Write your name here

Surname	Other names

Pearson Edexcel Certificate
Pearson Edexcel
International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics A

Paper 3H



Higher Tier

Friday 10 January 2014 – Morning
Time: 2 hours

Paper Reference
4MA0/3H
KMA0/3H

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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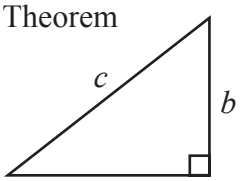
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P 4 2 9 4 0 A 0 1 2 0

PEARSON

International GCSE MATHEMATICS
FORMULAE SHEET – HIGHER TIER

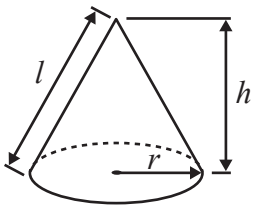
Pythagoras' Theorem



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

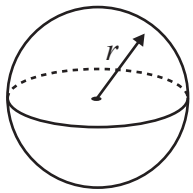
Volume of cone = $\frac{1}{3}\pi r^2 h$

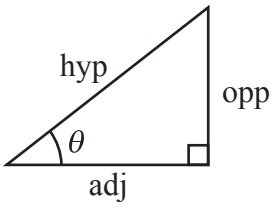
Curved surface area of cone = $\pi r l$



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

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





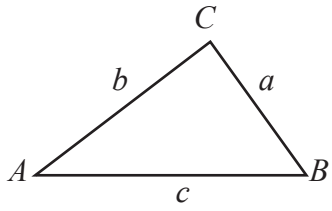
adj = hyp × cos θ
opp = hyp × sin θ
opp = adj × tan θ

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

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

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

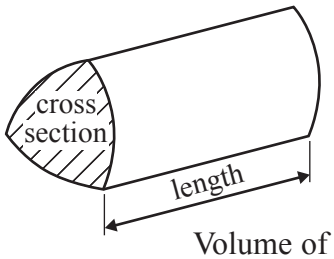
In any triangle ABC



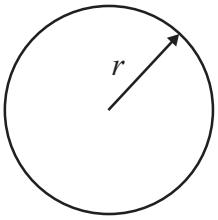
Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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



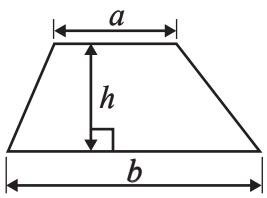
Volume of prism = area of cross section × length

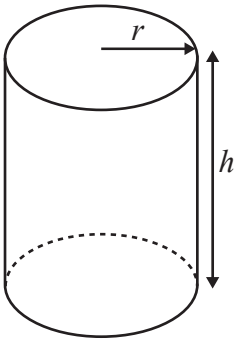


Circumference of circle = $2\pi r$

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

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

P 4 2 9 4 0 A 0 2 2 0

Answer ALL TWENTY ONE questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Here is a list of the ingredients needed to make leek and potato soup for 6 people.

Leek and Potato Soup
Ingredients for 6 people
900 ml chicken stock 900 ml water 750 g leeks 350 g potatoes 350 g onions

(a) Ainsley wants to make leek and potato soup for 13 people.

Work out the amount of chicken stock he needs.

..... ml

(2)

(b) Delia makes leek and potato soup for a group of people.
She uses 1250 g of leeks.

Work out the number of people in the group.

.....

(2)

(Total for Question 1 is 4 marks)

Do NOT write in this space.

2 A plane flew from Frankfurt to Hong Kong.
The flight time was 10 hours 45 minutes.
The average speed was 852 km/h.

Work out the distance the plane flew.

..... km

(Total for Question 2 is 3 marks)

3

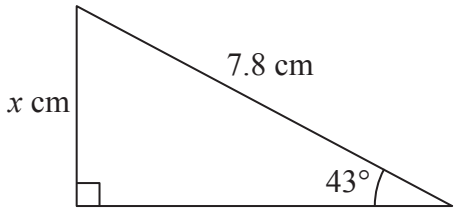


Diagram **NOT** accurately drawn

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

$x =$ .....

(Total for Question 3 is 3 marks)

Do NOT write in this space.

4 (a) Write $2^3 \times 2^4$ as a single power of 2

.....

(1)

(b) $280 = 2^n \times 5 \times 7$

Find the value of n.

$n =$ .....

(2)

(Total for Question 4 is 3 marks)

5 (a) Simplify $5c \times 4c$

.....

(1)

(b) Factorise $4x + x^2$

.....

(2)

(c) Work out the value of $y^3 + 5y$ when $y = 2$

.....

(2)

(Total for Question 5 is 5 marks)

6

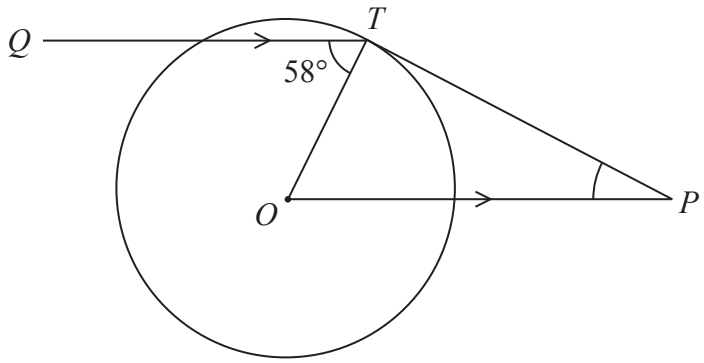


Diagram **NOT** accurately drawn

T is a point on a circle, centre *O*.
Q is a point such that angle *QTO* = 58°
P is the point such that *OP* is parallel to *QT* and *PT* is a tangent to the circle.

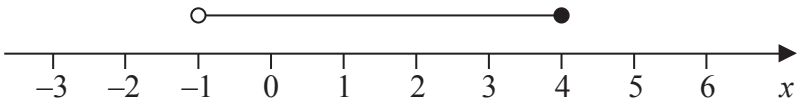
Work out the size of angle *OPT*.

.....°

(Total for Question 6 is 3 marks)

Do NOT write in this space.

7 (a)



An inequality is shown on the number line.

Write down this inequality.

.....

(2)

(b) (i) Solve the inequality $2(y - 3) \geqslant 1$

.....

(ii) Write down the lowest **integer** which satisfies this inequality.

.....

(4)

(Total for Question 7 is 6 marks)

Do NOT write in this space.

8 A box contains 80 tea bags.
The table shows information about the weight of each tea bag.



Weight (w grams)	Number of tea bags
$2.8 < w \leqslant 2.9$	2
$2.9 < w \leqslant 3.0$	4
$3.0 < w \leqslant 3.1$	22
$3.1 < w \leqslant 3.2$	32
$3.2 < w \leqslant 3.3$	14
$3.3 < w \leqslant 3.4$	6

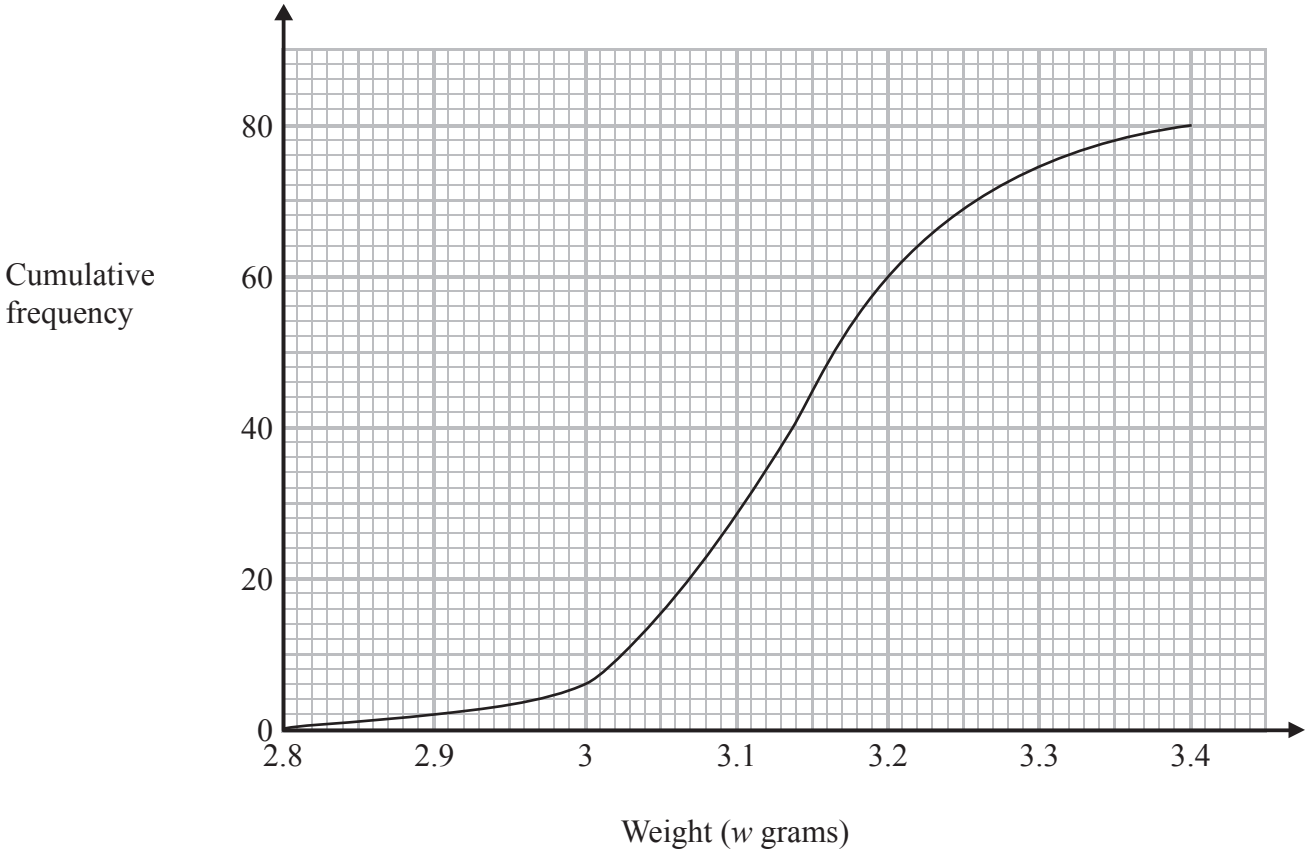
(a) Work out the percentage of the 80 tea bags that weigh more than 3.1 grams.

..... %
(2)

(b) Work out an estimate for the total weight of the 80 tea bags.
Use halfway values of 2.85 grams, 2.95 grams, ...

..... grams
(3)

Here is a cumulative frequency graph for the weights of the 80 tea bags.



(c) Use the graph to find an estimate for the number of tea bags which weighed more than 3.25 grams.

.....

(2)

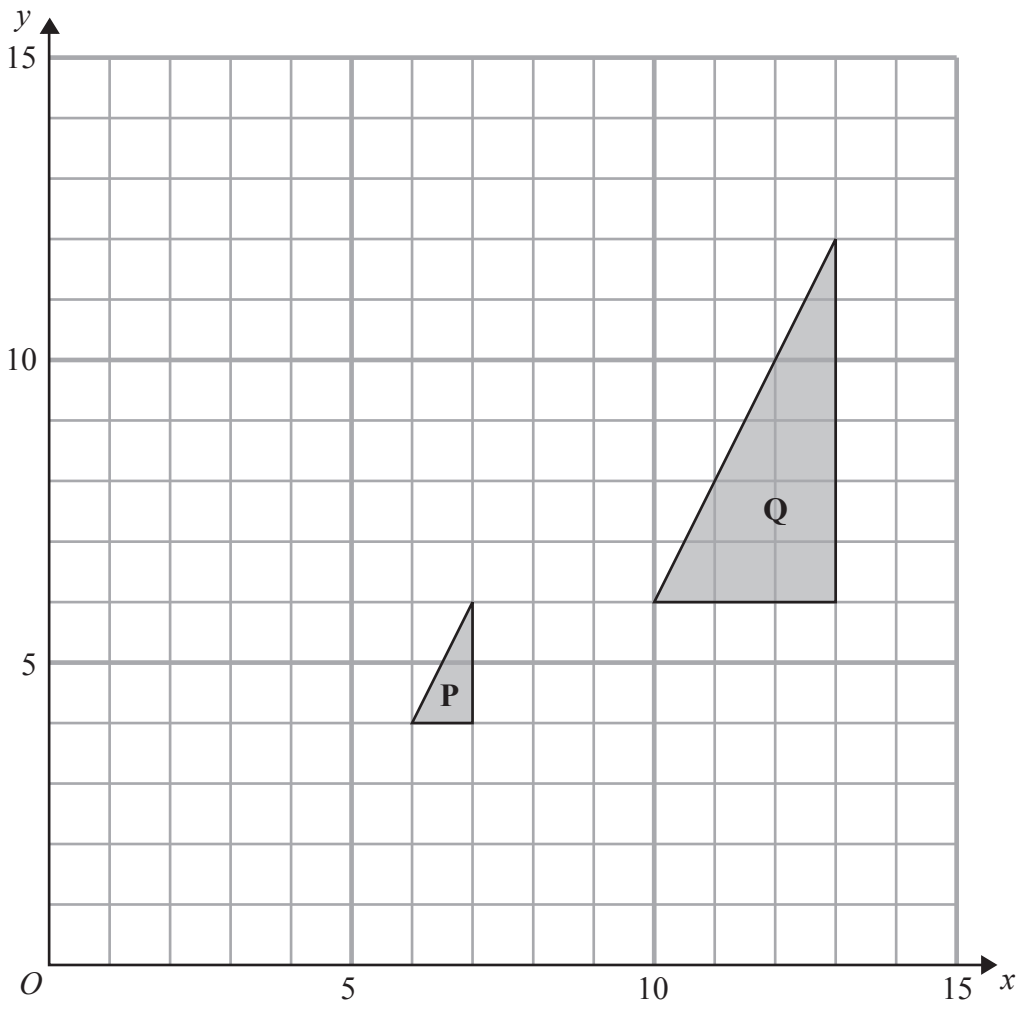
(d) Use the graph to find an estimate for the interquartile range of the weights of the tea bags.

..... grams

(2)

(Total for Question 8 is 9 marks)

9



(a) Describe fully the single transformation which maps triangle **P** onto triangle **Q**.

.....

.....

(3)

(b) On the grid, translate triangle **Q** by the vector $\begin{pmatrix} -8 \\ 2 \end{pmatrix}$

Label the new triangle **R**.

(1)

(c) Describe fully the single transformation which maps triangle **R** onto triangle **P**.

.....

.....

(2)

(Total for Question 9 is 6 marks)

10 Serena bought a car that had a value of $16 000
At the end of each year, the value of her car had depreciated by 15%.

Calculate the value of her car at the end of 3 years.

$.....

(Total for Question 10 is 3 marks)

11 Solve $\frac{6x-1}{4} - \frac{5-2x}{2} = 1$

Show clear algebraic working.

$x =$ .....

(Total for Question 11 is 4 marks)

12

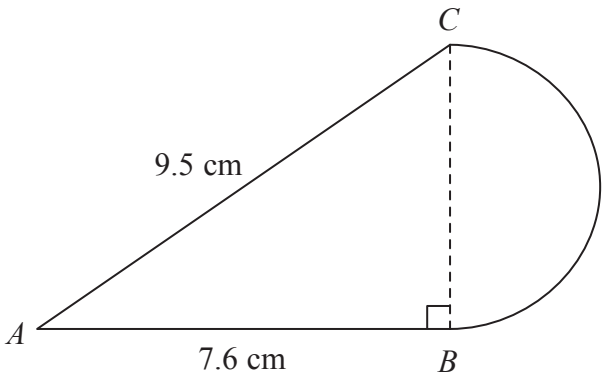


Diagram **NOT** accurately drawn

The diagram shows a shape made from triangle ABC and a semicircle with diameter BC.
Triangle ABC is right-angled at B.
$AB = 7.6$ cm and $AC = 9.5$ cm.

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

..... cm^2

(Total for Question 12 is 5 marks)

13 A box contains 20 nails.
The table shows information about the length of each nail.

Length of nail (mm)	25	30	40	50	60
Number of nails	1	8	4	5	2



(a) Viraj takes at random one nail from the box.

Find the probability that the length of the nail he takes is

(i) 50 mm or 60 mm,

.....

(ii) less than 35 mm.

.....

(4)

(b) Jamila puts all 20 nails into a bag.
She takes at random one of the nails and records its length.
She replaces the nail in the bag.
She then takes at random a second nail from the bag and records its length.

Calculate the probability that the two nails she takes

(i) each have a length of 60 mm,

.....

(ii) have a total length of 80 mm.

.....

(5)

(Total for Question 13 is 9 marks)

14 D is directly proportional to t^2
When $t = 4$, $D = 8$

(a) Find a formula for D in terms of t.

.....

(3)

(b) Find the positive value of t when $D = 50$

$t =$ .....

(2)

(Total for Question 14 is 5 marks)

15

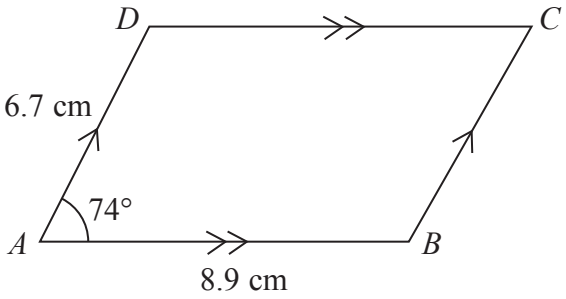


Diagram **NOT** accurately drawn

$ABCD$ is a parallelogram.
$AB = 8.9$ cm.
$AD = 6.7$ cm.
Angle $BAD = 74°$

Calculate the area of parallelogram $ABCD$.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 15 is 3 marks)

16 Given that y is positive, make y the subject of $y = \sqrt{ay^2 + n}$

Show clear algebraic working.

$y =$ .....

(Total for Question 16 is 5 marks)

17 Given that $(5 - \sqrt{x})^2 = y - 20\sqrt{2}$ where x and y are positive integers, find the value of x and the value of y.

$x =$ .....

$y =$ .....

(Total for Question 17 is 3 marks)

18 (a) $x = 9 \times 10^{2m}$ where m is an integer.

Find, in standard form, an expression for $\sqrt{x}$

.....

(2)

(b) $y = 9 \times 10^{2n}$ where n is an integer.

Find, in standard form, an expression for $y^{\frac{3}{2}}$

Give your answer as simply as possible.

.....

(3)

(Total for Question 18 is 5 marks)

19 Factorise completely $(12x - y)^2 - (4x - 3y)^2$

.....

(Total for Question 19 is 2 marks)

20 f is the function $f(x) = 2x + 5$

(a) Find f(3)

.....

(1)

(b) Express the inverse function f^{-1} in the form $f^{-1}(x) =$

$f^{-1}(x) =$.....

(2)

g is the function $g(x) = x^2 - 25$

(c) Find g(−3)

.....

(1)

(d) (i) Find $gf(x)$
Give your answer as simply as possible.

$gf(x) =$ .....

(ii) Solve $gf(x) = 0$

.....

(5)

(Total for Question 20 is 9 marks)

21

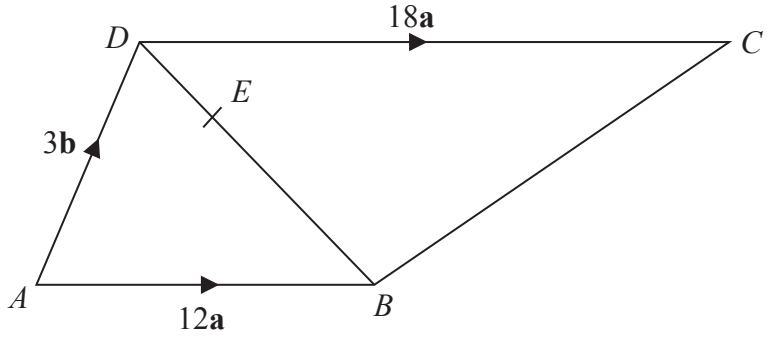


Diagram **NOT** accurately drawn

ABCD is a trapezium.
AB is parallel to *DC*.

$\overrightarrow{AB} = 12\mathbf{a}$

$\overrightarrow{AD} = 3\mathbf{b}$

$\overrightarrow{DC} = 18\mathbf{a}$

E is the point on the diagonal *DB* such that $DE = \frac{1}{3}DB$.

(a) Find, in terms of **a** and **b**,

(i) $\overrightarrow{DB}$

.....

(ii) $\overrightarrow{DE}$

.....

(iii) $\overrightarrow{AE}$

.....

(3)

(b) Show by a vector method that BC is parallel to AE.

(2)

(Total for Question 21 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

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