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Surname	Other names

Pearson Edexcel International GCSE

Centre Number | Candidate Number

Mathematics A

Paper 4HR



Higher Tier

Thursday 4 June 2015 – Morning
Time: 2 hours

Paper Reference
4MA0/4HR

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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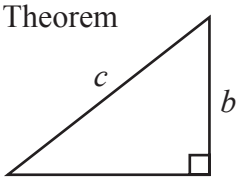
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International GCSE MATHEMATICS
FORMULAE SHEET – HIGHER TIER

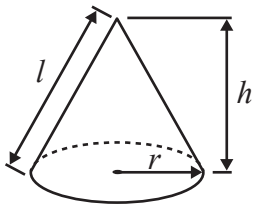
Pythagoras' Theorem



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

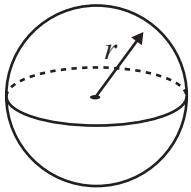
Volume of cone = $\frac{1}{3}\pi r^2 h$

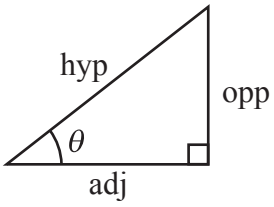
Curved surface area of cone = $\pi r l$



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

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





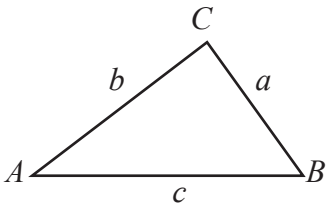
adj = hyp × cos θ
opp = hyp × sin θ
opp = adj × tan θ

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

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

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

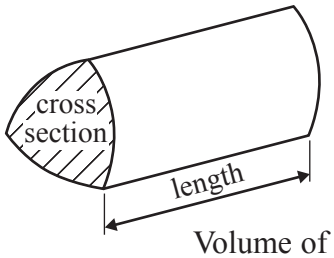
In any triangle ABC



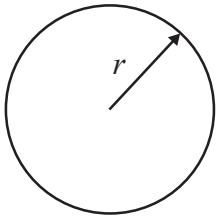
Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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



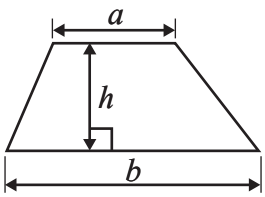
Volume of prism = area of cross section × length

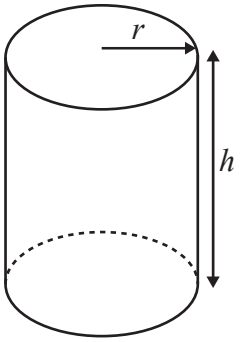


Circumference of circle = $2\pi r$

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

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

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Answer ALL TWENTY ONE questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 $S = \{c, h, i, n, a\}$ $V = \{i, t, a, l, y\}$

List the elements of the set

(i) $S \cap V$

.....

(ii) $S \cup V$

.....

(Total for Question 1 is 2 marks)

2 The distance from Kyoto to Hakata is 638 kilometres.
The train journey from Kyoto to Hakata takes 2 hours 45 minutes.

Work out the average speed, in kilometres per hour, of the train from Kyoto to Hakata.

..... km/h

(Total for Question 2 is 3 marks)

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3 Amit invests 15 000 rupees.
At the end of one year, his investment has increased by $7\frac{1}{2}\%$

(a) Work out the value of Amit's investment at the end of one year.

..... rupees
(2)

Priya invests a sum of money at an interest rate of 8% per year.
At the end of one year, the interest she receives is 1800 rupees.

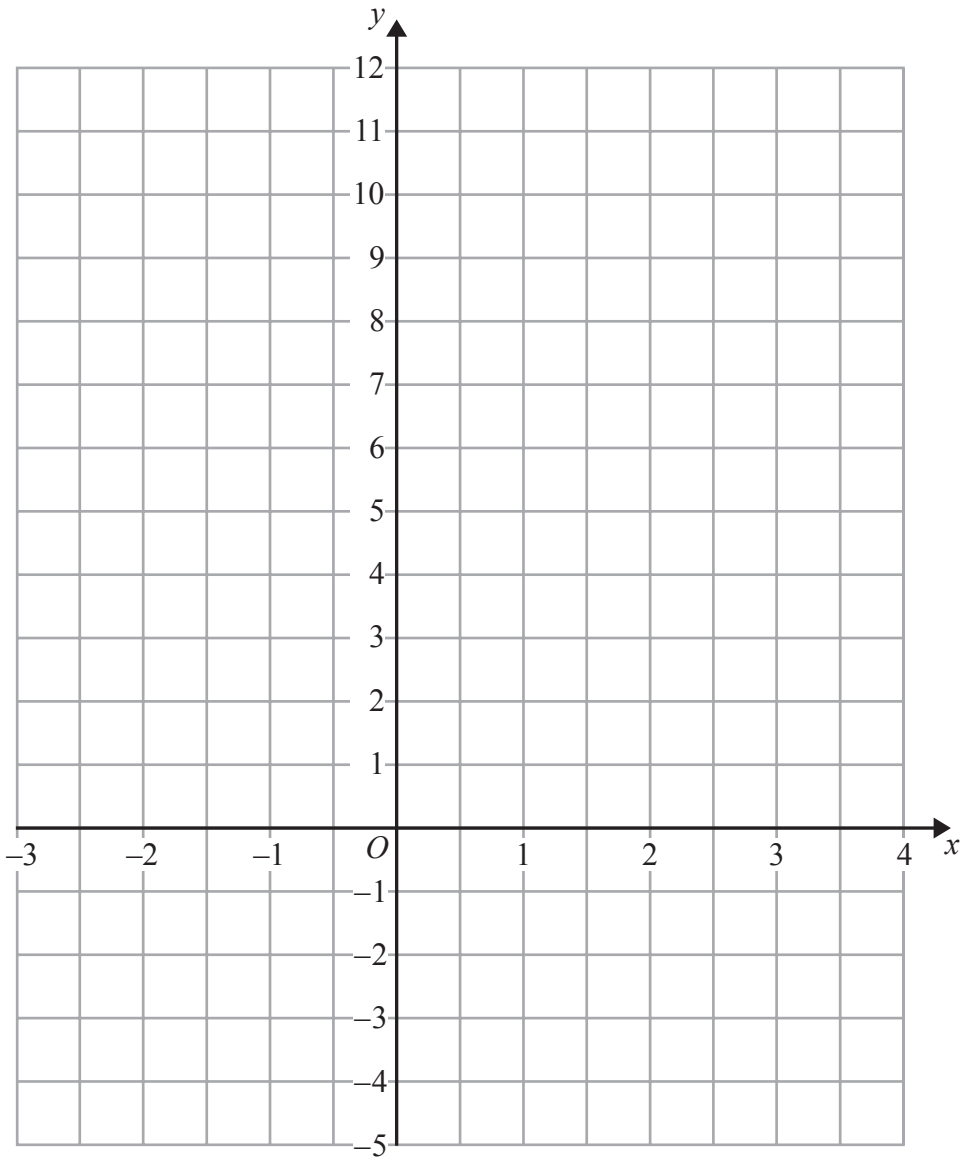
(b) Work out the value of Priya's investment at the end of one year.

..... rupees
(3)

(Total for Question 3 is 5 marks)

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4 (a) On the grid, draw the graph of $y = 3x + 2$ for values of x from –2 to 3



(3)

(b) Mark with a cross (×) a point on the grid that satisfies both the inequalities

$$x > 2 \text{ and } y > 3x + 2$$

Label this point P.

(2)

(Total for Question 4 is 5 marks)

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5 Jordan's school awards certificates for outstanding work.
The table shows information about the numbers of certificates awarded in Jordan's class during a term.

Number of certificates	Number of students
0	4
1	9
2	7
3	1
4	6
5	3

(a) Work out the median number of certificates awarded.

.....

(2)

(b) Work out the interquartile range of the numbers of certificates awarded.

.....

(3)

(Total for Question 5 is 5 marks)

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6 The table shows the probabilities of people in Wales being in blood group O or in blood group A or in blood group AB.

Blood group	Probability
O	0.44
A	0.42
B	
AB	0.04

All people in Wales are in exactly one of the blood groups O, A, B or AB.

A person is selected at random from the people in Wales.

(a) Find the probability that this person is in blood group B.

.....

(2)

(b) Find the probability that this person is in blood group O or A.

.....

(1)

There are 1200 students in Aled's school.
Aled's school is in Wales.

(c) Work out an estimate for the number of pupils in Aled's school who are in blood group AB.

.....

(2)

(Total for Question 6 is 5 marks)

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7 The diagram shows two points S and T.
The bearing of T from S is 043°

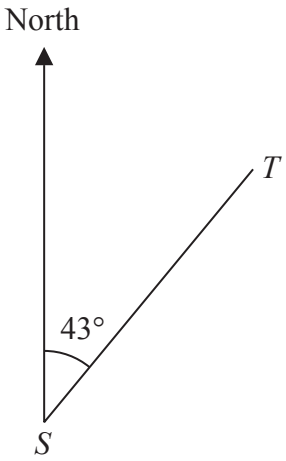


Diagram **NOT** accurately drawn

Work out the bearing of S from T.

..... °

(Total for Question 7 is 2 marks)

8 Flaky pastry is made using flour and fat in the ratio 9 : 7 by weight.
Cassie makes some flaky pastry.
She uses 175 grams of fat.

(a) Work out the weight of flour Cassie uses.

..... grams

(2)

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Sweet pastry is made using flour, fat and sugar in the ratio 27 : 14 : 9 by weight.
Luke makes some sweet pastry.
The total weight of flour, fat and sugar he uses is 400 grams.

(b) Work out the weight of flour Luke uses.

..... grams

(2)

Elisha makes some flaky pastry and some sweet pastry.
She uses the same weight of flour for the flaky pastry as she does for the sweet pastry.

(c) Work out the ratio of the weight of fat she uses in the flaky pastry to the weight of fat she uses in the sweet pastry.

.....

(2)

(Total for Question 8 is 6 marks)

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9 (a) Expand $5(2p - 3)$

.....

(1)

(b) Solve the inequality $9 - 2x < 3$

.....

(2)

(c) $y = x^3 - kx + 5$

Work out the value of k when $y = 6$ and $x = -2$

$k =$ .....

(3)

(d) Solve $\dfrac{1}{f + 2} = 3$

$f =$ .....

(2)

(Total for Question 9 is 8 marks)

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10

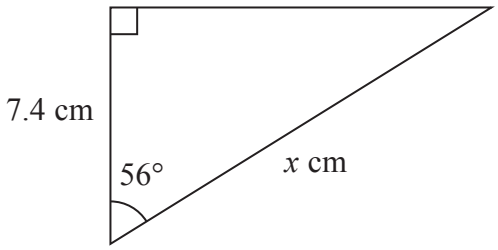


Diagram **NOT** accurately drawn

Work out the value of x.
Give your answer correct to 3 significant figures.

$x =$ .....

(Total for Question 10 is 3 marks)

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11

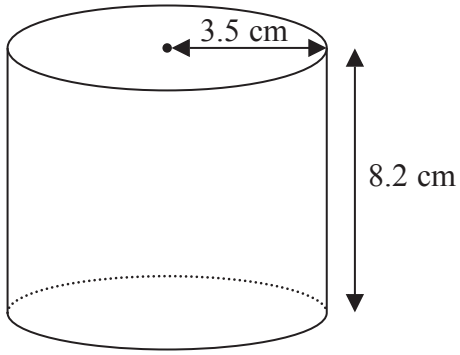


Diagram **NOT** accurately drawn

A solid cylinder has radius 3.5 cm and height 8.2 cm.

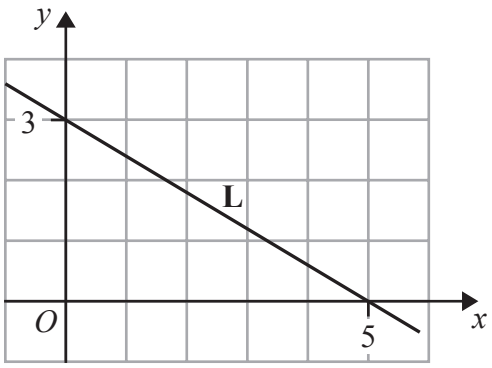
Work out the **total** surface area of the cylinder.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 11 is 3 marks)

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12 The straight line **L** is shown on the grid.



Find an equation of **L**.

.....

(Total for Question 12 is 3 marks)

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13 *PQRS* and *PLMN* are similar quadrilaterals.

PN = 12 cm, *NS* = 8 cm, *PL* = 9 cm and *RS* = 13.5 cm.

LM is parallel to *QR* and *MN* is parallel to *RS*.

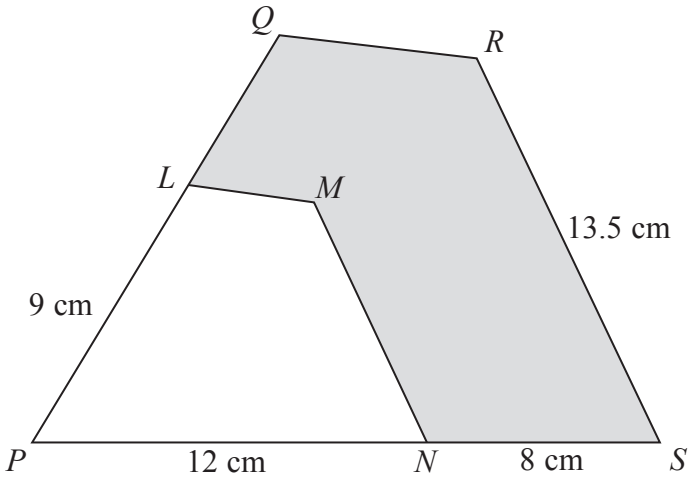


Diagram **NOT** accurately drawn

(a) Work out the length of *MN*.

..... cm

(2)

(b) Work out the length of *LQ*.

..... cm

(2)

The area of *PLMN* is A cm^2
The area of *PQRS* is kA cm^2

(c) Find the value of k.

k = ...

(1)

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The area of the shaded region is 105.6 cm^2

(d) Work out the value of A.

$A =$ .....

(3)

(Total for Question 13 is 8 marks)

14 V is inversely proportional to the square of t

$V = 28$ when $t = 2.5$

(a) Express V in terms of t

.....

(3)

(b) Work out the value of V when $t = 6.25$

$V =$ .....

(2)

(Total for Question 14 is 5 marks)

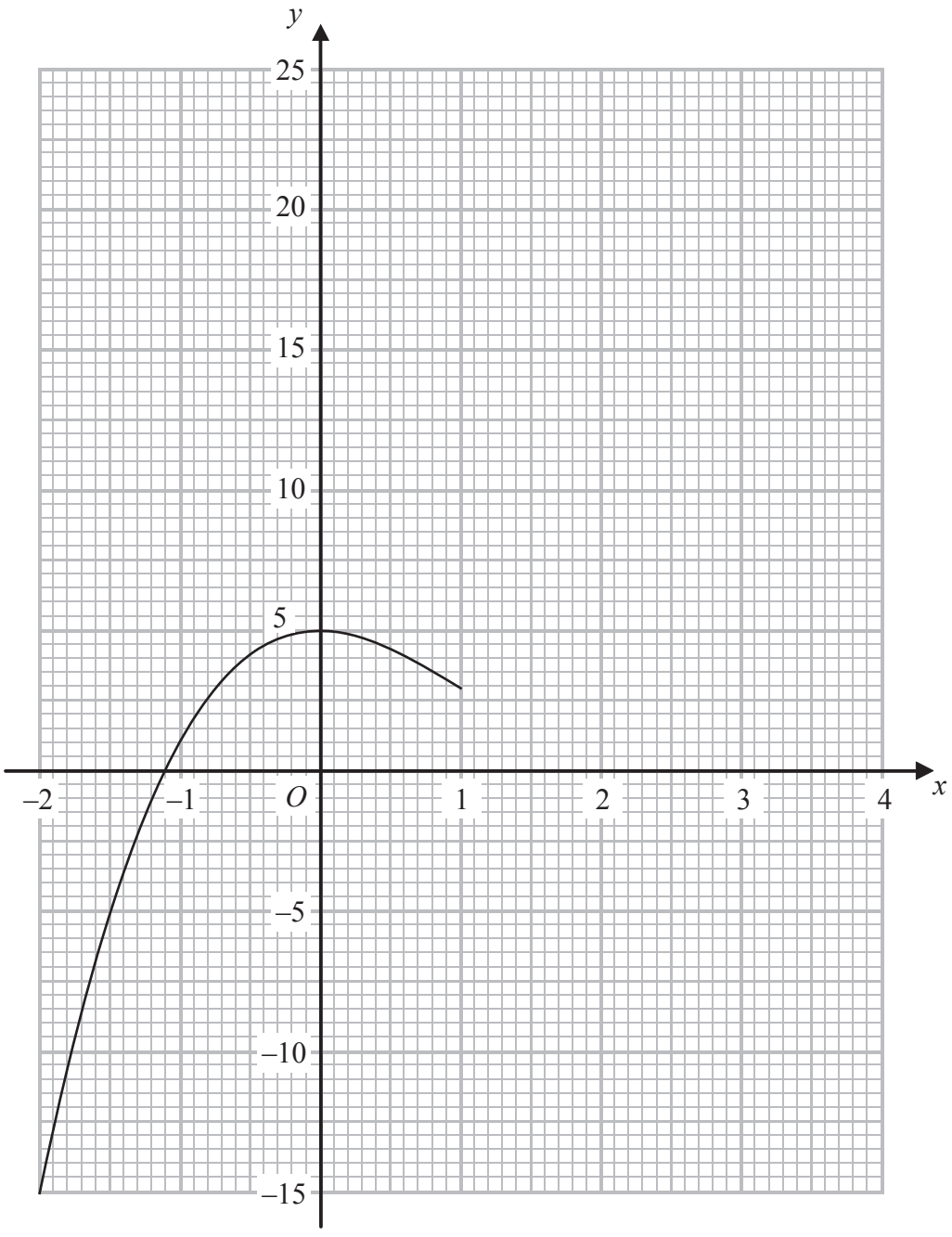
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15 (a) Complete the table of values for $y = x^3 - 3x^2 + 5$

x	–2	–1	0	1	2	3	4
y	–15	1	5	3			

(1)

(b) On the grid, complete the graph of $y = x^3 - 3x^2 + 5$ for $-2 \leqslant x \leqslant 4$



(1)

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(c) Use the graph to find an estimate for the solution of the equation $x^3 - 3x^2 + 5 = 0$

$x =$ .....

(1)

(d) By drawing a suitable straight line on the grid, find an estimate for the solution of the equation $x^3 - 3x^2 + 2x + 4 = 0$

$x =$ .....

(3)

(Total for Question 15 is 6 marks)

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16 When a fair dice is thrown the probability of scoring 6 is $\frac{1}{6}$

Arun throws four fair dice.

Work out the probability that he scores 6 with at least one of the four dice.

.....

(Total for Question 16 is 3 marks)

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17 *J*, *K*, *L* and *M* are points on the circumference of a circle.
GJH is the tangent to the circle at *J*.
MK and *JL* intersect at the point *P*.
GML is a straight line.

Angle *HJK* = 62°, angle *JKM* = 21° and angle *JGL* = 78°

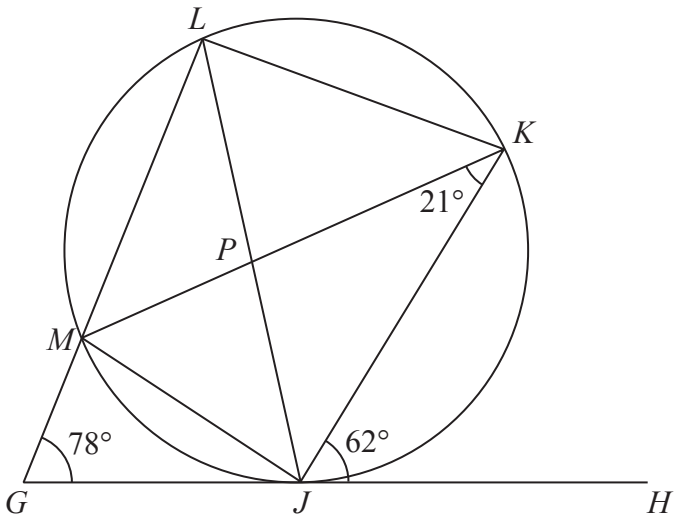


Diagram **NOT** accurately drawn

(a) Write down the size of angle *MLJ*.

.....°

(1)

(b) Write down the size of angle *JLK*.

.....°

(1)

(c) Work out the size of angle *KPL*.

.....°

(3)

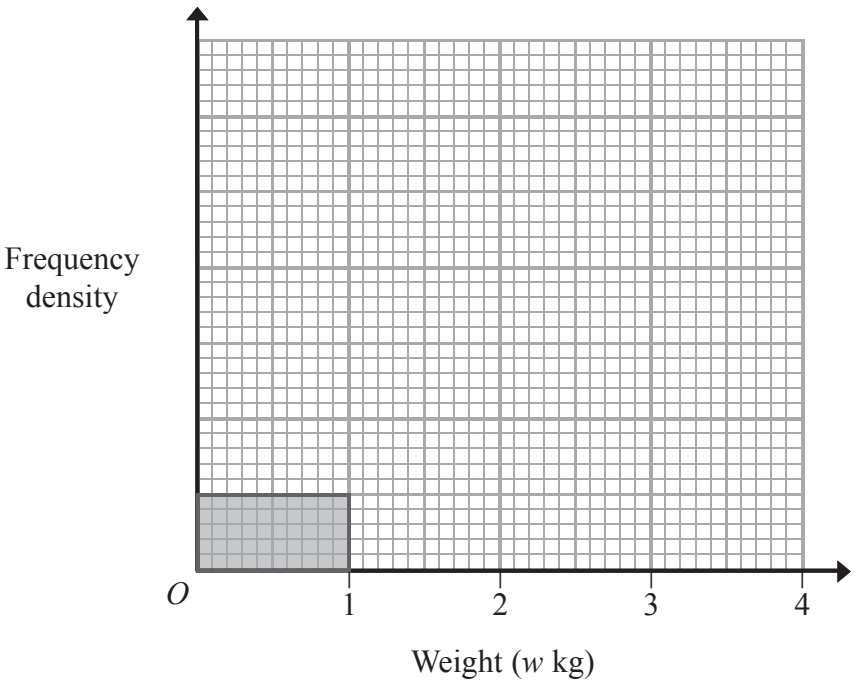
(Total for Question 17 is 5 marks)

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18 400 people are asked to guess the weight of a large cake.
The table shows information about the weights they guess.

Weight (w kg)	Number of guesses
$0 < w \leqslant 1$	50
$1 < w \leqslant 1.6$	90
$1.6 < w \leqslant 2$	120
$2 < w \leqslant 2.5$	95
$2.5 < w \leqslant 4$	45

Use the information in the table to complete the histogram.



(Total for Question 18 is 3 marks)

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19

$$\frac{1}{5^3} = 5^p \qquad 1 = 5^q \qquad \sqrt{5^3} = 5^r$$

(a) Write down the value of

(i) p

$p =$ .....

(ii) q

$q =$ .....

(iii) r

$r =$ .....

(3)

(b) Show that $\frac{14}{\sqrt{245}} = \frac{2\sqrt{5}}{5}$

You must write down each stage of your working.

(2)

$\left(e - 2\sqrt{3}\right)^2 = f - 20\sqrt{3}$ where e and f are integers.

(c) Find the value of e and the value of f

$e =$ .....

$f =$ .....

(3)

(Total for Question 19 is 8 marks)

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20

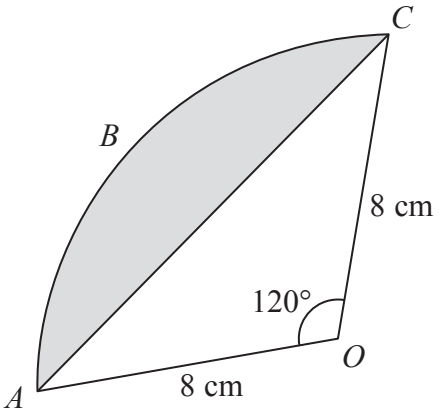


Diagram **NOT** accurately drawn

ABC is an arc of a circle with centre *O* and radius 8 cm.
AC is a chord of the circle.
Angle *AOC* = 120°

Calculate the perimeter of the shaded segment.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 20 is 5 marks)

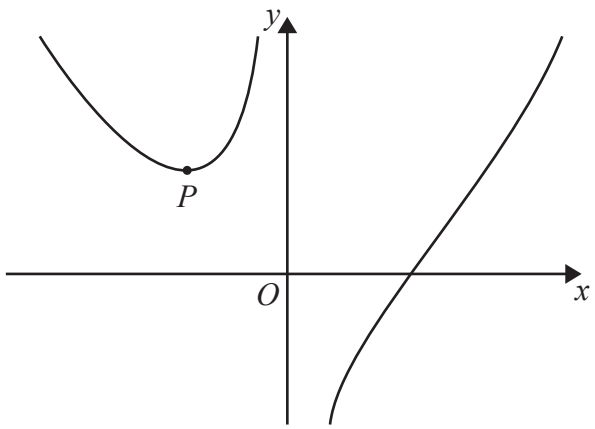
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21 $y = x^2 - \frac{16}{x}$

(a) Find $\frac{dy}{dx}$

$\frac{dy}{dx} =$ .....

(3)



The graph shows part of the curve with equation $y = x^2 - \frac{16}{x}$

The point P is the turning point of the curve.

(b) Work out the coordinates of P.

(..... , ...)

(4)

(Total for Question 21 is 7 marks)

TOTAL FOR PAPER IS 100 MARKS

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