

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)**

Aiming for Grade 9


Paper reference	<b>1MA1/2H</b>
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**Mathematics**

**PAPER 2 (Calculator)**

**Higher Tier**

40 marks 40 minutes



**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator, Formulae Sheet (enclosed). Tracing paper may be used.

Total Marks
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### 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.

### Information

- The total mark for this paper is 40. There are 12 questions.
- Questions have been broadly arranged in an ascending order of mean difficulty, as found by students achieving Grade 9 in the Summer and November 2023 examinations.
- Questions marked with an asterisk (\*) also appear on the Higher Tier paper.
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

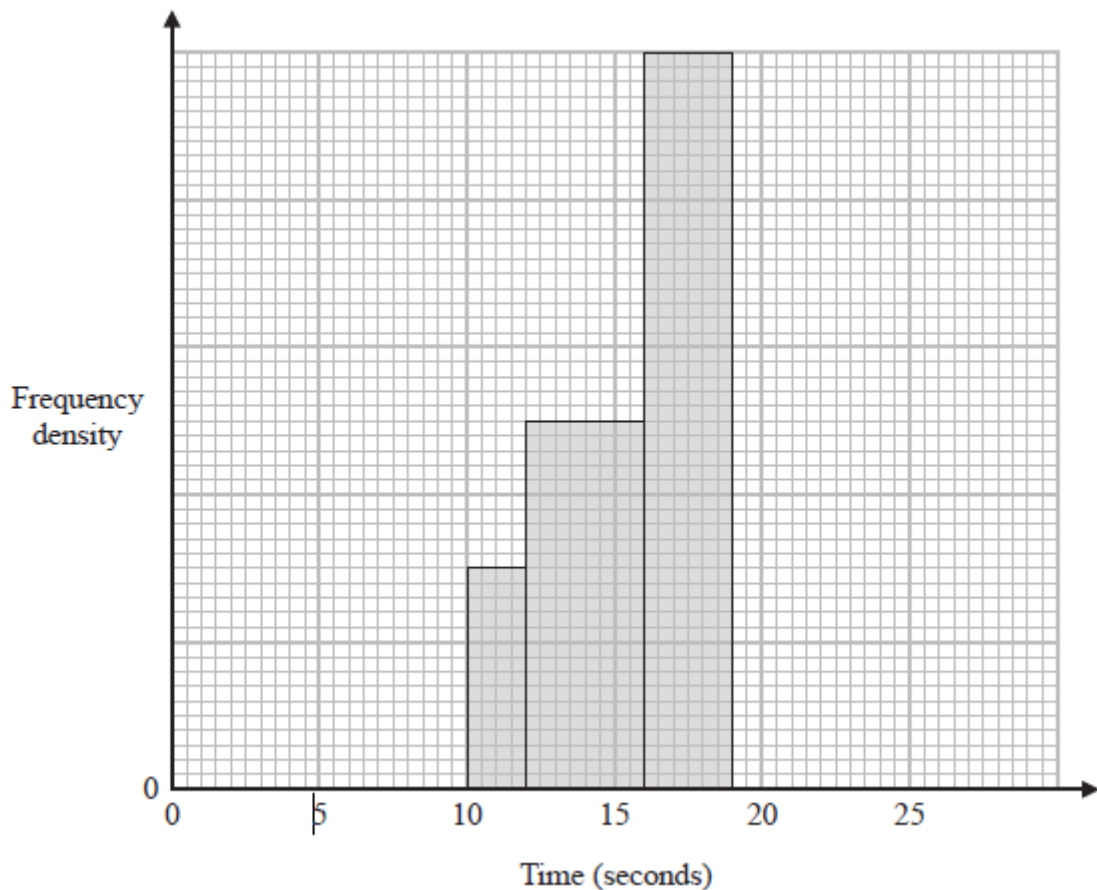
Answer all questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 The incomplete table and the incomplete histogram give information about the times taken by some students to run a race.

Time ( $t$ seconds)	Frequency
$10 < t \leq 12$	
$12 < t \leq 16$	10
$16 < t \leq 19$	15
$19 < t \leq 21$	9
$21 < t \leq 26$	7



None of these students had a time for the race such that  $t < 10$  or  $t > 26$

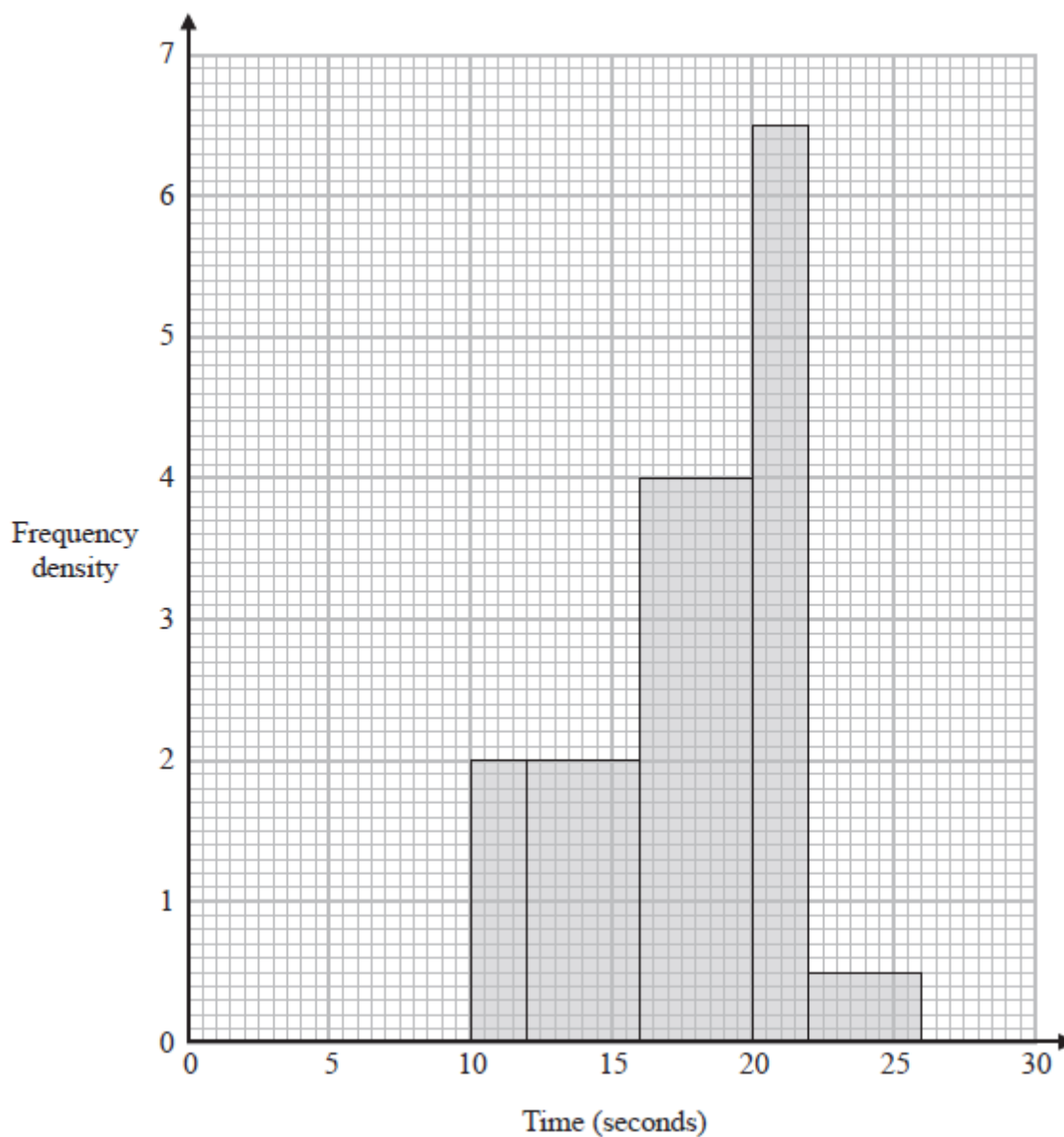
(a) Use the histogram to complete the table.

(1)

(b) Use the table to complete the histogram.

(2)

The histogram below gives information about the times taken by 43 students to run a different race.



(c) Work out an estimate for the median of the times taken by these 43 students to run the race.

..... seconds

(3)

(Total for Question 1 is 6 marks)

- 2 A biased dice is thrown 60 times.  
The table shows information about the number that the dice lands on each time.

<b>Number on dice</b>	1	2	3	4	5	6
<b>Frequency</b>	12	7	8	9	9	15

Gethin throws the dice twice.

- (a) Work out an estimate for the probability that the dice will land on 6 both times.

.....  
(3)

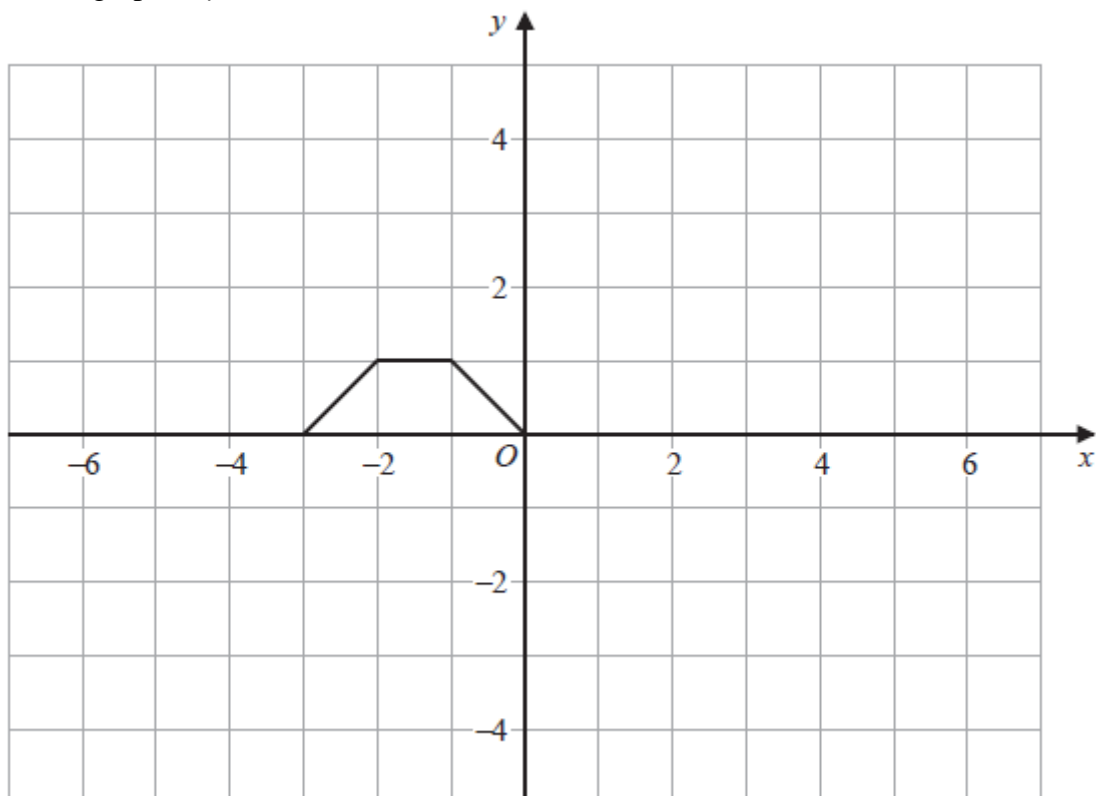
Sally is going to throw the same dice  $n$  times and record the number it lands on each time.  
She will use her results to work out a more reliable estimate for the probability in part (a).

- (b) What can you say about the value of  $n$ ?

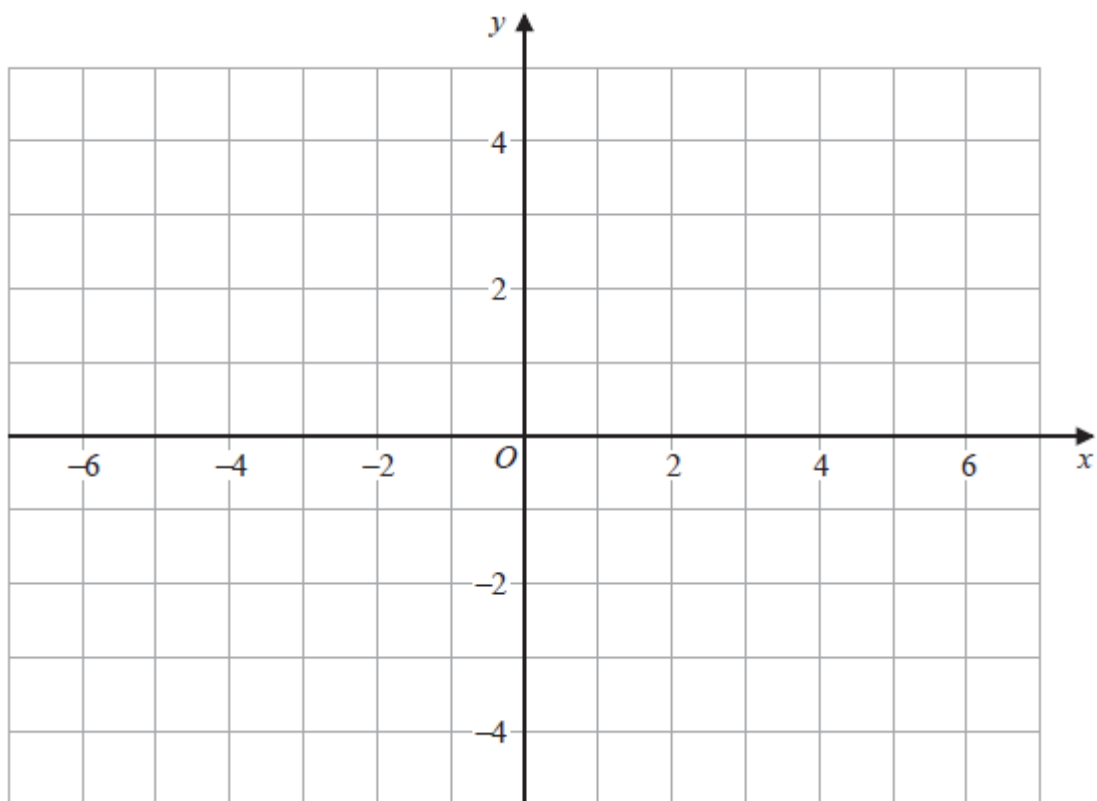
.....  
.....  
.....  
(1)

(Total for Question 2 is 4 marks)

- 3 Here is the graph of  $y = f(x)$



On the grid below, draw the graph of  $y = f(-x)$



(Total for Question 3 is 1 mark)

- \*4 The bearing of port  $B$  from port  $A$  is  $147^\circ$   
Work out the bearing of port  $A$  from port  $B$ .

.....<sup>o</sup>  
(Total for Question 4 is 2 marks)

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- 5  $2a : 5c = 6 : 25$   
 $4b : 7c = 20 : 21$

Show that  $a + b : b + c = 17 : 20$

(Total for Question 5 is 3 marks)

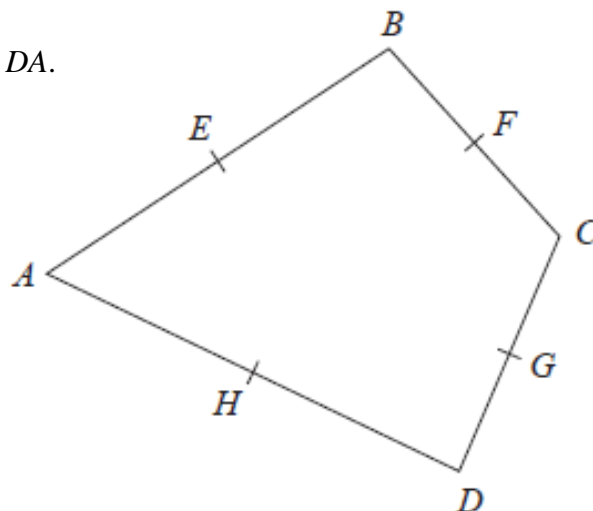
6 Write  $\frac{14}{3x-21} + \left[ (x+4) \div \frac{2x^2-6x-56}{2x+3} \right]$  in the form  $\frac{ax+b}{cx+d}$  where  $a, b, c$  and  $d$  are integers.

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

- 7  $ABCD$  is a quadrilateral.  
 $E, F, G$  and  $H$  are the midpoints of  $AB, BC, CD$  and  $DA$ .

$$\vec{AH} = \mathbf{a} \quad \vec{AE} = \mathbf{b} \quad \vec{DG} = \mathbf{c}$$

Prove, using vectors, that  $EFGH$  is a parallelogram.



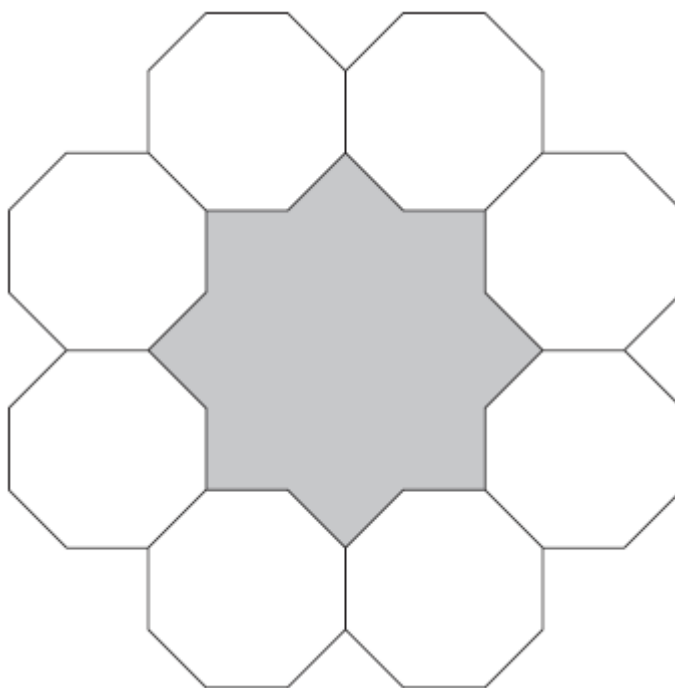
(Total for Question 7 is 4 marks)

- 8 Show that the equation  $x^3 + 2x - 6 = 0$  has a solution between  $x = 1$  and  $x = 2$

(Total for Question 8 is 2 marks)



- 9 The diagram shows 8 identical regular octagons joined to enclose a shaded shape.



Each octagon has sides of length  $a$ .

Find, in terms of  $a$ , an expression for the area of the shaded shape.

Give your answer in the form  $p(2 + \sqrt{2})a^2$  where  $p$  is an integer.

You must show all your working.

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(Total for Question 9 is 5 marks)

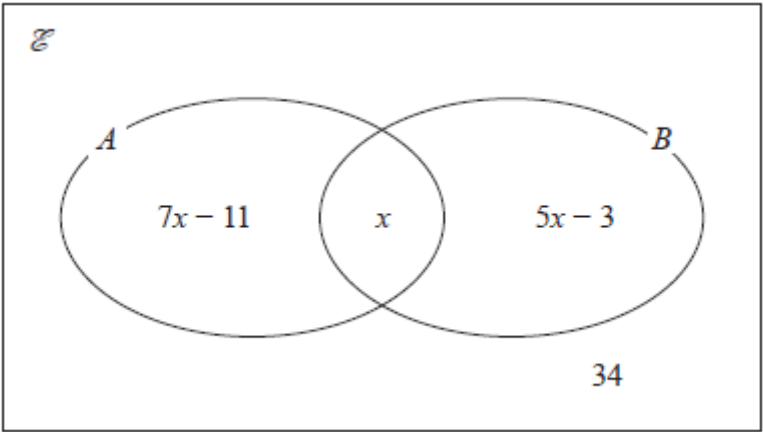
**10** Vicky has a collection of medals.

The Venn diagram gives information about the number of medals in her collection where

$\mathcal{E} = \{\text{all medals}\}$

$A = \{\text{English medals}\}$

$B = \{\text{gold medals}\}$



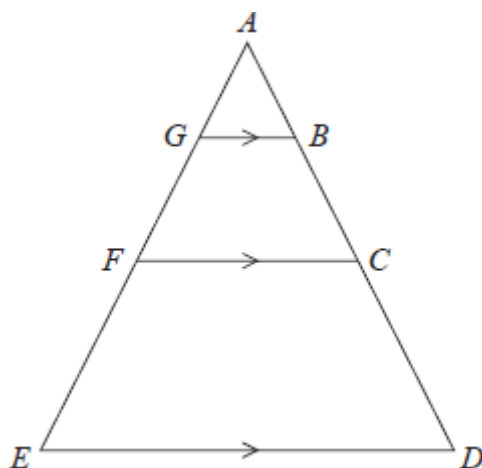
Vicky is going to take at random a medal from her collection.

Given that the medal is gold, the probability that the medal is English is  $\frac{2}{11}$

Work out the number of medals in Vicky's collection.

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

- 11 Here are three similar triangles,  $ABG$ ,  $ACF$  and  $ADE$ .



$ABCD$  and  $AGFE$  are straight lines.

$$AB : BC : CD = 1 : 2 : 3$$

Show that

$$\text{area of } ABG : \text{area of } BCFG : \text{area of } CDEF = 1 : 8 : 27$$

(Total for Question 11 is 3 marks)

**12** There are only blue pens and red pens in a box.

The number of blue pens is four times the number of red pens.

Rita takes at random one pen from the box.

She records the colour of the pen and then replaces it in the box.

Rita does this  $n$  times, where  $n \geq 2$

Write down an expression, in terms of  $n$ , for the probability that Rita gets a blue pen at least once and a red pen at least once.

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(Total for Question 12 is 2 marks)

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**TOTAL FOR PAPER IS 36 MARKS**