Please check the examination details below before entering your candidate information

| Candidate surname | Other names |
|---|---|
| | |

**Pearson Edexcel International GCSE**

Centre Number | | | | | |

Candidate Number | | | | |

# Tuesday 15 January 2019

Morning (Time: 2 hours) | Paper Reference **4MA1/2HR**

# Mathematics A

**Level 1/2**
**Paper 2HR**
**Higher Tier**

**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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P 5 9 0 2 4 A 0 1 2 4

Pearson

**International GCSE Mathematics**

**Formulae sheet – Higher Tier**

**Arithmetic series**

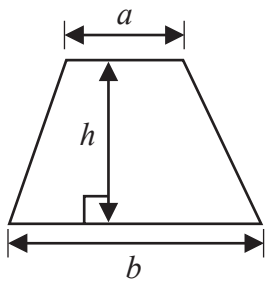
Sum to $n$ terms, $S_n = \frac{n}{2}[2a + (n-1)d]$

**The quadratic equation**

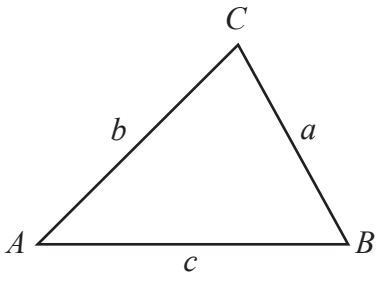
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by:

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

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




**Trigonometry**




**In any triangle** ***ABC***

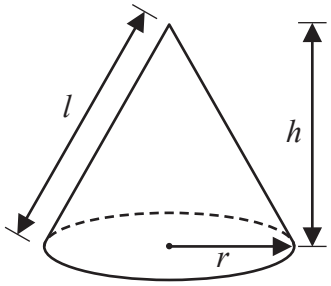
**Sine Rule** $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule** $a^2 = b^2 + c^2 - 2bc\cos A$

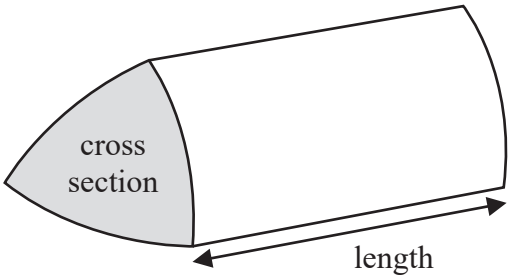
**Area of triangle** $= \frac{1}{2}ab\sin C$

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

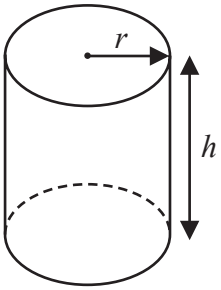
**Curved surface area of cone** $= \pi rl$




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

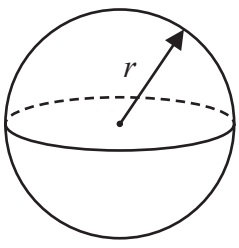



**Volume of cylinder** $= \pi r^2 h$
**Curved surface area of cylinder** $= 2\pi rh$




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

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



**Answer ALL TWENTY THREE questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

**1** The table gives information about the number of days that 100 cars were in an airport car park.

| Number of days ($d$) | Frequency |
|---|---|
| $0 < d \leqslant 4$ | 16 |
| $4 < d \leqslant 8$ | 18 |
| $8 < d \leqslant 12$ | 19 |
| $12 < d \leqslant 16$ | 27 |
| $16 < d \leqslant 20$ | 20 |

(a) Write down the modal class.

.....

**(1)**

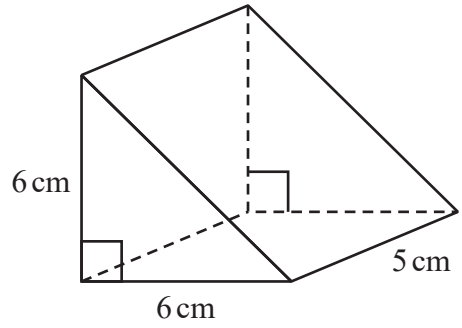
(b) Work out an estimate for the mean number of days.

..... days

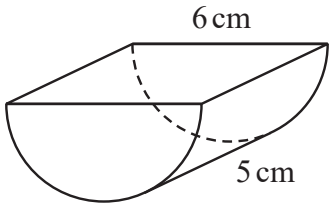
**(4)**

**(Total for Question 1 is 5 marks)**

**2** The diagram shows two solid toy bricks, Brick **A** and Brick **B**.




Brick **A**




Brick **B**

Diagram **NOT** accurately drawn

Brick **A** is a triangular prism of length 5 cm.
The cross section of Brick **A** is an isosceles right-angled triangle with equal sides of length 6 cm.

Brick **B** is half a cylinder of length 5 cm.
The semicircular cross section of Brick **B** has diameter 6 cm.

The volume of Brick **A** is greater than the volume of Brick **B**.

How much greater?
Give your answer correct to 1 decimal place.

..... $cm^3$

**(Total for Question 2 is 4 marks)**

**3** Here are the first five terms of a number sequence $S$.

10 16 22 28 34

(a) Find an expression, in terms of $n$, for the $n$th term of this sequence.

.....

**(2)**

The $n$th term of a sequence $T$ is given by $n^2 - 3$

There are numbers that are terms in both the sequence $S$ and the sequence $T$.

(b) Find one of these numbers.

.....

**(2)**

**(Total for Question 3 is 4 marks)**

**4** On Saturday, Jacob walked 10 800 steps.
On Sunday, he walked 7% more steps than on Saturday.

Work out how many steps Jacob walked on Sunday.

.....

**(Total for Question 4 is 3 marks)**

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**5** The scale drawing shows the position of a hall and the position of a library.


Scale: 1 cm represents 20 metres

A post box is 140 metres from the library on a bearing of 220°

(a) Show the position of the post box on the scale drawing.
Mark the position with a cross (×) and label it *P*.

**(2)**

(b) Use your scale drawing to find

(i) the real distance, in metres, of the hall from the post box,

..... m

(ii) the bearing of the hall from the post box.

..... °

**(2)**

**(Total for Question 5 is 4 marks)**

**6**

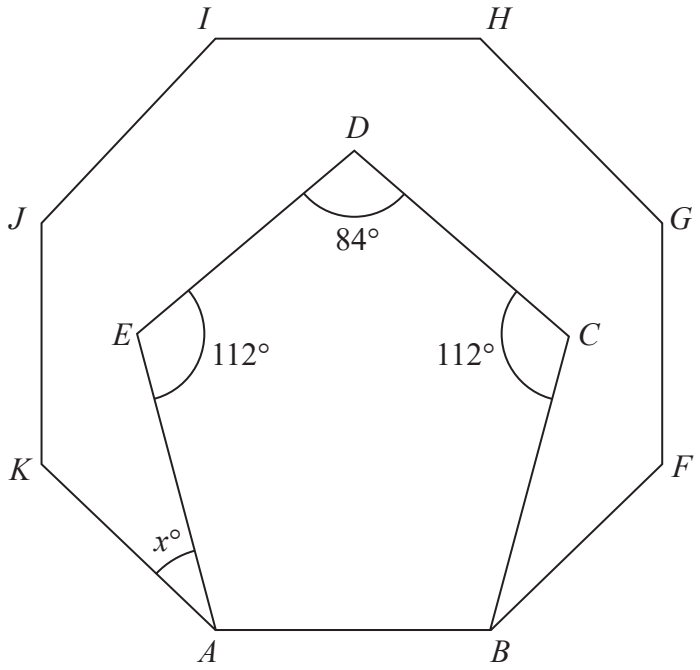


Diagram **NOT** accurately drawn

Pentagon *ABCDE* is drawn inside the regular octagon *ABFGHIJK*.
The pentagon has exactly one line of symmetry.

Work out the value of $x$.

$x =$ .....

**(Total for Question 6 is 4 marks)**

**7** The diagram shows a trapezium.

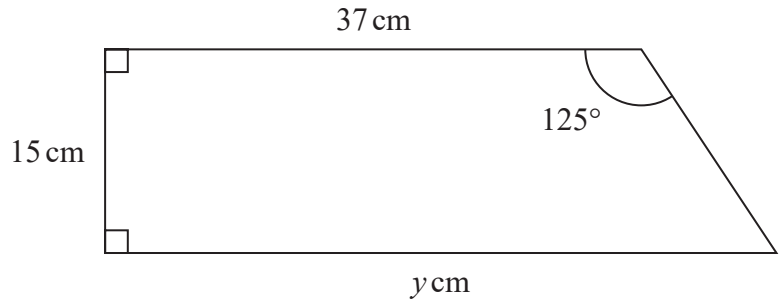


Diagram **NOT** accurately drawn

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

$y =$ .....

**(Total for Question 7 is 4 marks)**

**8** (a) Simplify fully $\dfrac{15k^4m^3}{5km^2}$

.....

**(2)**

(b) Solve the inequality $7 < 4x - 1 \leqslant 17$

.....

**(3)**

**(Total for Question 8 is 5 marks)**

**9** Omar invests 6000 dirham for 4 years in a savings account.
He will get 1.5% per year compound interest.

Work out the total amount of interest Omar will have received by the end of 4 years.
Give your answer correct to the nearest dirham.

..... dirham

**(Total for Question 9 is 3 marks)**

**10** (a) Simplify fully $\left(16x^8y^6\right)^{\frac{1}{2}}$

.....

**(2)**

(b) Solve $\frac{8-2x}{3}-\frac{2x-3}{2}=4$

Show clear algebraic working.

$x =$ .....

**(3)**

(c) Make $f$ the subject of $m=\sqrt{\frac{1}{3}ef}$

.....

**(2)**

**(Total for Question 10 is 7 marks)**

**11** The straight line $\mathbf{L}_1$ has equation $x + 2y = 4$
The straight line $\mathbf{L}_2$ passes through the points $(-1, -7)$ and $(7, 9)$

Michael says that the lines $\mathbf{L}_1$ and $\mathbf{L}_2$ are perpendicular.

Is Michael correct?
You must show clearly how you get your answer.

**(Total for Question 11 is 3 marks)**

**12** Freddie recorded the number of runs he scored in each of 11 cricket matches.
Here are his results.

4 0 21 32 51 6 102 69 17 9 42

Find the interquartile range of his results.

.....

**(Total for Question 12 is 3 marks)**

**13** Carlos, Flavia and Tazia shared £861 between themselves.

The amount of money Flavia got is 65% of the amount of money Carlos got.
The amount of money Tazia got is 22% **more** than the amount of money Carlos got.

Work out how much money Carlos got.

£.....

**(Total for Question 13 is 3 marks)**

**14** (a) Given that $a = 3^x$ and $b = 3^y$

express in terms of $a$ or $b$ or $a$ and $b$,

(i) $3^{2x}$

.....

(ii) $3^{x+4y}$

.....

(iii) $3^{y-1}$

.....

**(3)**

$a = 3^x$ and $b = 3^y$

$ab = 2187$

$a^2b = 177\,147$

(b) Work out the value of $x$ and the value of $y$.
Show your working clearly.

$x =$.....

$y =$.....

**(3)**

**(Total for Question 14 is 6 marks)**

**15** Barney has a biased coin.

When the coin is thrown once, the probability that the coin will land heads is 0.3

Barney throws the coin 4 times.

(a) Work out the probability that the coin will land heads exactly 3 times.

.....

**(3)**

(b) Work out the probability that the coin will land heads at least once.

.....

**(2)**

**(Total for Question 15 is 5 marks)**

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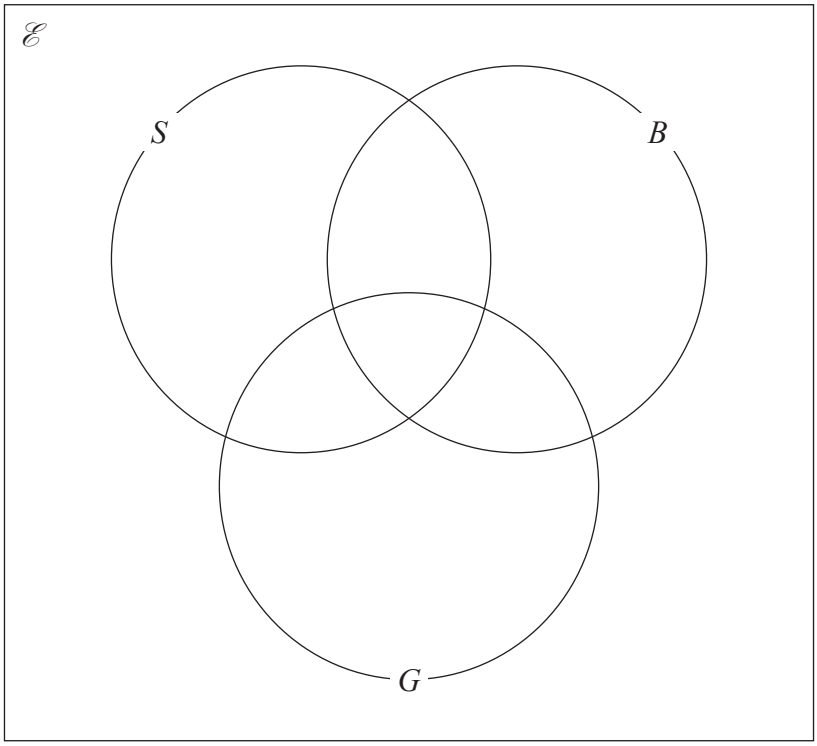
**16** 120 people who visited a sports centre were asked if they went swimming ($S$), played basketball ($B$) or used the gym ($G$).

Their answers showed that

28 people went swimming
16 people played basketball
27 people used the gym
3 people went swimming and played basketball
5 people played basketball and used the gym
7 people went swimming and used the gym
2 people went swimming, played basketball and used the gym

(a) Using this information, complete the Venn diagram to show the number of people in each region of the Venn diagram.




**(3)**

One of the people who went swimming is chosen at random.

(b) Find the probability that this person also played basketball.

.....

**(1)**

**(Total for Question 16 is 4 marks)**

**17** $P = ef$

$e = 4.8$ correct to 2 significant figures.
$f = 0.26$ correct to 2 significant figures.

(a) Work out the lower bound for the value of $P$.
Show your working clearly.
Give your answer correct to 3 significant figures.

.....

**(2)**

$$Q = \frac{t}{w}$$

$t = 2.73$ correct to 3 significant figures.
$w = 0.04$ correct to 1 significant figure.

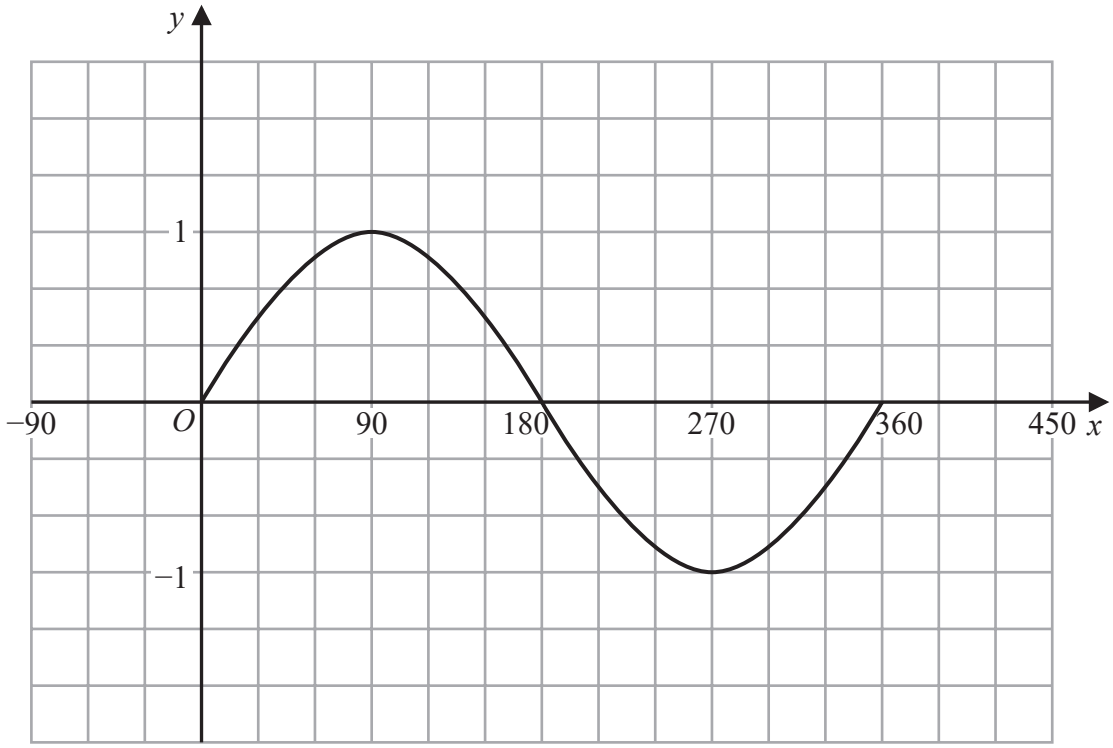
(b) Work out the upper bound for the value of $Q$.
Show your working clearly.
Give your answer correct to 2 significant figures.

.....

**(2)**

**(Total for Question 17 is 4 marks)**

**18** Here is the graph of $y = \sin x°$ for $0 \leqslant x \leqslant 360$




(a) On the grid above, sketch the graph of $y = \sin(x + 90)°$ for $0 \leqslant x \leqslant 360$

**(2)**

In $0 \leqslant x \leqslant 360$, the graph of $y = \sin\left(\frac{x}{2}\right)° + 3$ has a maximum at the point $A$.

(b) Write down the coordinates of $A$.

(..... , .....)

**(2)**

**(Total for Question 18 is 4 marks)**

**19** *ABCD* is a quadrilateral.

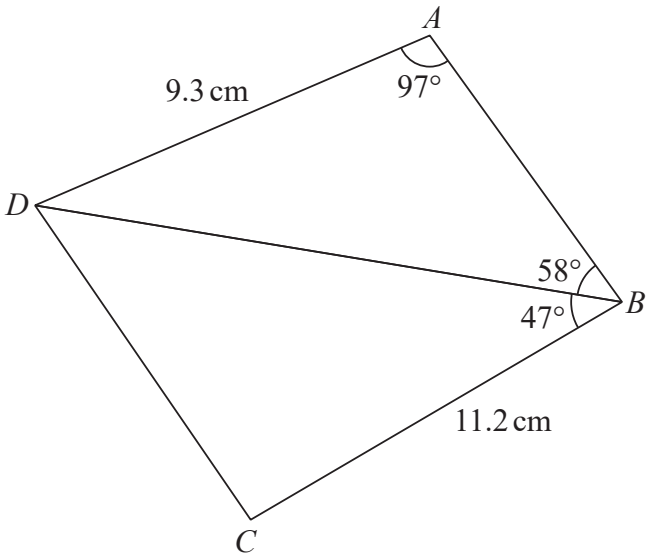



Diagram **NOT** accurately drawn

Find the area of quadrilateral *ABCD*.
Give your answer correct to 3 significant figures.

..... $cm^2$

**(Total for Question 19 is 5 marks)**

**20** (a) Write $3x^2 - 12x + 7$ in the form $a(x + b)^2 + c$

.....

**(3)**

The line **L** is the line of symmetry of the curve with equation $y = 3x^2 - 12x + 7$

(b) Using your answer to part (a) or otherwise, write down an equation of **L**.

.....

**(1)**

**(Total for Question 20 is 4 marks)**

**21** The curve with equation $y = (10x - 3)(x + 1)$ and the line with equation $y - 6x = 0$ intersect at the points $A$ and $B$.

Find the coordinates of the midpoint of $AB$.
Show your working clearly.

(..... , .....)

**(Total for Question 21 is 6 marks)**

**22**

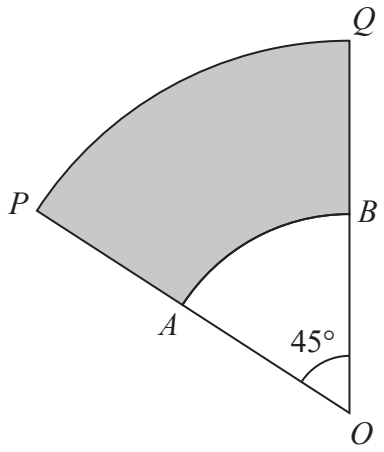



Diagram **NOT** accurately drawn

*OPQ* is a sector of a circle, centre *O*
*OAB* is a sector of a circle, centre *O*

*A* is the point on *OP* such that $OA : AP = 3 : 2$
*B* is the point on *OQ* such that $OB : BQ = 3 : 2$
Angle $POQ = 45°$

The area of the shaded region is $\frac{81}{2}\pi$ cm$^2$

Work out the perimeter of the shaded region.
Give your answer in terms of $\pi$.

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..... cm

**(Total for Question 22 is 6 marks)**

**Turn over for Question 23**

**23** The 10th term of an arithmetic series, $S$, is 66
The sum of the first 20 terms of $S$ is 1290

Find the 5th term of $S$.
Show your working clearly.

.....

**(Total for Question 23 is 4 marks)**

**TOTAL FOR PAPER IS 100 MARKS**