Write your name here

Surname	Other names

Pearson Edexcel International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics A

Paper 3H

Higher Tier

Monday 9 January 2017 – Morning
Time: 2 hours

Paper Reference
4MA0/3H

You must have:
Ruler graduated in centimetres and millimetres, protractor, 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.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
  Anything you write on the formulae page will gain NO credit.

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.*

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ▶

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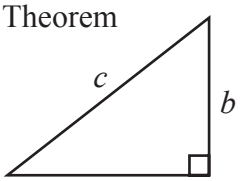
Pearson

International GCSE MATHEMATICS
FORMULAE SHEET – HIGHER TIER

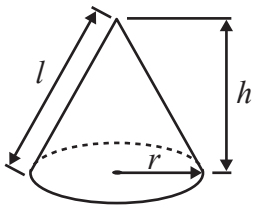
Pythagoras' Theorem



$a^2 + b^2 = c^2$

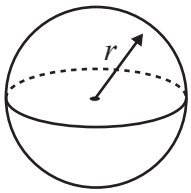
Volume of cone = $\frac{1}{3}\pi r^2 h$

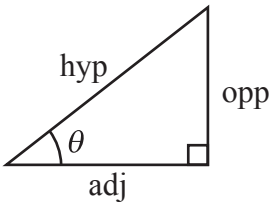
Curved surface area of cone = $\pi r l$



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

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





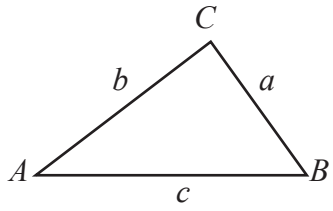
adj = hyp × cos θ
opp = hyp × sin θ
opp = adj × tan θ

or $\sin\theta = \frac{\text{opp}}{\text{hyp}}$

$\cos\theta = \frac{\text{adj}}{\text{hyp}}$

$\tan\theta = \frac{\text{opp}}{\text{adj}}$

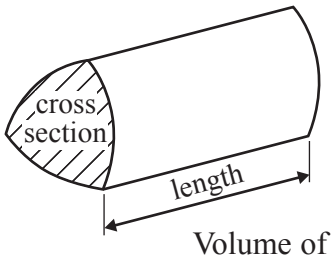
In any triangle ABC



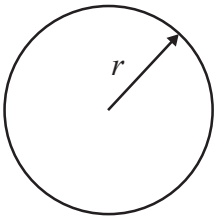
Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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



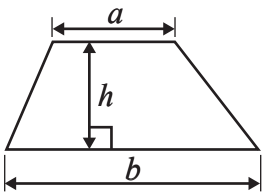
Volume of prism = area of cross section × length

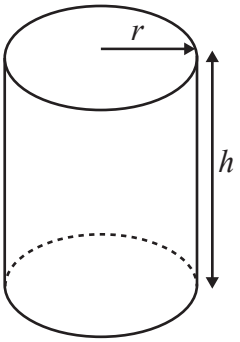


Circumference of circle = $2\pi r$

Area of circle = πr^2

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





Volume of cylinder = $\pi r^2 h$

Curved surface area of cylinder = $2\pi rh$

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 TWENTY FOUR questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The average speed for an aeroplane flight from Dubai to London is 750 km/h.
The flight time from Dubai to London is 7 hours 18 minutes.

(a) Work out the flight distance from Dubai to London.

.....km

(3)

(b) Change 750 kilometres per hour to a speed in metres per second.
Give your answer correct to the nearest whole number.

.....m/s

(3)

(Total for Question 1 is 6 marks)

2 Three integers have a mean of 7, a median of 5 and a range of 14

Find the three integers.

....

(Total for Question 2 is 2 marks)

3 Show that $5\frac{2}{3} - 3\frac{4}{5} = 1\frac{13}{15}$

(Total for Question 3 is 3 marks)

4

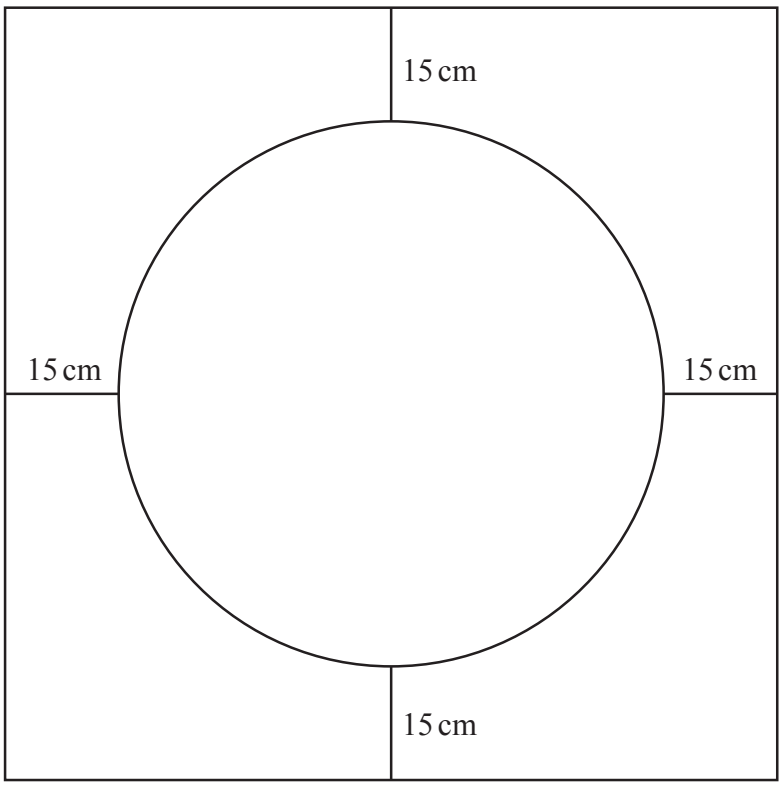


Diagram **NOT** accurately drawn

The diagram shows a design made from wire.

The design is made from
a square with side 70 cm,
a circle with diameter 40 cm,
4 straight pieces each of length 15 cm.

Find the total length of wire needed for the design.
Give your answer correct to the nearest centimetre.

.....cm

(Total for Question 4 is 4 marks)

5 (a) Factorise $7h + h^2$

.....

(1)

(b) Expand and simplify $4(p + 5) + 7(p - 2)$

.....

(2)

$D = 7c^2 + f$

(c) Work out the value of D when $c = -2$ and $f = 5$

$D =$ .....

(2)

(d) Solve $5(q - 3) = 12 - q$
Show clear algebraic working.

$q =$ .....

(3)

(e) Solve the inequality $3 - 7t \geqslant 31$

.....

(2)

(Total for Question 5 is 10 marks)

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6 The table gives information about the distances, in kilometres, Darren travelled to deliver 100 parcels.

Distance travelled (d km)	Frequency
$0 < d \leqslant 5$	28
$5 < d \leqslant 10$	32
$10 < d \leqslant 15$	20
$15 < d \leqslant 20$	14
$20 < d \leqslant 25$	6

Work out an estimate for the mean distance Darren travelled to deliver these parcels.

.....km

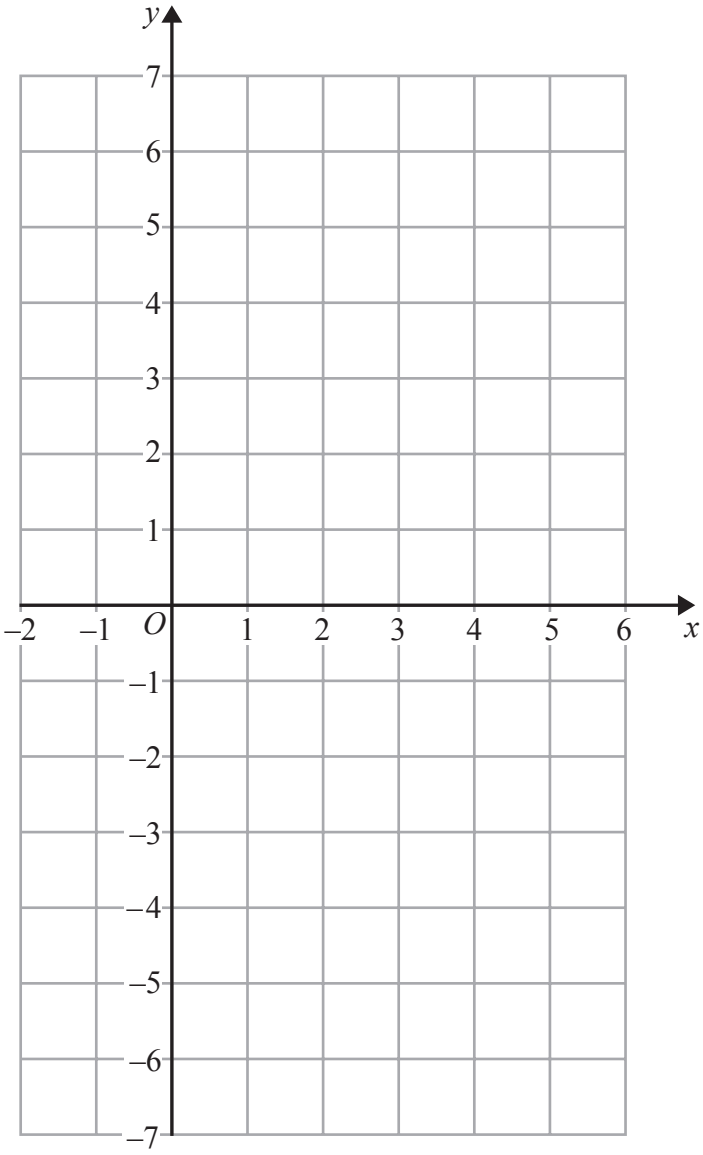
(Total for Question 6 is 4 marks)

7 Rachel, Mario and Sanjit share some money in the ratios 4 : 3 : 9
Mario receives £96
Work out the difference between the amount received by Rachel and the amount received by Sanjit.

£.....

(Total for Question 7 is 3 marks)

8 (a) On the grid, draw the graph of $y = -2x + 4$ for values of x from -1 to 5



(4)

(b) Show by shading on the grid, the region defined by all three of the inequalities

$y \leqslant -2x + 4$

$y \geqslant -4$

$x \geqslant 1$

Label your region **R**.

(3)

(Total for Question 8 is 7 marks)

9 Simplify $(2x + 3)^2 - (2x + 3)(x - 5)$

Give your answer in the form $ax^2 + bx + c$

.....

(Total for Question 9 is 3 marks)

10 In a sale, normal prices are reduced by 18%
The sale price of an umbrella is £25.83

Work out the normal price of the umbrella.

£.....

(Total for Question 10 is 3 marks)

11 The frequency table gives information about the lengths of time 100 people spent in a coffee shop.

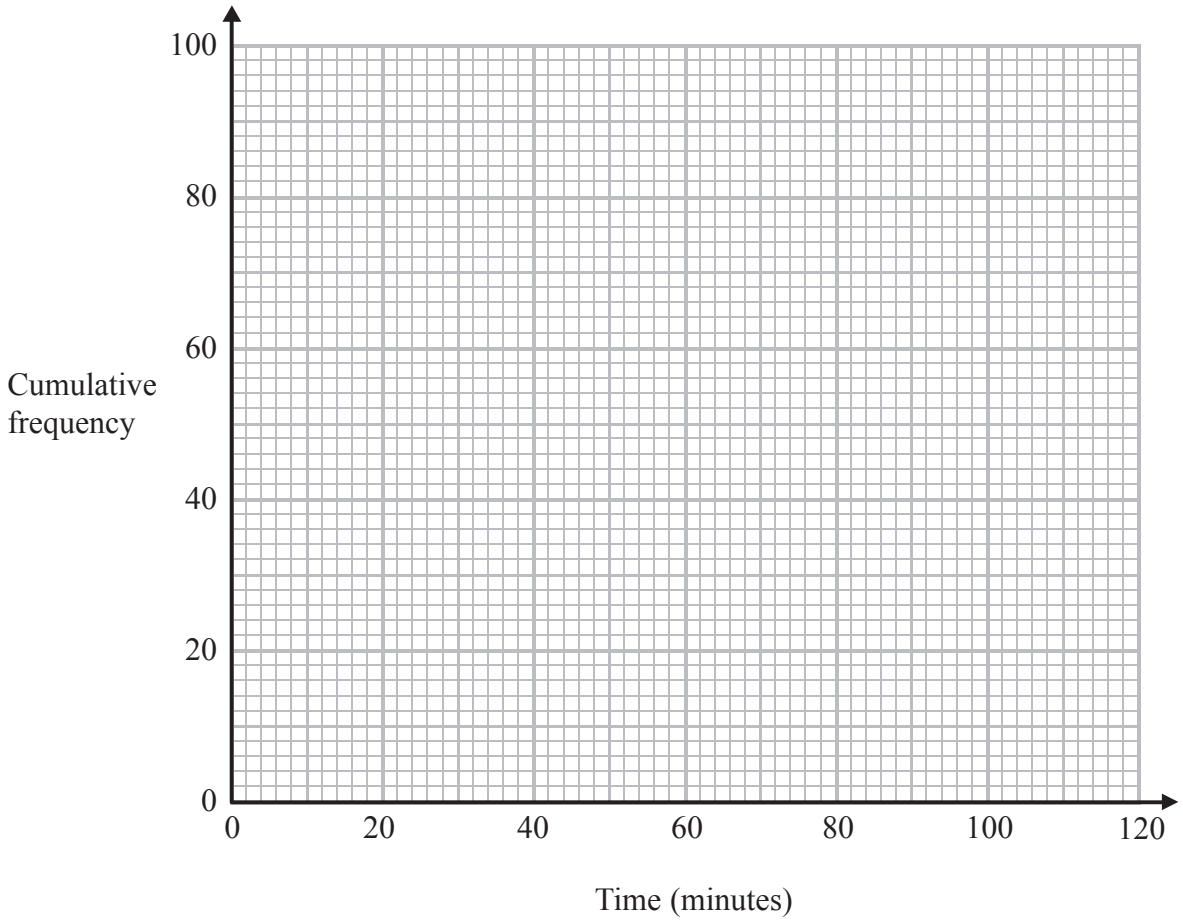
Time (t minutes)	Frequency
$0 < t \leqslant 20$	4
$20 < t \leqslant 40$	12
$40 < t \leqslant 60$	26
$60 < t \leqslant 80$	42
$80 < t \leqslant 100$	12
$100 < t \leqslant 120$	4

(a) Complete the cumulative frequency table.

Time (t minutes)	Cumulative frequency
$0 < t \leqslant 20$	
$0 < t \leqslant 40$	
$0 < t \leqslant 60$	
$0 < t \leqslant 80$	
$0 < t \leqslant 100$	
$0 < t \leqslant 120$	

(1)

(b) On the grid, draw a cumulative frequency graph for your table.



(2)

(c) Use your graph to find an estimate for the lower quartile.

..... minutes

(1)

(d) Use your graph to find an estimate for the number of these people who spent longer than 70 minutes in the coffee shop.

.....

(2)

(Total for Question 11 is 6 marks)

12

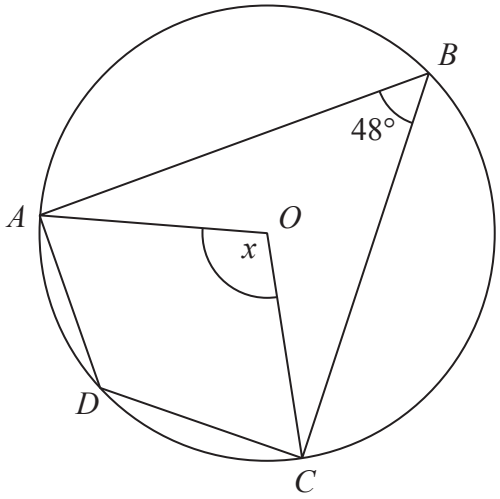


Diagram **NOT** accurately drawn

A, *B*, *C* and *D* are points on a circle with centre *O*.
Angle *ABC* = 48°

(a) (i) Calculate the size of angle *x*.

.....°

(ii) Give a reason for your answer.

.....

.....

(2)

(b) (i) Calculate the size of angle *ADC*.

.....°

(ii) Give a reason for your answer.

.....

.....

(2)

(Total for Question 12 is 4 marks)

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13 Micah invests $4000 for 3 years at 2.75% per year compound interest.

Work out the value of the investment at the end of 3 years.

$.....

(Total for Question 13 is 3 marks)

14 T is directly proportional to $\sqrt{x}$
$T = 400$ when $x = 625$

(a) Find a formula for T in terms of x.

.....

(3)

(b) Calculate the value of T when $x = 56.25$

.....

(1)

(Total for Question 14 is 4 marks)

15

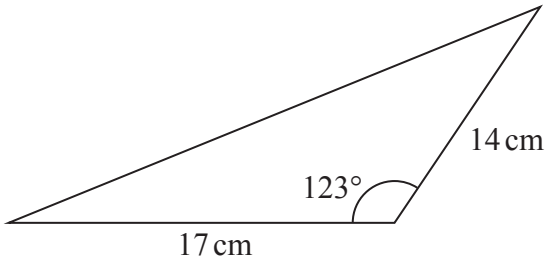


Diagram **NOT** accurately drawn

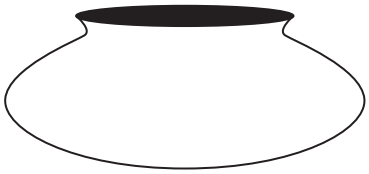
Calculate the perimeter of the triangle.
Give your answer correct to 1 decimal place.

.....cm

(Total for Question 15 is 4 marks)

16 The diagram shows two mathematically similar pots, **A** and **B**.

A



B

Diagram **NOT** accurately drawn

A has a volume of 264 cm^3
B has a volume of 891 cm^3

A has a height of 8 cm

(a) Work out the height of pot **B**.

..... cm

(2)

B has a surface area of 459 cm^2

(b) Work out the surface area of pot **A**.

..... cm^2

(2)

(Total for Question 16 is 4 marks)

17 Solve the equation $5x^2 + 8x - 23 = 0$
Show your working clearly.
Give your solutions correct to 3 significant figures.

.....

(Total for Question 17 is 3 marks)

18 The curve with equation $y = 10x^2 + 9x + 5$ has a minimum at point A.

Find the coordinates of A.
Show your working clearly.

(..... , ...)

(Total for Question 18 is 4 marks)

19 Make e the subject of $k = \sqrt{\dfrac{5m + 2e}{3e}}$

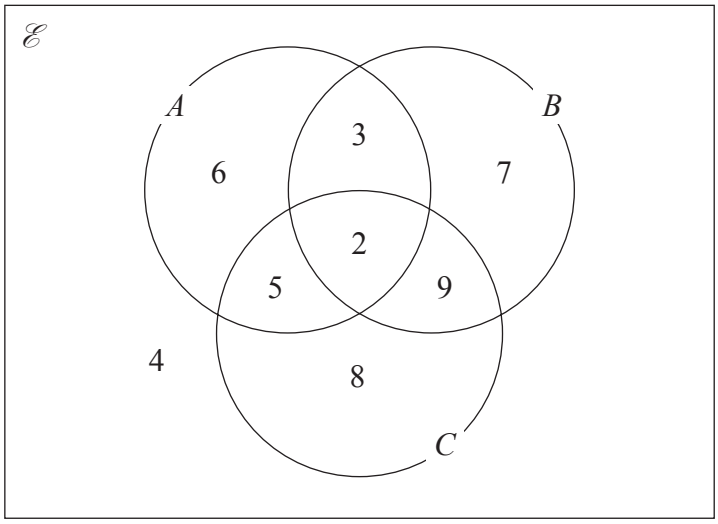
(Total for Question 19 is 4 marks)

20 $x = 3$ correct to 1 significant figure.
$y = 8.37$ correct to 3 significant figures.
$z = 5.3$ correct to 1 decimal place.

Calculate the upper bound of $x(y - z)$
Show your working clearly.

(Total for Question 20 is 3 marks)

21 The Venn diagram shows a universal set $\mathscr{E}$ and sets A, B and C, where 6, 3, 7, 5, 2, 9, 4 and 8 represent **numbers** of elements.



(a) Find $n(A \cup B)'$

.....

(1)

(b) Find $n((A \cup C)' \cap B)$

.....

(1)

(c) On the Venn diagram, shade the region that represents the set $(A \cup B) \cap C$

(1)

(Total for Question 21 is 3 marks)

22

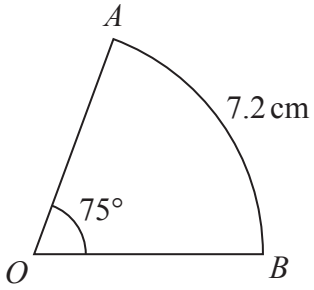


Diagram **NOT** accurately drawn

The diagram shows a sector OAB of a circle, centre O.

Angle $AOB = 75°$
Length of arc $AB = 7.2$ cm

Calculate the area of the sector.
Give your answer correct to 3 significant figures.

.....cm^2

(Total for Question 22 is 4 marks)

23 Solve the simultaneous equations

$$x^2 + y^2 = 52$$
$$2x + y = 8$$

Show clear algebraic working.

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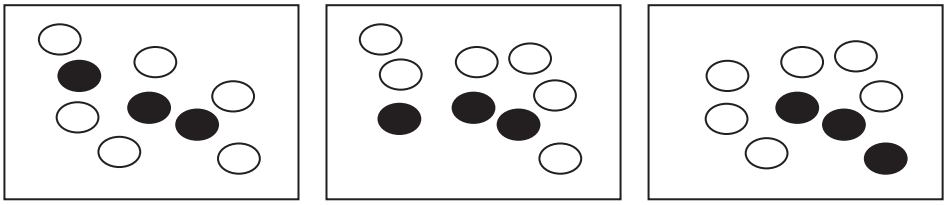
(Total for Question 23 is 6 marks)

24 The diagram shows three boxes containing beads.



Box **A** Box **B** Box **C**

Each box contains 3 black beads and 6 white beads.

Tim takes at random a bead from box **A** and puts it into box **B**.
He then takes at random a bead from box **B** and puts it into box **C**.
Finally, he takes at random a bead from box **C** and puts it into box **A**.

Calculate the probability that there are still 3 black beads and 6 white beads in each of the three boxes.

(Total for Question 24 is 3 marks)

TOTAL FOR PAPER IS 100 MARKS

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