

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

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## Pearson Edexcel Level 1/Level 2 GCSE (9–1)

**Friday 19 May 2023**

Morning (Time: 1 hour 30 minutes)

Paper  
reference

**1MA1/1H**

### Mathematics PAPER 1 (Non-Calculator) Higher Tier



**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, Formulae Sheet (enclosed). 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.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**

### Information

- The total mark for this paper is 80
- 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.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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**Answer ALL questions.**

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

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

- 1** Work out  $8.46 \div 0.15$

(Total for Question 1 is 3 marks)

- 2** Work out  $7\frac{3}{8} - 2\frac{1}{2}$

Give your answer as a mixed number.

(Total for Question 2 is 3 marks)



- 3 A cube has a total surface area of  $150 \text{ cm}^2$

Work out the volume of the cube.

.....  $\text{cm}^3$

(Total for Question 3 is 4 marks)

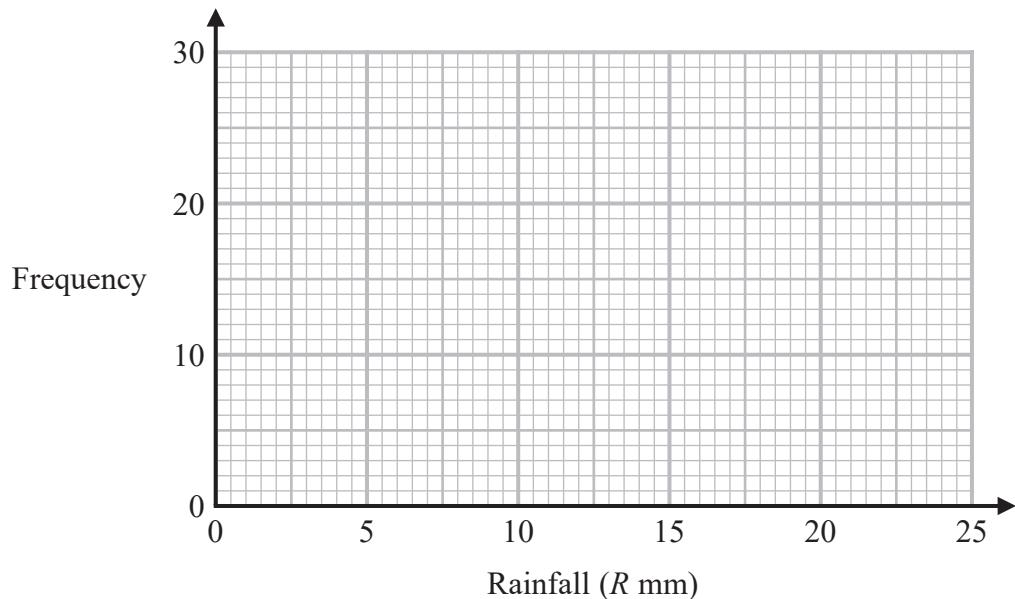


P 7 5 1 4 8 A 0 3 2 4

- 4 The table shows information about the daily rainfall in a town for 60 days.

Rainfall ( $R$ mm)	Frequency
$0 \leq R < 5$	8
$5 \leq R < 10$	24
$10 \leq R < 15$	13
$15 \leq R < 20$	11
$20 \leq R < 25$	4

Draw a frequency polygon for this information.

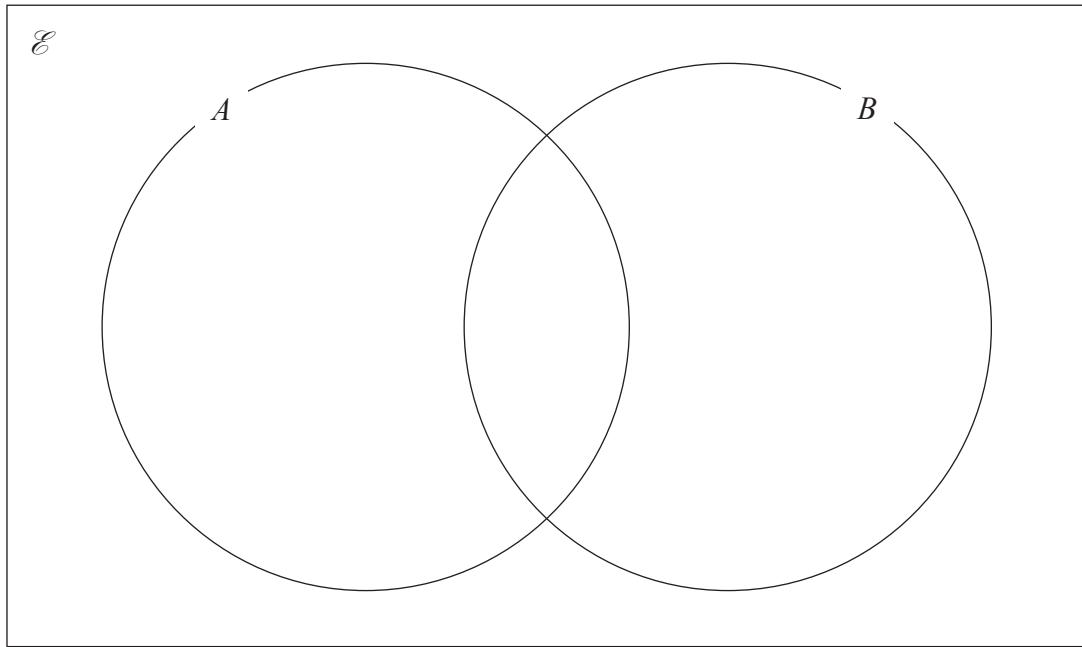


(Total for Question 4 is 2 marks)



- 5  $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$   
 $A = \{\text{odd numbers}\}$   
 $B = \{\text{square numbers}\}$

(a) Complete the Venn diagram for this information.



(3)

A number is chosen at random from the universal set  $\mathcal{E}$

(b) Find the probability that this number is in the set  $B'$

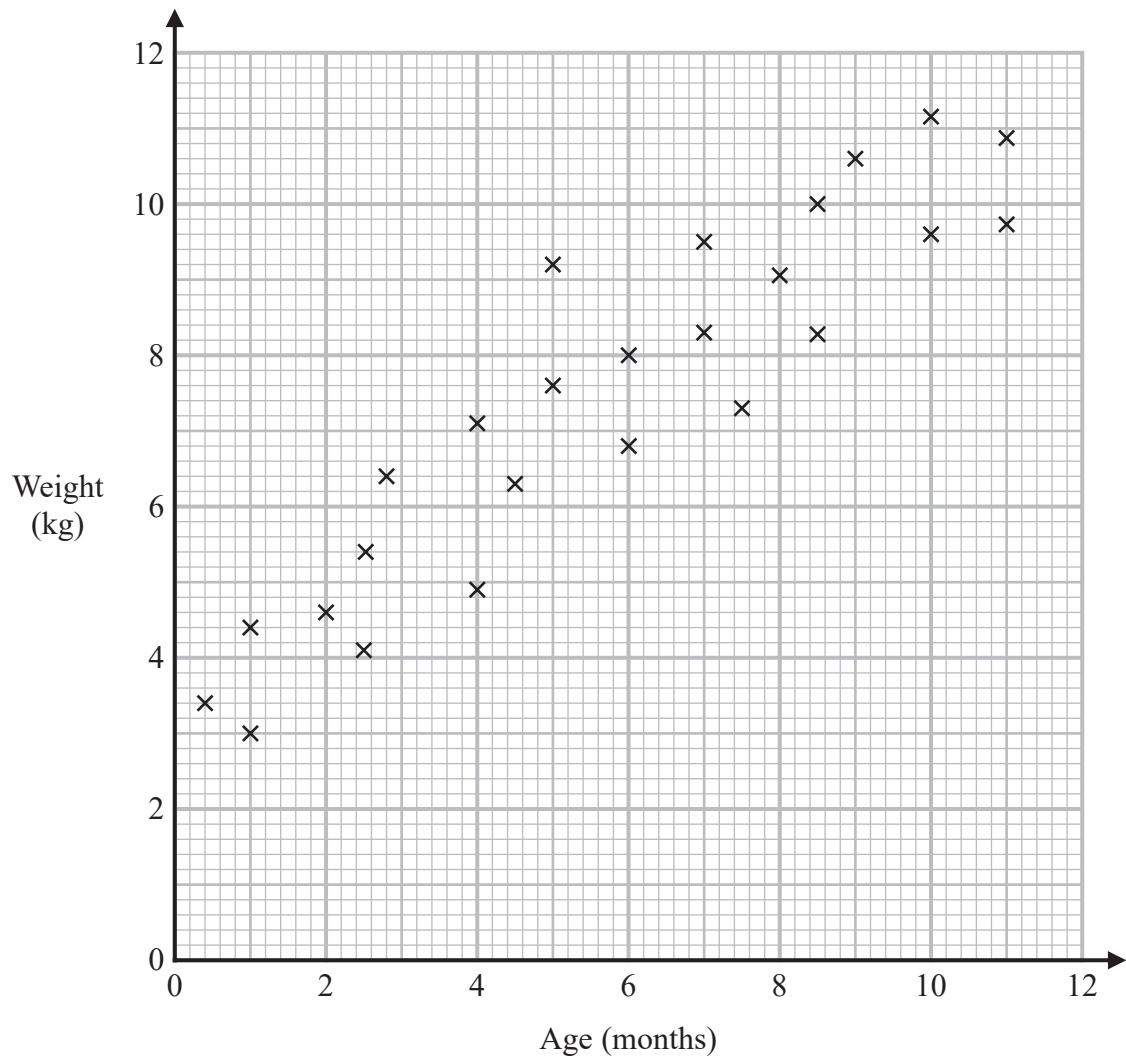
.....  
(2)

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



P 7 5 1 4 8 A 0 5 2 4

- 6 The scatter graph shows information about the ages and weights of some babies.



- (a) Describe the relationship between the age and the weight of the babies.

(1)

Another baby has a weight of 5.8 kg

- (b) Using the scatter graph, find an estimate for the age of this baby.

..... months

(2)

(Total for Question 6 is 3 marks)



- 7 The price of a holiday increases by 20%  
This 20% increase adds £240 to the price of the holiday.

Work out the price of the holiday before the increase.

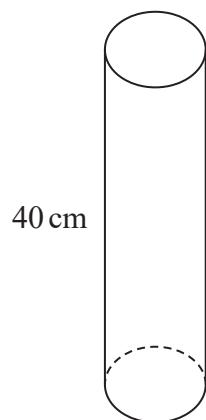
£.....

(Total for Question 7 is 2 marks)



P 7 5 1 4 8 A 0 7 2 4

- 8 The diagram shows a solid cylinder on a horizontal floor.



$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The cylinder has a

volume of  $1200\text{ cm}^3$   
height of 40 cm.

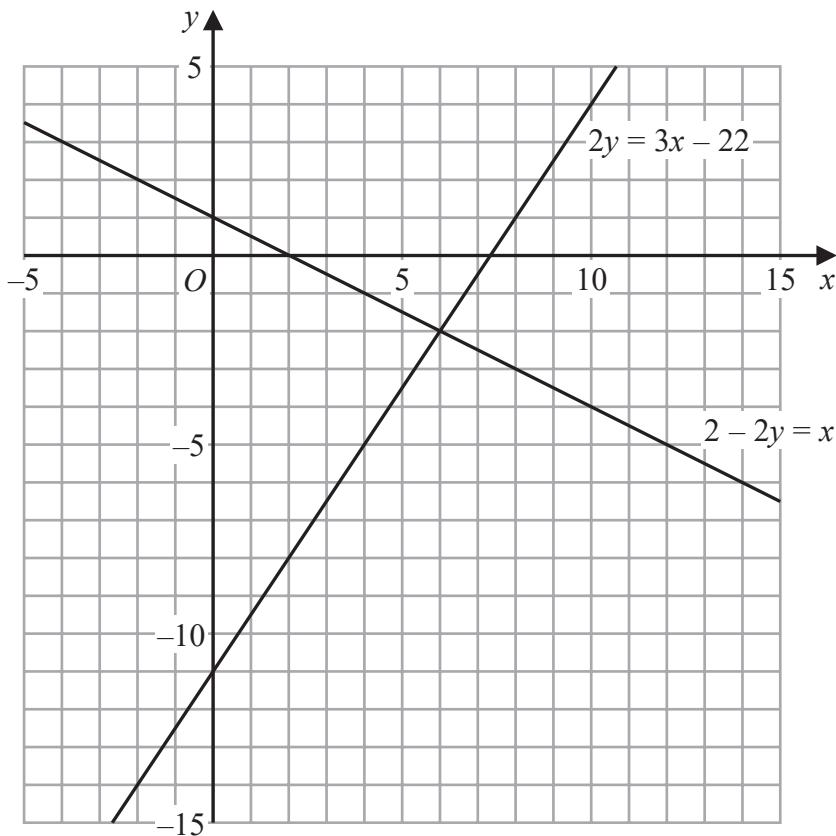
The cylinder exerts a force of 90 newtons on the floor.

Work out the pressure on the floor due to the cylinder.

..... newtons/ $\text{cm}^2$

(Total for Question 8 is 3 marks)



**9**

Use these graphs to solve the simultaneous equations

$$\begin{aligned}2 - 2y &= x \\2y &= 3x - 22\end{aligned}$$

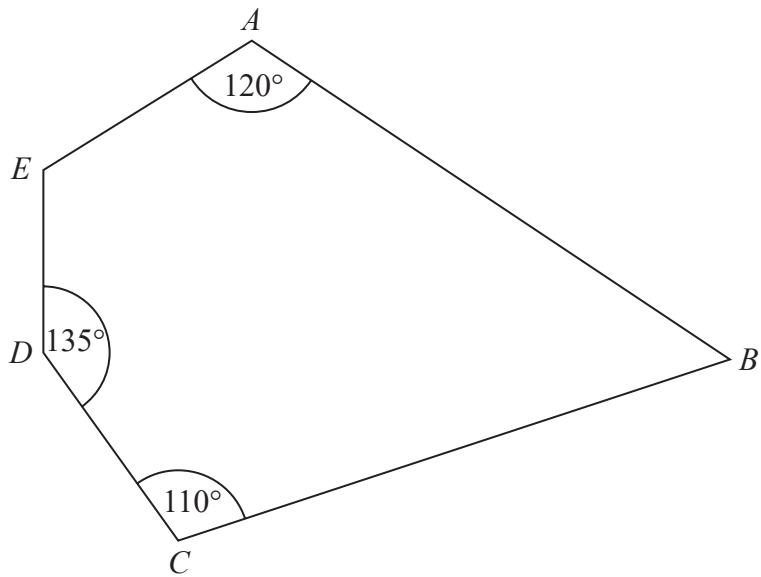
$$x = \dots$$

$$y = \dots$$

**(Total for Question 9 is 1 mark)**



**10** Here is a pentagon.



$$\text{Angle } AED = 4 \times \text{angle } ABC$$

Work out the size of angle  $AED$ .  
You must show all your working.

**(Total for Question 10 is 4 marks)**



11 Write  $\frac{(6x^5y^3)^2}{3x^2y^7 \times 4xy^{-3}}$  in the form  $ax^b y^c$  where  $a$ ,  $b$  and  $c$  are integers.

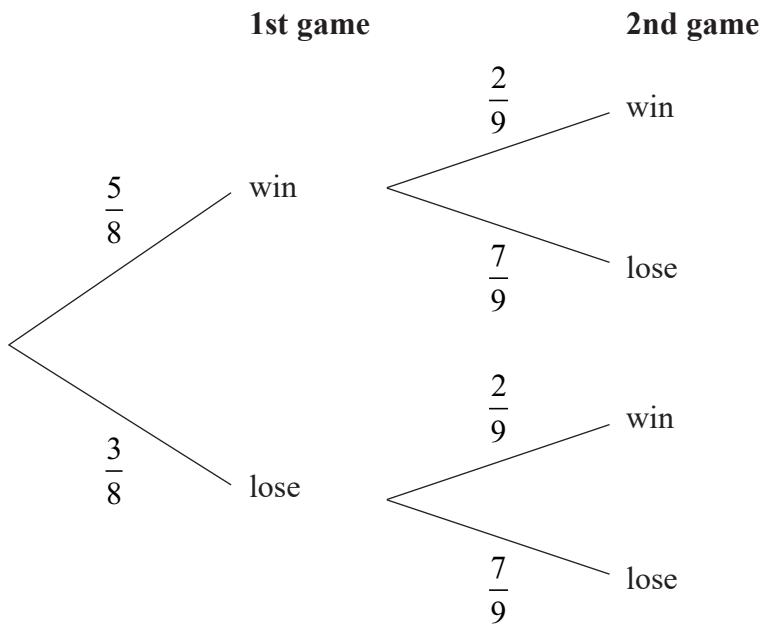
(Total for Question 11 is 3 marks)



P 7 5 1 4 8 A 0 1 1 2 4

**12** Martha plays a game twice.

The probability tree diagram shows the probabilities that Martha will win or lose each game.



Find the probability that Martha will lose at least one game.

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



13  $y$  is directly proportional to  $x$ .

$$y = 24 \text{ when } x = 1.5$$

Work out the value of  $y$  when  $x = 5$

$$y = \dots$$

(Total for Question 13 is 3 marks)

14 (a) Write  $\frac{1}{16}$  in the form  $4^n$  where  $n$  is an integer.

.....  
(1)

(b) Work out the value of  $8^{\frac{5}{3}} - 9^{\frac{3}{2}}$

.....  
(3)

(Total for Question 14 is 4 marks)



P 7 5 1 4 8 A 0 1 3 2 4

- 15** The equation of line  $L_1$  is  $y = 2x - 5$   
The equation of line  $L_2$  is  $6y + kx - 12 = 0$

$L_1$  is perpendicular to  $L_2$

Find the value of  $k$ .

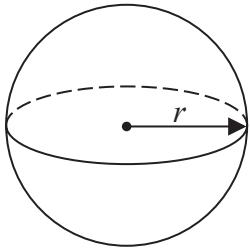
You must show all your working.

$$k = \dots$$

**(Total for Question 15 is 3 marks)**



16 Here is a sphere.



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

$\frac{3}{8}$  of the surface area of this sphere is  $75\pi \text{ cm}^2$

Find the diameter of the sphere.

Give your answer in the form  $a\sqrt{b}$  where  $a$  is an integer and  $b$  is a prime number.

..... cm

(Total for Question 16 is 4 marks)



P 7 5 1 4 8 A 0 1 5 2 4

**17** Make  $x$  the subject of the formula  $y = \frac{4(2x - 7)}{5x + 3}$

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

**18** 7kg of carrots and 5kg of tomatoes cost a total of 480p

$$\text{cost of 1 kg of carrots : cost of 1 kg of tomatoes} = 5 : 9$$

Work out the cost of 1 kg of carrots and the cost of 1 kg of tomatoes.

carrots ..... p

tomatoes ..... p

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



- 19 The menu in a restaurant has starters, main courses and desserts.

There are 5 starters.

There are 12 main courses.

There are  $x$  desserts.

There are 420 different ways to choose one starter, one main course and one dessert.

Work out the value of  $x$ .

$$x = \dots$$

**(Total for Question 19 is 2 marks)**



**20** For  $x \geq 0$ , the functions  $f$  and  $g$  are such that

$$f(x) = 3x + 4 \quad g(x) = \frac{\sqrt{x} + 2}{5}$$

(a) Find  $g^{-1}(x)$

$$g^{-1}(x) = \dots \quad (2)$$

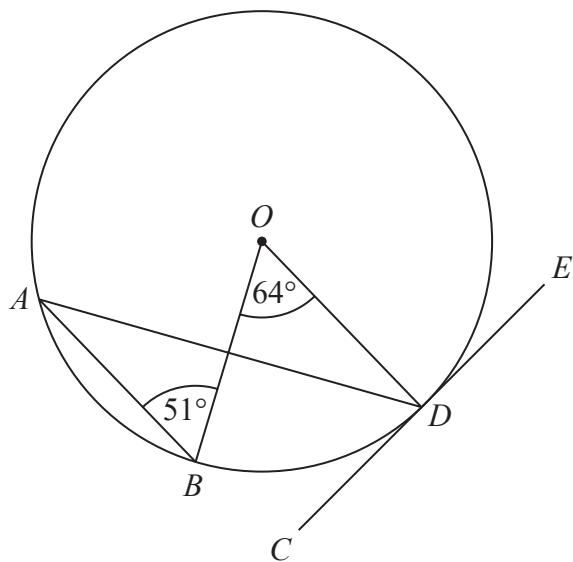
(b) Solve  $gf(x) = 3$

$$x = \dots \quad (3)$$

**(Total for Question 20 is 5 marks)**



- 21  $A$ ,  $B$  and  $D$  are points on a circle with centre  $O$ .  
 $CDE$  is the tangent to the circle at  $D$ .



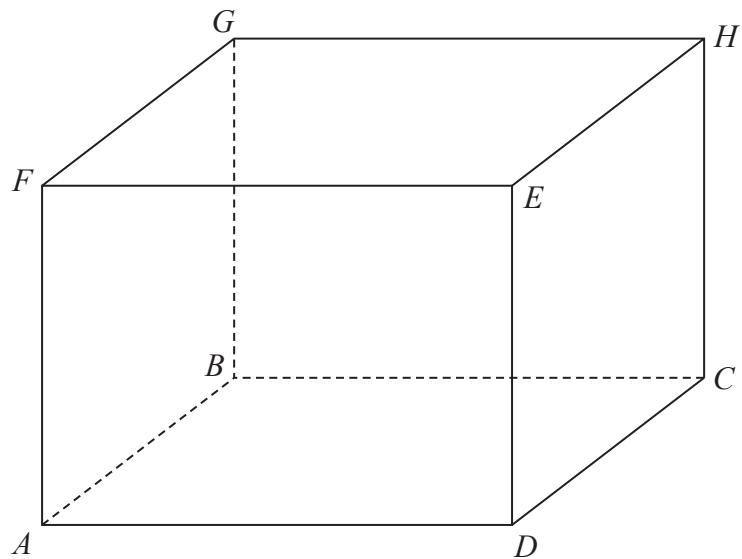
Work out the size of angle  $ADC$ .  
Write down any circle theorems you use.

(Total for Question 21 is 4 marks)



P 7 5 1 4 8 A 0 1 9 2 4

**22**  $ABCDEFGH$  is a cuboid.



$$AF = 6.8 \text{ cm}$$

$$FC = 13.6 \text{ cm}$$

Work out the size of the angle between  $FC$  and the plane  $ABCD$ .

(Total for Question 22 is 2 marks)



23 Write  $\frac{3\sqrt{3}}{4 - \sqrt{3}} - \frac{2}{\sqrt{3}}$  in the form  $\frac{a\sqrt{3} + b}{c}$  where  $a$ ,  $b$  and  $c$  are integers.

(Total for Question 23 is 4 marks)



**24** Find the set of possible values of  $x$  for which

$$4x^2 - 25 < 0 \quad \text{and} \quad 12 - 5x - 3x^2 > 0$$

You must show all your working.

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(Total for Question 24 is 5 marks)

**TOTAL FOR PAPER IS 80 MARKS**



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# Pearson Edexcel GCSE (9–1) Mathematics

**Friday 19 May 2023 – Morning**

Syllabus  
reference

**1MA1/1H**

## **Mathematics**

**PAPER 1 (Non-Calculator)**  
**Higher Tier**

### **Formulae Sheet**

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## Higher Tier Formulae Sheet

### Perimeter, area and volume

Where  $a$  and  $b$  are the lengths of the parallel sides and  $h$  is their perpendicular separation:

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

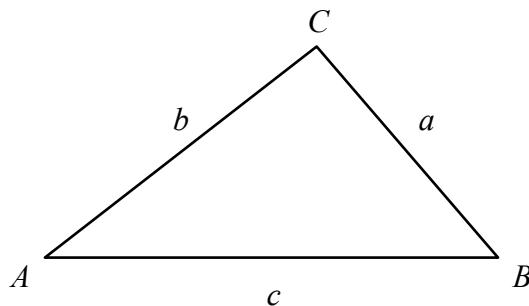
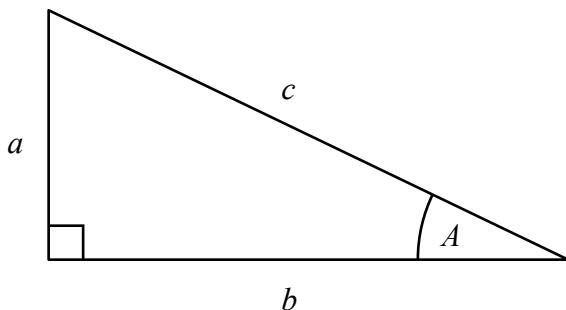
Volume of a prism = area of cross section  $\times$  length

Where  $r$  is the radius and  $d$  is the diameter:

$$\text{Circumference of a circle} = 2\pi r = \pi d$$

$$\text{Area of a circle} = \pi r^2$$

### Pythagoras' Theorem and Trigonometry



### Quadratic formula

The solution of  $ax^2 + bx + c = 0$

where  $a \neq 0$

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

In any right-angled triangle where  $a$ ,  $b$  and  $c$  are the length of the sides and  $c$  is the hypotenuse:

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

In any right-angled triangle  $ABC$  where  $a$ ,  $b$  and  $c$  are the length of the sides and  $c$  is the hypotenuse:

$$\sin A = \frac{a}{c} \quad \cos A = \frac{b}{c} \quad \tan A = \frac{a}{b}$$

In any triangle  $ABC$  where  $a$ ,  $b$  and  $c$  are the length of the sides:

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

$$\text{cosine rule: } a^2 = b^2 + c^2 - 2bc \cos A$$

$$\text{Area of triangle} = \frac{1}{2} a b \sin C$$

### Compound Interest

Where  $P$  is the principal amount,  $r$  is the interest rate over a given period and  $n$  is number of times that the interest is compounded:

$$\text{Total accrued} = P \left(1 + \frac{r}{100}\right)^n$$

### Probability

Where  $P(A)$  is the probability of outcome  $A$  and  $P(B)$  is the probability of outcome  $B$ :

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$P(A \text{ and } B) = P(A \text{ given } B) P(B)$$

### END OF EXAM AID