

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

E

Extension Tier Paper 1E

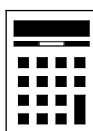
Wednesday 6 November 2024 07:00 GMT

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	
28–29	
TOTAL	



N O V 2 4 9 2 6 0 1 E 0 1

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

1 Increase 20 by 18%

[1 mark]

Answer _____

2 Write down **all** the prime numbers less than 10

[1 mark]

Answer _____

3 Write down the reciprocal of 4

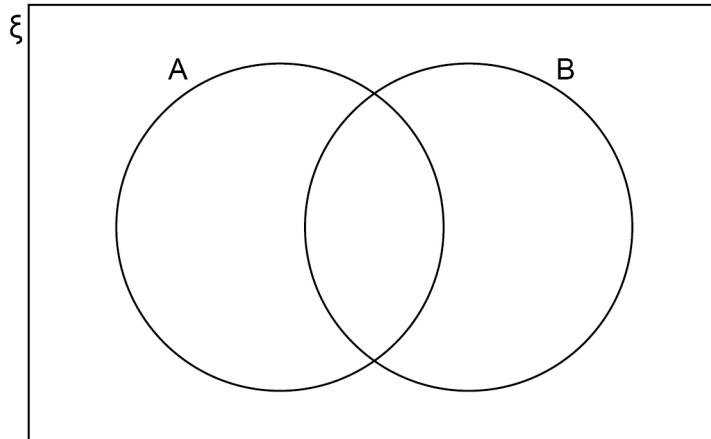
[1 mark]

Answer _____



- 4 On the Venn diagram, shade the region that represents $A \cap B'$

[1 mark]



- 5 Solve $4(x + 7) < 36$

[2 marks]

Answer _____



6

 a is a common **factor** of 70 and 105 b is a common **multiple** of 2 and 5Work out the **greatest** possible value of $\frac{a}{b}$ **[4 marks]**

Answer _____



7 Investment A Save \$120 per **month** for 2 years.
After the 2 years 2.5% interest is added to the total amount saved.

Investment B Invest \$2800
Compound interest is added at 3% per year.

After 2 years, how much **more** is investment B worth than investment A?

[4 marks]

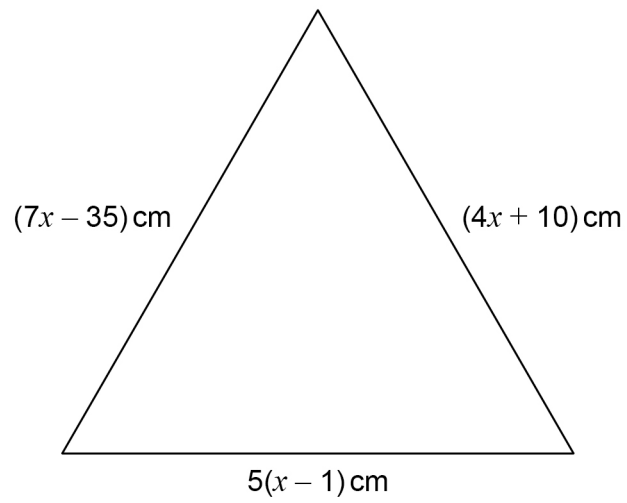
Answer \$ _____

Turn over for the next question



8

This triangle is equilateral.

Not drawn
accurately

Is the perimeter of the triangle greater than 2 metres?

You **must** show your working.**[5 marks]**

- 9** The mean mass of a team of 17 hockey players is 82 kg
A player of mass 91 kg joins the team.
Work out the mean mass of the team now.

[3 marks]

Answer _____ kg

Turn over for the next question

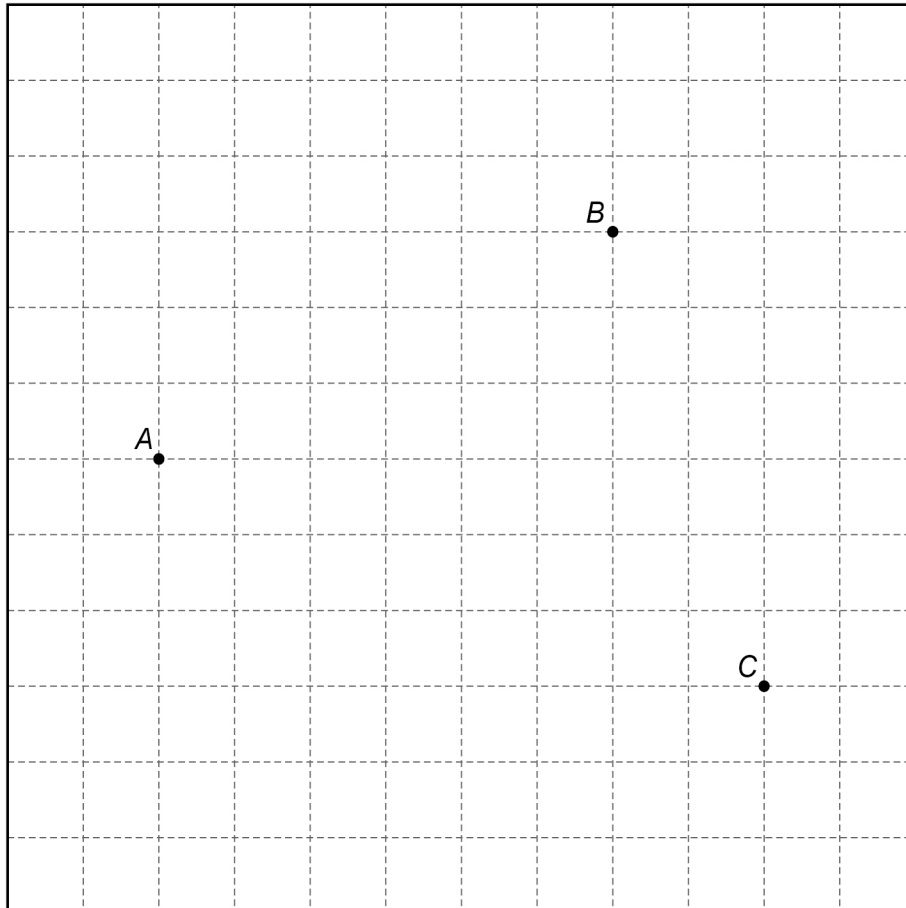


10

Using ruler and compasses, show the region inside the centimetre grid that is
less than 5 cm from A
and
nearer to B than to C .

Label the region R .

Show all your construction lines.

[3 marks]

11 Here is an identity.

$$a(3x - 8) \equiv 33x + 2b$$

Work out the values of a and b .

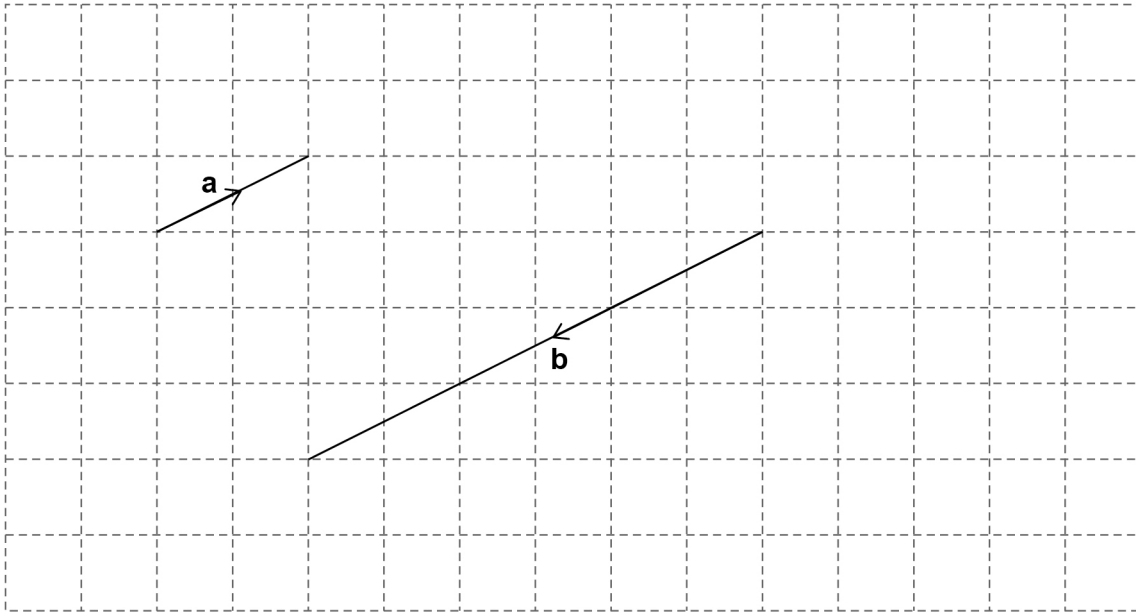
[3 marks]

$a =$ _____ $b =$ _____

Turn over for the next question



12 (a) Vectors **a** and **b** are drawn on a grid.



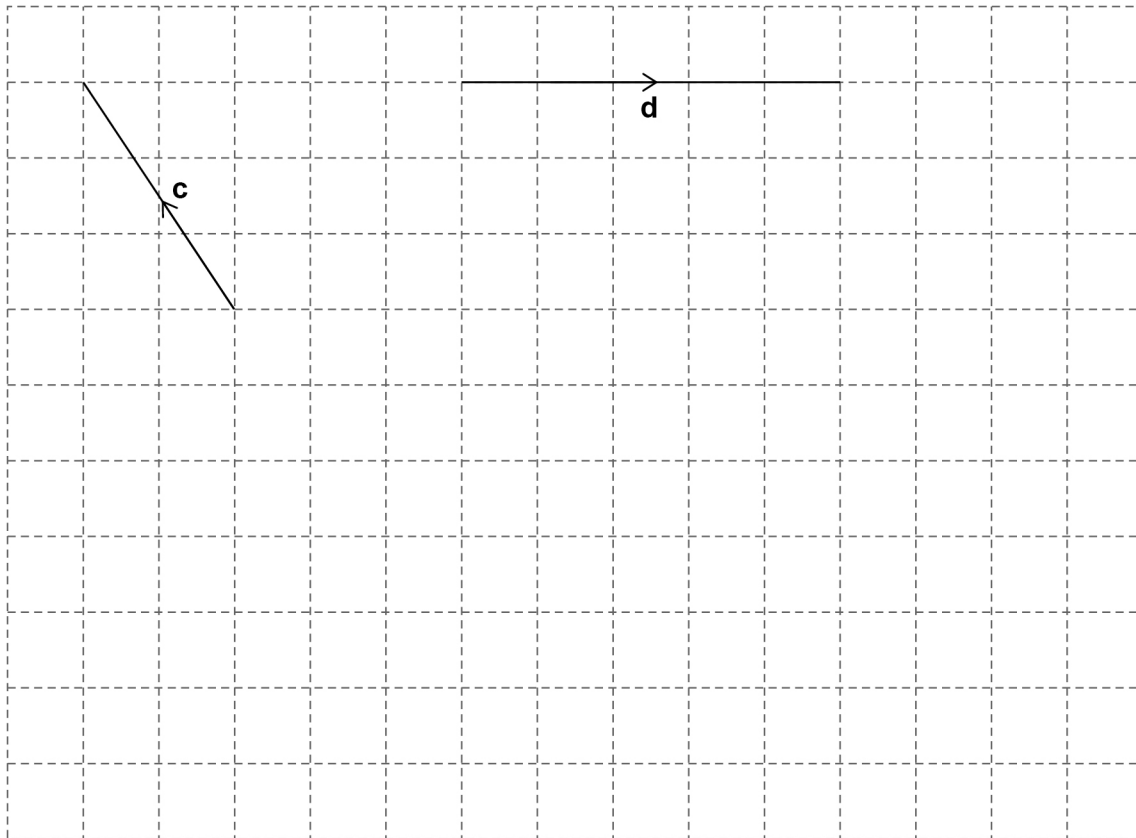
Write **b** in terms of **a**.

[1 mark]

b = _____



12 (b) Vectors **c** and **d** are drawn on a grid.



On the grid above, draw a vector representing $\mathbf{c} - \mathbf{d}$

[2 marks]

Turn over for the next question



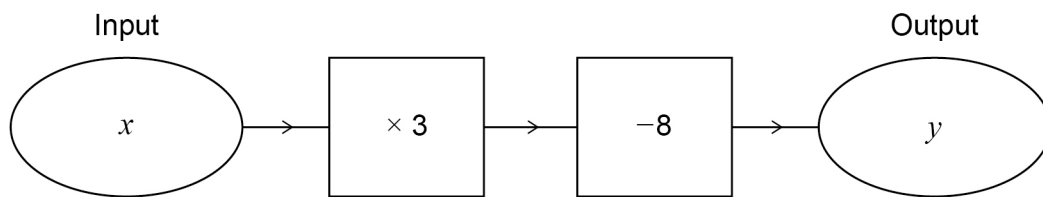
- 13** The cost of a ticket increases by 10% to \$31.35

Work out the original cost.

[3 marks]

Answer \$ _____

- 14** Here is a number machine.



Work out x in terms of y .

[2 marks]

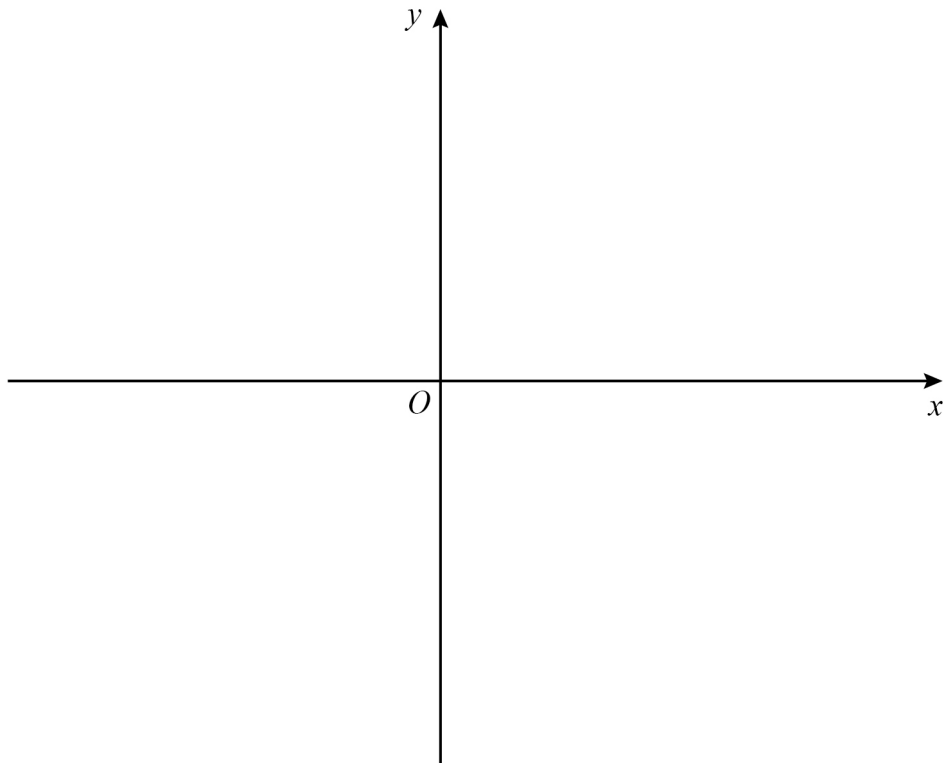
$x =$ _____



15

On the axes, sketch the curve $y = x^3 + 4$

You **must** show the coordinates of the y -intercept.

[2 marks]

Turn over for the next question



- 16** A bag contains 40 socks.
10 are red, 23 are blue and 7 are green.

- 16 (a)** Jaya takes a sock at random before putting it back in the bag.
Kyle then takes a sock at random before putting it back in the bag.
Leo then takes a sock at random.

Work out the probability that they **all** take a red sock.

[2 marks]

Answer _____

- 16 (b)** All 40 socks are in the bag.
Meg takes three socks at random, one after the other.
After she takes a sock she does **not** put it back in the bag.
The first sock is blue.

Work out the probability that all three socks are different colours.

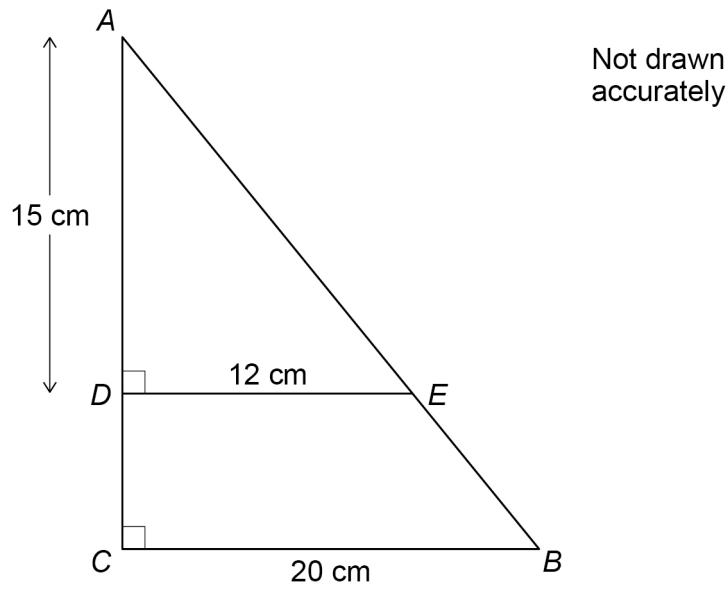
[3 marks]

Answer _____



17

Triangle ABC is divided into a smaller triangle and a trapezium.



Work out the area of the trapezium $BCDE$.

[4 marks]

Answer _____ cm^2



18 Show that, for $x \neq -1$, $x \neq 0$

$\frac{12x^3 - 12x}{3x^2 + 3x}$ simplifies to the form $ax - b$ where a and b are integers.

[3 marks]



19 y is inversely proportional to $\sqrt{x}$

$$y = 5 \text{ when } x = 36$$

19 (a) Work out an equation connecting y and x .

[3 marks]

Answer _____

19 (b) Work out the value of y when $x = 81$

Give your answer as a mixed number.

[2 marks]

Answer _____

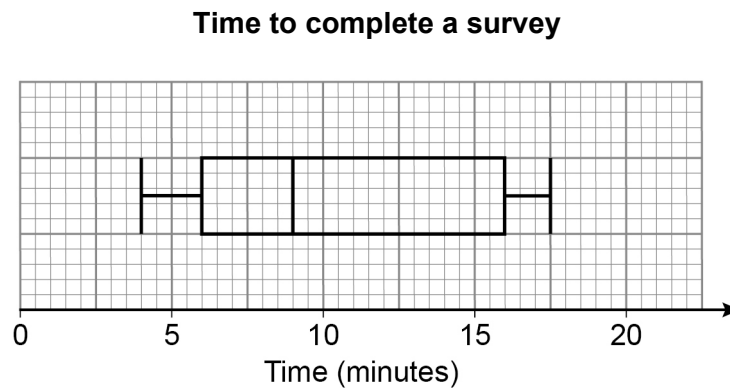


20

Here is some information about the times people took to complete a survey.

Fastest time	4 minutes
Slowest time	18 minutes
Median	9 minutes
Upper quartile	16 minutes
Interquartile range	11 minutes

Ben draws this box plot to show the information.



What **two** errors has he made?

[2 marks]

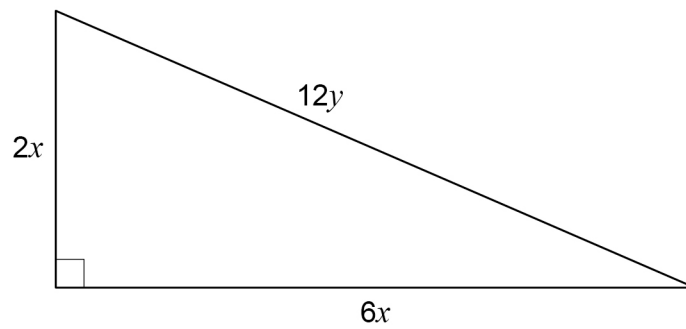
Error 1 _____

Error 2 _____



21

All dimensions are in centimetres.

Not drawn
accurately

Use Pythagoras' theorem to work out the exact value of $\frac{x}{y}$

[3 marks]

Answer _____



22 Events A and B are independent.

$$P(A) = 0.30$$

$$P(A \cap B) = 0.24$$

Circle the value of $P(B)$.

[1 mark]

0.09

0.54

0.072

0.8

23 Prove algebraically that $4.\dot{5}7$ converts to the fraction $\frac{206}{45}$

[3 marks]

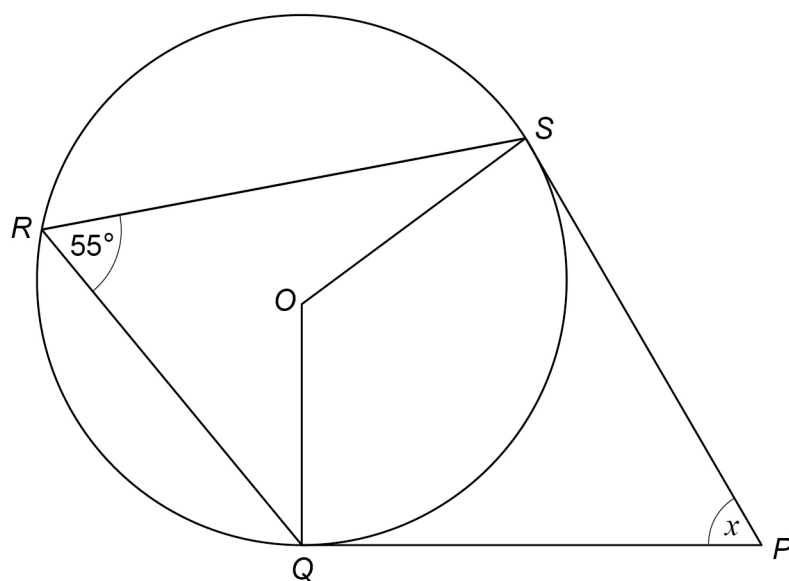


24

Q , R and S are points on the circumference of a circle, centre O .

PQ and PS are tangents to the circle.

Angle $QRS = 55^\circ$



Not drawn
accurately

Work out the size of angle x .

[3 marks]

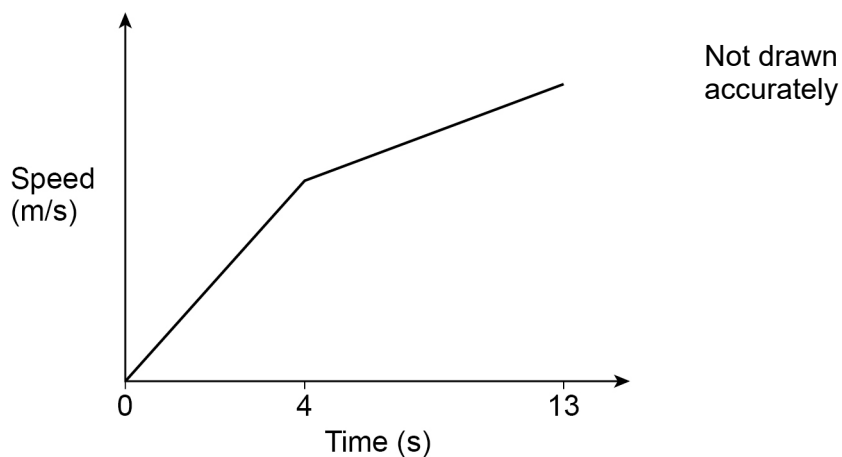
$x =$ _____ $^\circ$

25

Maya runs a 60-metre race in 13 seconds.

- During the first 4 seconds her speed increases at a constant rate.
- During the last 9 seconds her speed increases at a **different** constant rate.
- Her speed at 13 seconds is 3 m/s more than her speed at 4 seconds.

Here is a sketch of her speed-time graph.



25 (a) Work out her acceleration during the last 9 seconds.

State the units of your answer.

[2 marks]

Answer _____



- 25 (b)** When Maya finishes the 60-metre race, her speed is v m/s

Work out the value of v .

[4 marks]

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

- 26** Solids X and Y are similar.

X has volume 125 cm^3

Y has volume 729 cm^3

The surface area of X is 108 cm^2

Work out the surface area of Y.

Give your answer to the nearest integer.

[3 marks]

Answer $\underline{\hspace{10cm}}$ cm^2

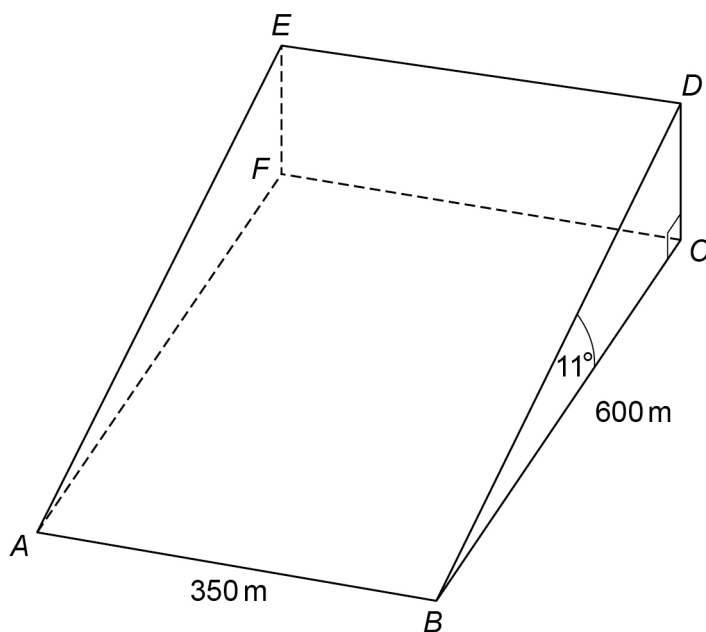


27

$ABCDEF$ is a triangular prism which represents part of a hill.

$ABCF$ is the horizontal rectangular base.

D is vertically above C .



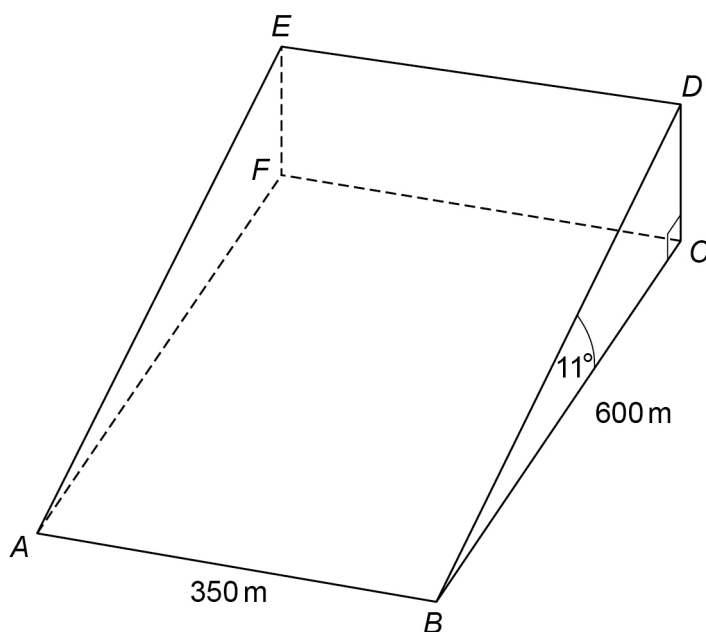
27 (a) Work out the height CD .

[2 marks]

Answer _____ m



- 27 (b)** Stefan walks in a straight line from A to D .



Work out the size of angle DAC .

[4 marks]

Answer _____ °



28 A curve has the equation $y = x^2 - 14x + 19$

The turning point of the curve is at $(a, -30)$

28 (a) By completing the square, or otherwise, work out the value of a .

[2 marks]

$a =$ _____

28 (b) The turning point of the curve $y = x^2 + 6x + c$ also has y -coordinate -30

Work out the value of c .

[2 marks]

$c =$ _____



29

 a and b are **positive integers**.

$$b = 1.265a$$

Work out the **least** possible value of b .**[2 marks]**

Answer _____

30

$$g(x) = 9 + 2x \quad h(x) = x^4$$

Solve $gh(x) = 171$

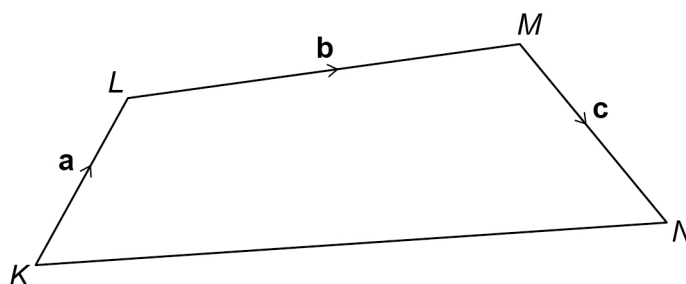
[3 marks]

 $x =$ _____

31

Here is quadrilateral $KLMN$.

$$\overrightarrow{KL} = \mathbf{a} \quad \overrightarrow{LM} = \mathbf{b} \quad \overrightarrow{MN} = \mathbf{c}$$

Not drawn
accurately

X is a point on KL where $KX : XL = 2 : 3$

Y is a point on MN where $MY : YN = 4 : 1$

Is XY parallel to KN ?

Tick a box.

☐

Yes

☐

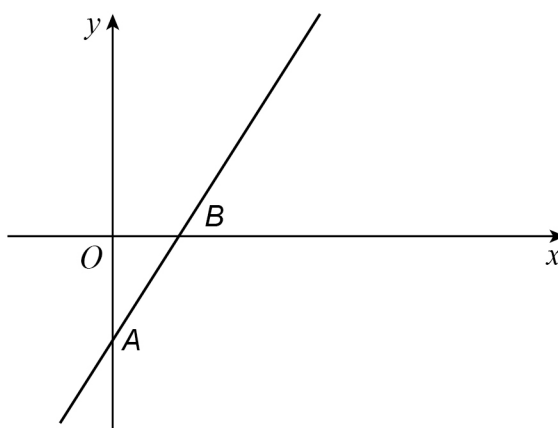
No

Show working to support your answer.

[3 marks]



The line $3y - 5x + 9 = 0$ intersects the axes at A and B .



Not drawn
accurately

Work out the equation of the perpendicular bisector of AB .

Give your answer in the form $y = mx + c$

[6 marks]

[illegible]

Answer _____

END OF QUESTIONS



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ANSWER IN THE SPACES PROVIDED**



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