

Please write clearly in block capitals.

Centre number

Candidate number

Surname

Forename(s)

Candidate signature

I declare this is my own work.

INTERNATIONAL GCSE

MATHEMATICS

Extension Tier Paper 2E

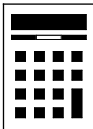
E

Tuesday 11 November 2025 07:00 UK Time Time allowed: 2 hours

Materials

For this paper you must have:

- a calculator
- mathematical instruments.



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 100.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.
- If your calculator does not have a π button, take the value of π to be 3.142.

Advice

Show all necessary working; otherwise marks for method may be lost.

For Examiner's Use	
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
24–25	
26–27	
28	
TOTAL	

Answer **all** questions in the spaces provided.

- 1** Work out the lowest common multiple (LCM) of 8 and 10

[1 mark]

Answer _____

- 2** Write down the number between 30 and 50 that is an integer power of 2

[1 mark]

Answer _____

- 3** Show that $1\frac{2}{5} \div \frac{3}{7} = 3\frac{4}{15}$

[2 marks]



- 4** Ash has a biased spinner.
The spinner has a red section and a blue section.
He wants to estimate the probability of the spinner landing on red.
He spins the spinner 20 times.
Here are the results.

	Red	Blue
Number of spins	9	11

- 4 (a)** Work out an estimate of the probability that the spinner lands on red.

[1 mark]

Answer _____

- 4 (b)** Write down **one** way Ash could make the estimate more reliable.

[1 mark]

- 4 (c)** Claire spins the same spinner 20 times.
Will her results be the same as Ash's results?

Tick a box.

Yes

☐

No

☐

Cannot tell

☐

[1 mark]



5 (a) Simplify $a^4 \times a^9$

[1 mark]

Answer _____

5 (b) Simplify $\frac{c^{12}}{c^3}$

[1 mark]

Answer _____

5 (c) Simplify fully $(3y^5)^2$

[2 marks]

Answer _____



- 6** A town has a population of 70 000
The population decreases by 4.5% each year.
Work out the population of the town after 4 years.

[3 marks]

Answer _____

- 7** A circle has an area of 220 cm^2
Work out the **circumference** of the circle.

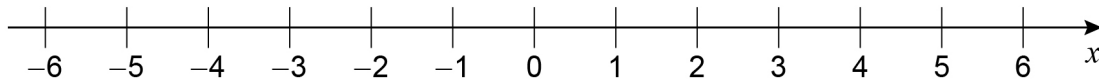
[3 marks]

Answer _____ cm



8 (a) Represent $-5 < x < 3$ on the number line.

[1 mark]



8 (b) Solve $9y \geq 6y + 15$

[2 marks]

Answer _____

8 (c) $-3 \leq w < 2$

Work out the **greatest** possible value of w^2

[1 mark]

Answer _____



9

Two jars each contain only green balls and red balls.

Jar A	number of green balls : number of red balls = 4 : 7
--------------	--

Jar B	number of green balls : number of red balls = 3 : 2
--------------	--

Both jars have the same number of **green** balls.

Each jar has fewer than 50 balls.

Work out the **total** number of red balls in the jars.

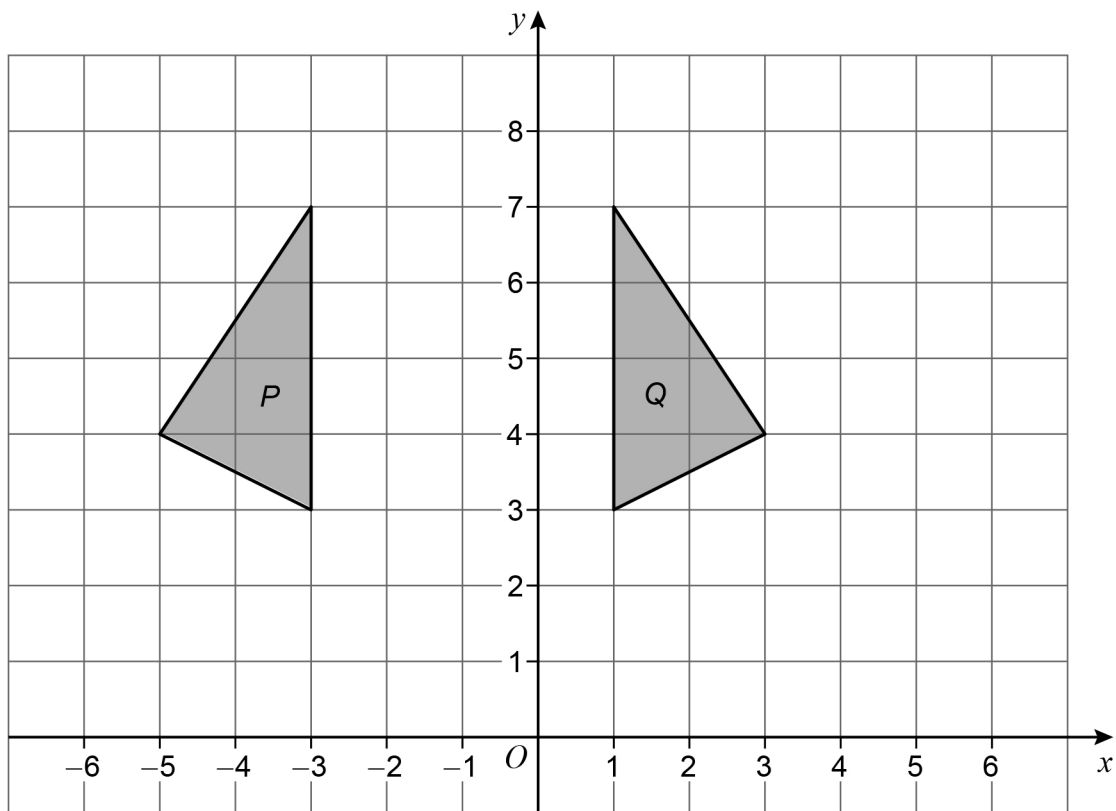
[3 marks]

Answer _____

Turn over for the next question



10 (a)

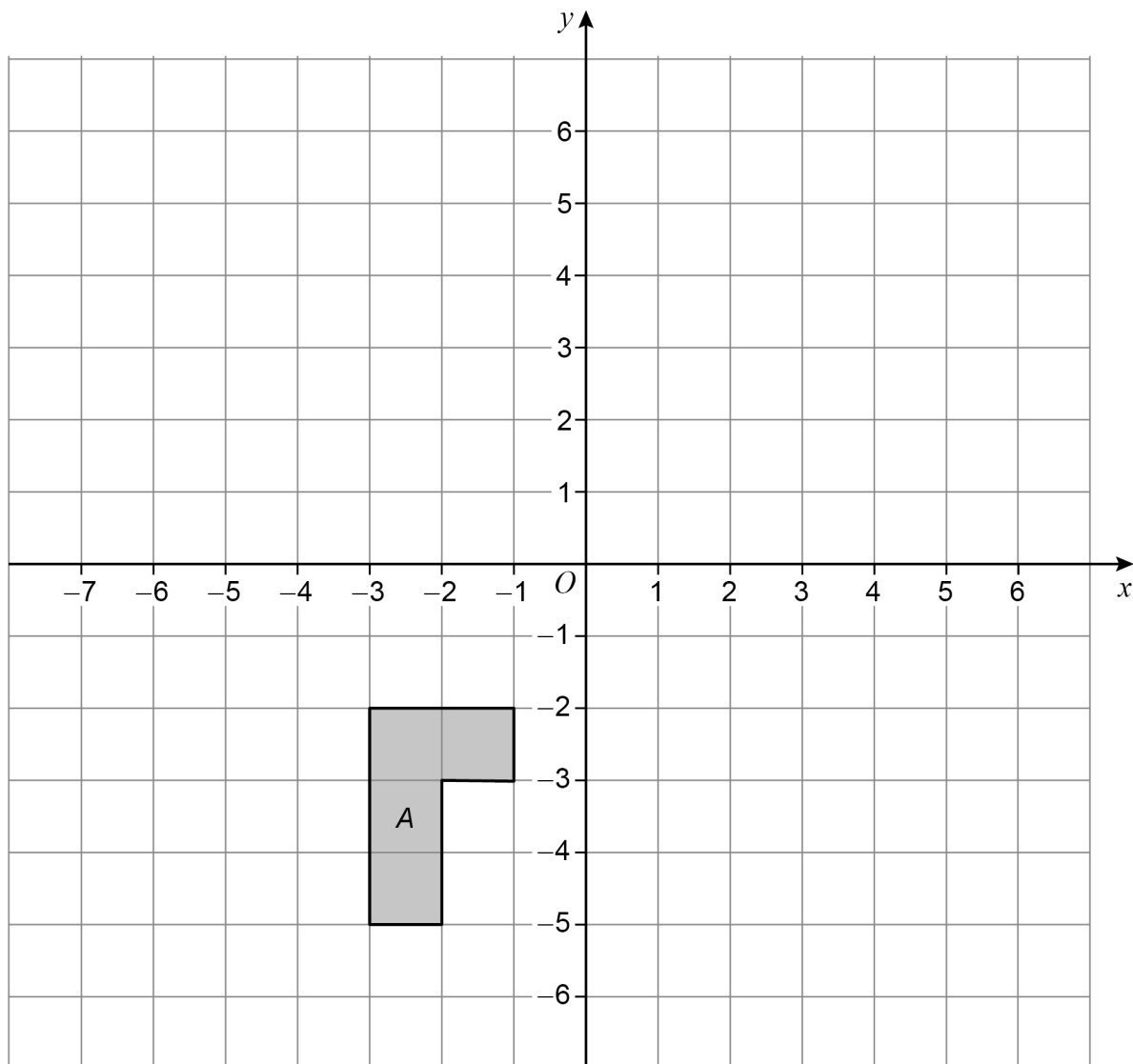


Describe fully the **single** transformation that maps triangle *P* to triangle *Q*.

[2 marks]



10 (b)



Rotate shape A 90° anti-clockwise about $(-1, 1)$

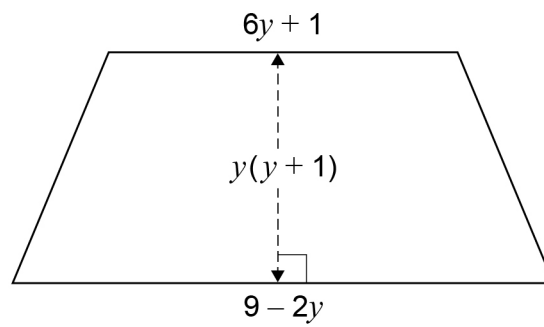
[2 marks]

Turn over for the next question

Turn over ►



11 Here is a trapezium.



Not drawn
accurately

All the lengths are in centimetres.

The sum of the lengths of the two parallel sides is 20 cm

Work out the **area** of the trapezium.

[4 marks]

Answer _____ cm^2



12

Here is an identity.

$$7ax(ax + 2) + bx \equiv 63x^2 - 20x \quad \text{where } a < 0$$

Work out the value of a and the value of b .**[3 marks]**

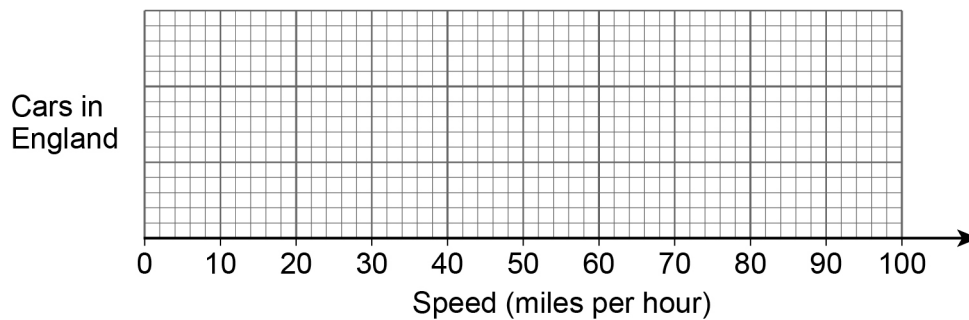
 $a = \underline{\hspace{2cm}} \quad b = \underline{\hspace{2cm}}$
Turn over for the next question**Turn over ►**

13

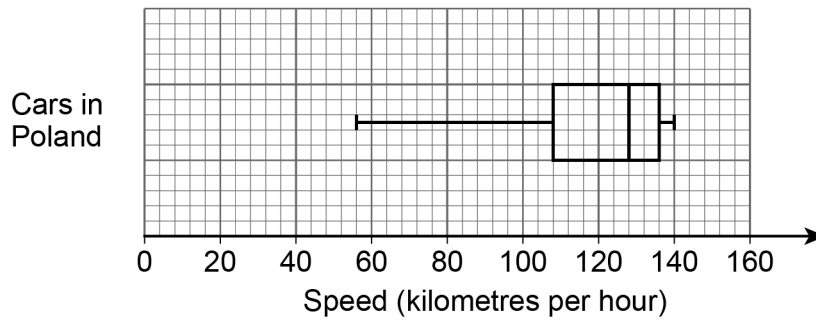
Here is some information about the speeds of some cars, in **miles per hour**, on a road in England.

	Speed (miles per hour)
Lowest	30
Highest	70
Lower quartile	46
Upper quartile	58
Median	54

13 (a) Draw a box plot to represent this information.

[2 marks]

- 13 (b)** The box plot below shows information about the speeds of some cars, in **kilometres per hour**, on a road in Poland.



5 miles = 8 kilometres

In which country were the speeds **more consistent**?

Tick a box.

England

☐

Poland

☐

Work out the interquartile ranges to support your answer.

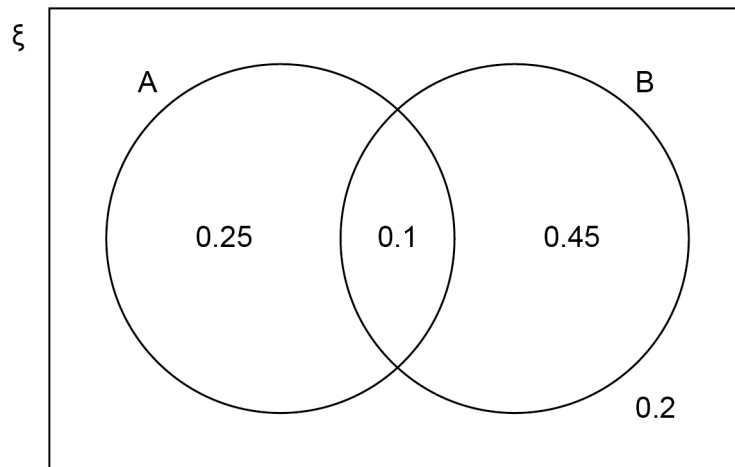
[3 marks]

Turn over for the next question



14 (a) A and B are two events.

The Venn diagram shows the probability for each region.



Work out $P(A')$.

[1 mark]

Answer _____



14 (b) P and Q are two sets such that

- $P \cap Q = \{5, 11\}$
- $P \cup Q = \{3, 5, 7, 8, 9, 11, 14\}$
- $n(Q) = 5$
- the mean of the elements of P is 7

Work out the elements of P.

[3 marks]

Answer _____

15 A fruit smoothie is made using only fruit and yoghurt.

In the smoothie, the mass of the fruit is 40% of the mass of the yoghurt.

The **total** mass of the smoothie is 980 grams.

Work out the mass of the **fruit**.

[3 marks]

Answer _____ grams

7

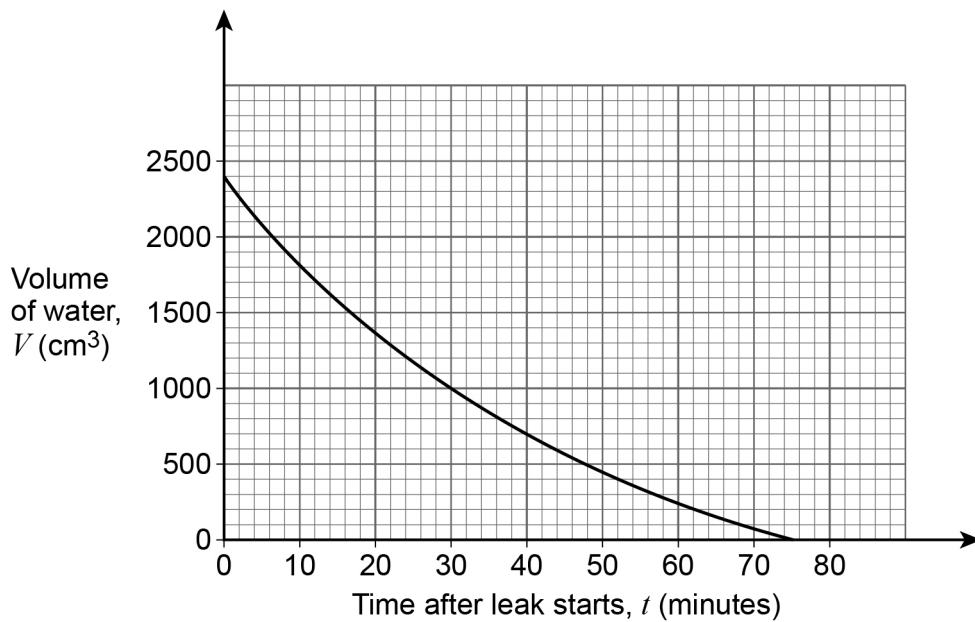


16

The graph shows information about the volume of water in a leaking tank.

V is the volume in cm^3 of water in the tank

t is the time in minutes after the leak starts



16 (a) What does the gradient of the graph at any point represent?

[1 mark]

16 (b) By drawing a tangent, work out an estimate for the gradient of the graph when $t = 30$

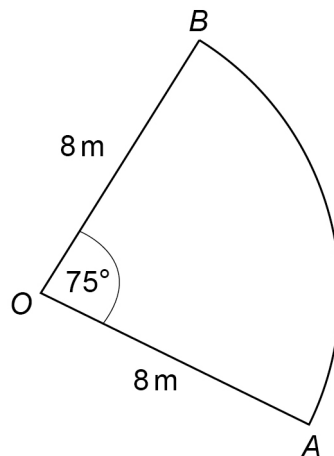
[2 marks]

Answer _____



17

The diagram shows the plan of an area of grass.



Not drawn
accurately

OAB is a sector of a circle with centre O and radius 8 m

Angle $AOB = 75^\circ$

People are going to sit on the grass.

Each person needs 0.5 m^2 of grass.

Work out the **maximum** number of people that can sit on the grass.

[3 marks]

Answer _____

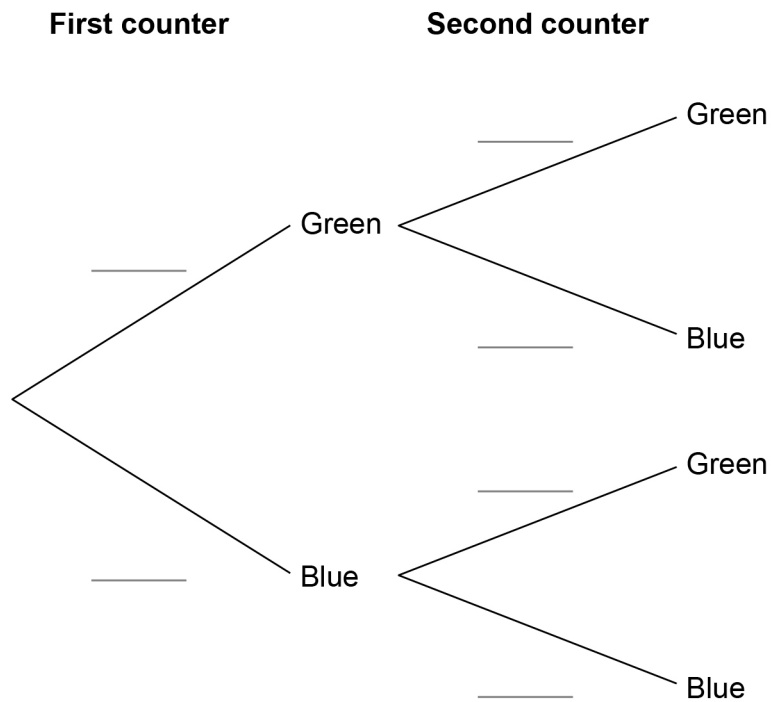
Turn over for the next question



- 18** A box only contains 9 green counters and 6 blue counters.
A counter is chosen at random and **not** replaced.
A second counter is then chosen at random.

- 18 (a)** Complete the tree diagram to show the probabilities.

[3 marks]



- 18 (b)** Work out the probability that **at least one** of the counters is green.

[3 marks]

Answer _____

- 19** Multiply out and simplify fully $(2y - 3)(y + 3)(y - 1)$

[3 marks]

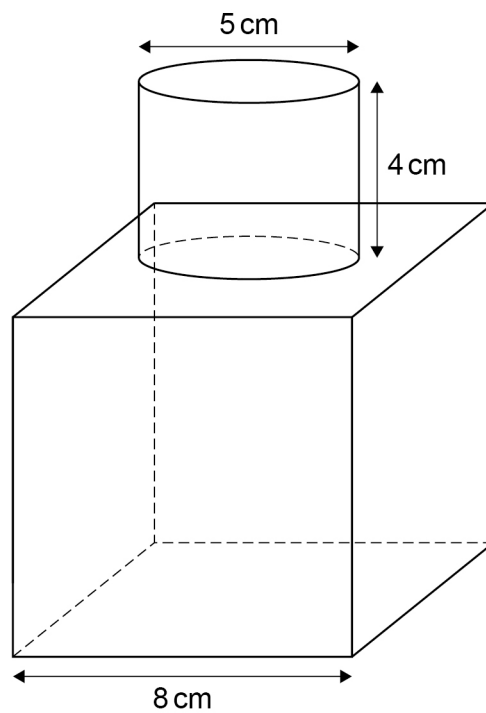
Answer _____

Turn over ►



20

A cylinder and a cube are joined together to make a solid.



The cube has side length 8 cm

The cylinder has diameter 5 cm and height 4 cm

Work out the **total** surface area of the solid.

[4 marks]

Answer _____ cm^2



21 $f(x) = 5x - 3$ $g(x) = 4x + 2$

21 (a) Work out $fg(6)$

[2 marks]

Answer _____

21 (b) Work out $f^{-1}(8)$

[2 marks]

Answer _____

Turn over for the next question



22

Convert $0.0\dot{2}\dot{7}$ to a fraction in its simplest form.

You **must** show your working.

[3 marks]

Answer _____

23

x is directly proportional to the square of y .

y is inversely proportional to w .

When $y = 4$, $x = 8$ and $w = 5$

Work out an equation for x in terms of w .

[4 marks]

Answer _____



24

Show that $3\sqrt{6} + \sqrt{24}$ can be written in the form $\sqrt{k}$ where k is an integer.

You **must** show your working.

[3 marks]

25

Here are the first four terms in a quadratic sequence.

8 11 18 29

Work out an expression for the n th term of the sequence.

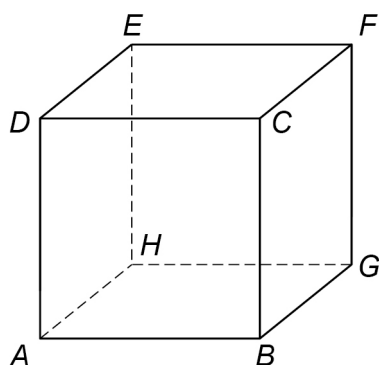
Give your answer in the form $an^2 + bn + c$ where a , b and c are constants.

[3 marks]

Answer _____



26 Here is a cube.



26 (a) Assume the side length of the cube is 5 cm

Work out the size of angle AFG .

[3 marks]

Answer _____ °



26 (b) Actually, the side length of the cube is **not** 5 cm

What does this mean about the size of angle AFG ?

Tick **one** box.

[1 mark]

It is greater than the answer to part (a)

☐

It is less than the answer to part (a)

☐

It could be greater than or less than the answer to part (a)

☐

It is the same as the answer to part (a)

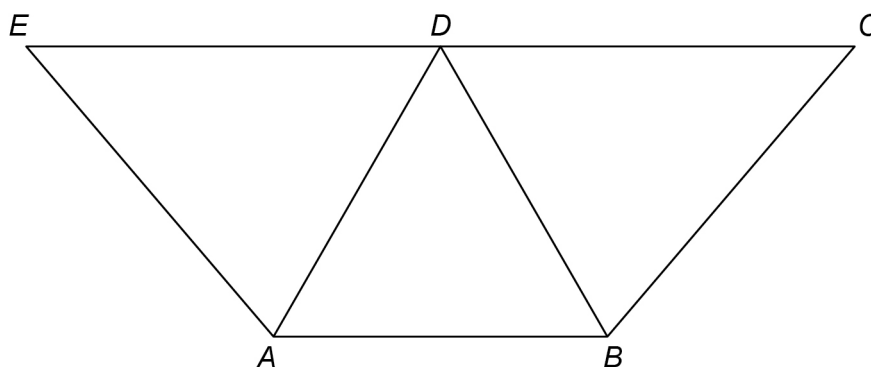
☐

Turn over for the next question

Turn over ►



27

 AB and EC are straight lines.Not drawn
accurately D is the midpoint of EC . ABD is an equilateral triangle. $AE = BC$ Prove that ADE and BCD are **congruent** triangles.**[3 marks]**

28

$$\overrightarrow{AB} = 3\mathbf{a} + (k + 5)\mathbf{b}$$

$$\overrightarrow{PQ} = 12\mathbf{a} + (4 - 2k)\mathbf{b}$$

$\overrightarrow{AB}$ is parallel to $\overrightarrow{PQ}$

Work out the value of k .

[3 marks]

$$k = \underline{\hspace{10cm}}$$

29

Prove algebraically that

the product of two consecutive multiples of 4 is always a multiple of 32

[3 marks]

Turn over ►



30 (a) $f(x) = 5 - 3(x - 2)^2$ for $-1 < x < 7$

Work out the range of $f(x)$.

Give your answer as a single inequality.

[3 marks]

Answer _____

30 (b) $g(x) = 5 - 3(x - 2)^2$ for $a < x < 7$ where $a < -1$

The range of $g(x)$ is the **same** as the range of $f(x)$.

Write down the **smallest** possible value of a .

[1 mark]

Answer _____

END OF QUESTIONS



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ANSWER IN THE SPACES PROVIDED**





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