottle made by machine A is faulty is 0.02
The probability that a bottle made by machine B is faulty is 0.05

(a) Complete the probability tree diagram.

machine A　　　　　　　　　　　**machine B**

0.05 — faulty

faulty

0.02

.... — not faulty

.... — faulty

....

not faulty

.... — not faulty

(2)

Shazia takes at random one bottle made by machine A and one bottle made by machine B.

(b) Work out the probability that at least one of these bottles is faulty.

....

(3)

(Total for Question 19 is 5 marks)

20 T is inversely proportional to d^2

$T = 12$ when $d = 8$

Find the value of T when $d = 0.5$

....

(Total for Question 20 is 3 marks)

21 Solve $2x^2 + 3x - 7 = 0$

Give your solutions correct to 2 decimal places.

....

(Total for Question 21 is 3 marks)

Turn over ▶

22 $a = \dfrac{v - u}{t}$

$v = 37.6$ correct to 3 significant figures.
$u = 11.3$ correct to 3 significant figures.
$t = 8.4$ correct to 2 significant figures.

Work out the upper bound for the value of a.
Show your working clearly.

....
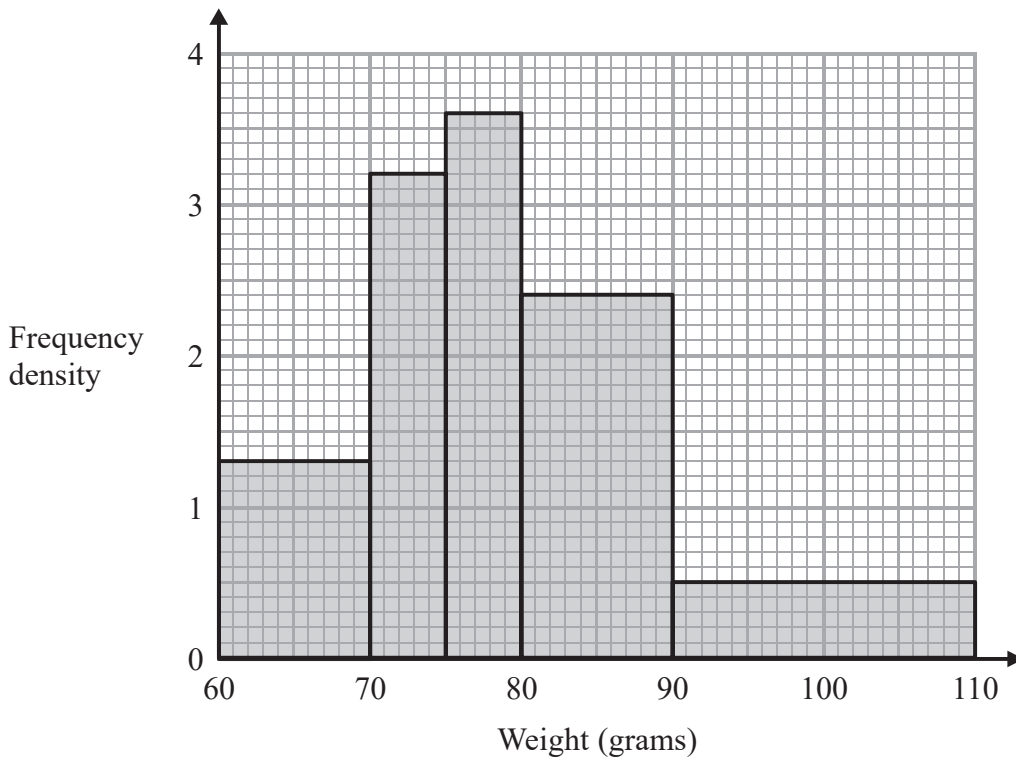
(Total for Question 22 is 3 marks)

23 The histogram shows information about the weights, in grams, of some plums.

Work out an estimate for the proportion of these plums with a weight of less than 100 grams.

....

(Total for Question 23 is 3 marks)

24 The straight line **L** has equation $4x + y = 7$

Find an equation of the straight line perpendicular to **L** that passes through $(-8, 3)$.

....

(Total for Question 24 is 4 marks)
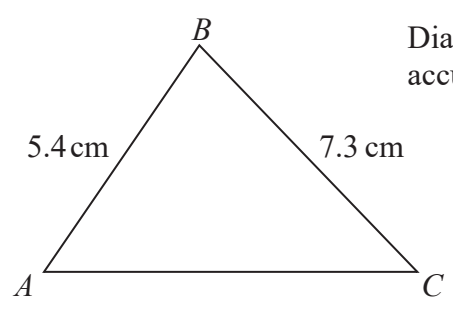
25 *ABC* is an acute angled triangle.

Diagram **NOT** accurately drawn

The area of triangle *ABC* is 19 cm².

Work out the size of angle *ACB*.
Give your answer correct to 3 significant figures.

.... °

(Total for Question 25 is 6 marks)

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