

OXFORD

INTERNATIONAL
AQA EXAMINATIONS

Please write clearly in block capitals.

Centre number

9 6 2 4 2

Candidate number /

5 7 6 8

Surname

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Forename(s)

Hongbin

Candidate signature

7/18/2019 Enri Stom

INTERNATIONAL GCSE MATHEMATICS EXTENSION

Paper 1E

E

Tuesday 5 November 2019

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	
TOTAL	



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

IB/M/Nov19/E6

9260/1E

Answer all questions in the spaces provided.

- 1 The first four terms of a linear sequence are

$$\begin{array}{ccccccc} -16 & & -9 & & -2 & & 5 \\ & \swarrow & \searrow & \swarrow & \searrow & \swarrow & \searrow \\ & +7 & & +7 & & +7 & \end{array}$$

Circle the expression for the n th term.

$$\begin{aligned} & 7n - 2 \\ & -16 + 7(n-1) \\ & -16 + 7n - 7 \quad [1 \text{ mark}] \end{aligned}$$

$n + 7$

$7n - 16$

$7n - 23$

$-9 - 7n$

- 2 Circle the ratio equivalent to $\frac{2}{3} : 12$

$2 : 36 \quad 1 : 8$

[1 mark]

$1 : 8$

$1 : 18$

$8 : 1$

$18 : 1$

- 3 A is the set of single-digit even numbers.

B is the set of single-digit prime numbers.

Circle the value of $n(A \cap B)$

A $2, 4, 6, 8$
 B $1, 3, 5, 7, 9$

[1 mark]

1

2

7

0



0 2

- 4 Two triangles each have angles of 51° , 34° and 95°
One triangle is larger than the other.

Circle the word that describes the triangles.

[1 mark]

congruent

similar

corresponding

regular

- 5 The price of a watch increases from \$160 to \$194

Work out the percentage increase in the price.

[3 marks]

$$\frac{194 - 160}{160} = 21.25\%$$

Answer

21.25

%

Turn over for the next question



- 6 Two villages, A and B, are connected by a road of length 9 km

Sabine left B at 10.20, running towards A at a speed of 6 km/h

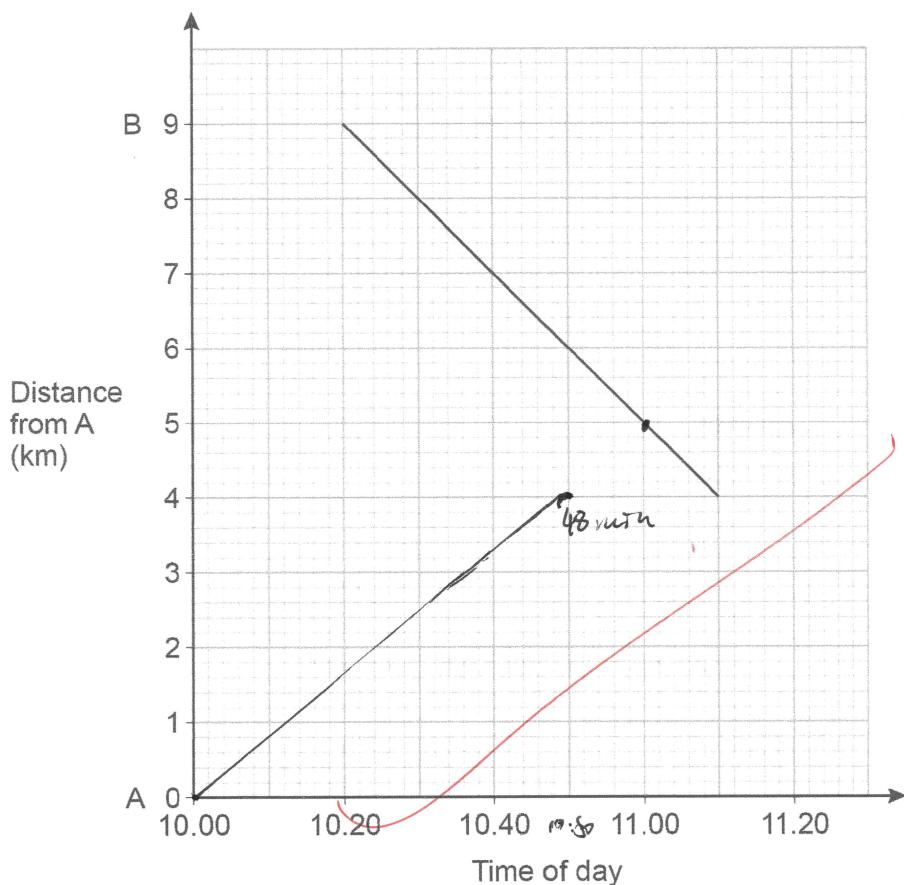
A distance-time graph for Sabine is shown on the grid.

Nadia left A at 10.00, walking towards B at a speed of 5 km/h

After walking 4 km she stopped and waited for Sabine to arrive.

- 6 (a) On the same grid, draw a distance-time graph for Nadia.

[3 marks]



- 6 (b) Use the two graphs to work out how long Nadia waited for Sabine to arrive.

[1 mark]

Answer _____

22

minutes



0 4

7

The table shows information about the widths of 80 picture frames.

Do not write outside the box

Width, w (cm)	Frequency	Midpoint
$20 \leq w < 30$	18	25
$30 \leq w < 40$	20	
$40 \leq w < 50$	33	
$50 \leq w < 60$	9	
	Total = 80	

Work out an estimate of the mean width.

[3 marks]

Answer cm

Turn over for the next question



Turn over ►



8

$$x^c \div x^4 = x^6 \times x^8$$

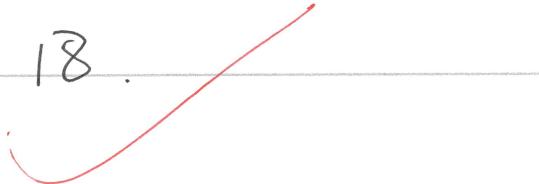
Work out the value of c .

[2 marks]

$$x^{c-4} = x^{6+8}$$

$$c-4=14 \quad c=18$$

Answer 18



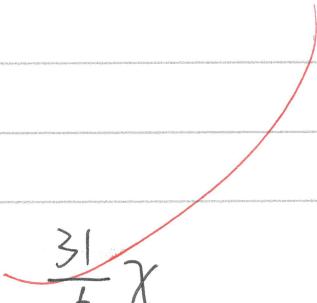
9

Simplify fully $\frac{5x-6}{3} + \frac{7x+4}{2}$

[3 marks]

$$\begin{aligned} &= \frac{10x-12 + 21x+12}{6} \\ &= \frac{31x}{6} \end{aligned}$$

Answer $\frac{31}{6}x$



0 6

IB/M/Nov19/9260/1E

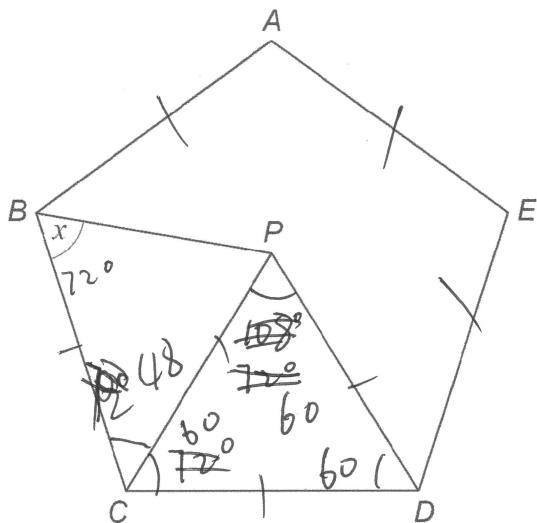
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10

 $ABCDE$ is a regular pentagon. CPD is an equilateral triangle.Angle $CBP = x$

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Not drawn accurately

Work out the size of angle x .

[5 marks]

$$\frac{180 \times 3}{5} = 108^\circ$$

$$\angle BCP = 108^\circ - 60^\circ \\ = 48^\circ$$

$$BC = CP$$

$$\frac{180^\circ - 48^\circ}{2} = 66^\circ$$

Answer

~~66~~ 66

10

Turn over ►



0 7

IB/M/Nov19/9260/1E

11

Two numbers are in the ratio 9 : 13

The difference between the numbers is 504

Work out the two numbers.

[3 marks]

Set Number 1 = 9x, Number 2 = 13x.

$$13x - 9x = 504$$

$$x = 126$$

~~N₁~~ = 1134, N₂ = 1638.

Answer 1134 and 1638



0 8

12

Use a ruler and compasses for this question.

X, Y and Z are points on horizontal ground.

A ball is rolled along the ground.

The ball stops

6 m from Z

an equal distance from X and Y.

On the scale diagram, show the point where the ball stops.

Label this point B.

[4 marks]

Scale: 1 cm represents 1 m



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7

Turn over ►



0 9

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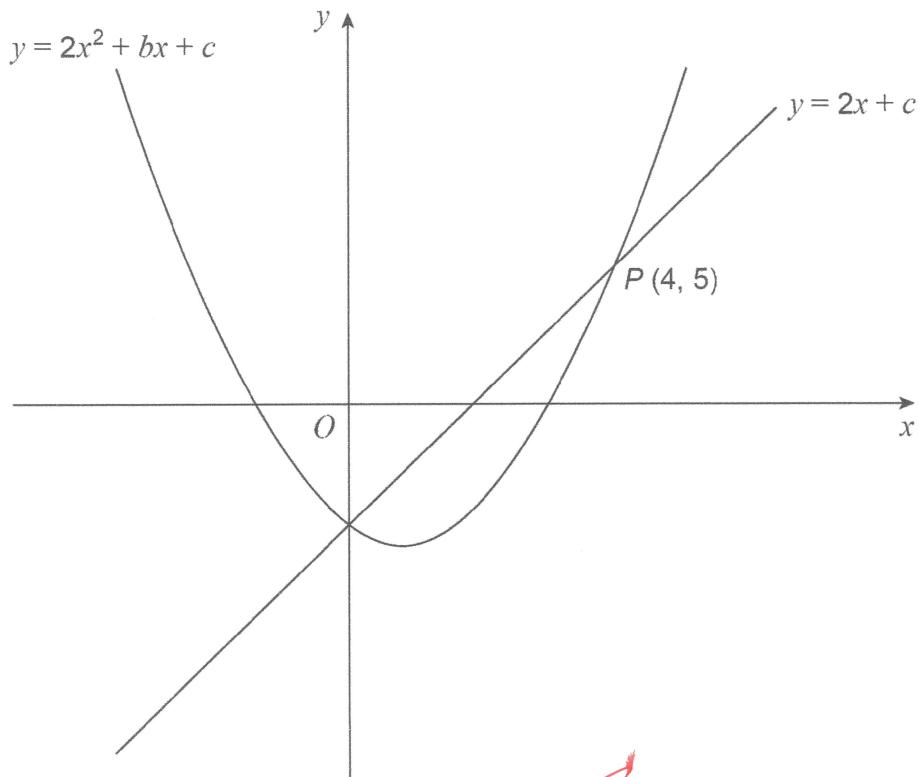
13

Here are sketch graphs of

$$y = 2x + c \quad \text{and} \quad y = 2x^2 + bx + c$$

 $P(4, 5)$ is a point of intersection.

Do not write outside the box

13 (a) Show that $c = -3$

[1 mark]

$$5 = 8 + c$$

$$\cancel{c = -3}$$

13 (b) Work out the value of b .

[3 marks]

$$\because y = 2x - 3$$

$$(0, -3)$$

$$\left\{ \begin{array}{l} -3 = c \\ 5 = 32 + 4b - 3 \end{array} \right.$$

$$b = \frac{-35}{-6}, c = -3$$

Answer

$$\cancel{b = -24/6} \quad b = -6$$

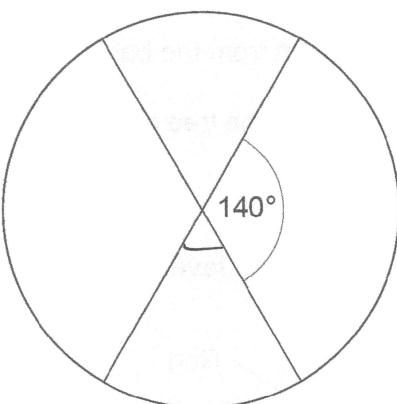


14

A circle has radius 15 cm

Two diameters divide the circle into four sectors as shown.

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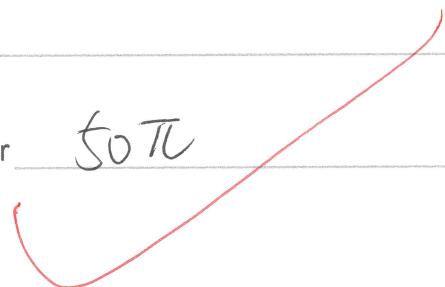
Not drawn
accurately

Work out the total shaded area.

[3 marks]

$$2 \left(\frac{40}{360} \times 15^2 \pi \right) \approx 50\pi$$

Answer 50π cm²



Turn over for the next question



15

A bag contains counters.

Each counter is either red or blue.

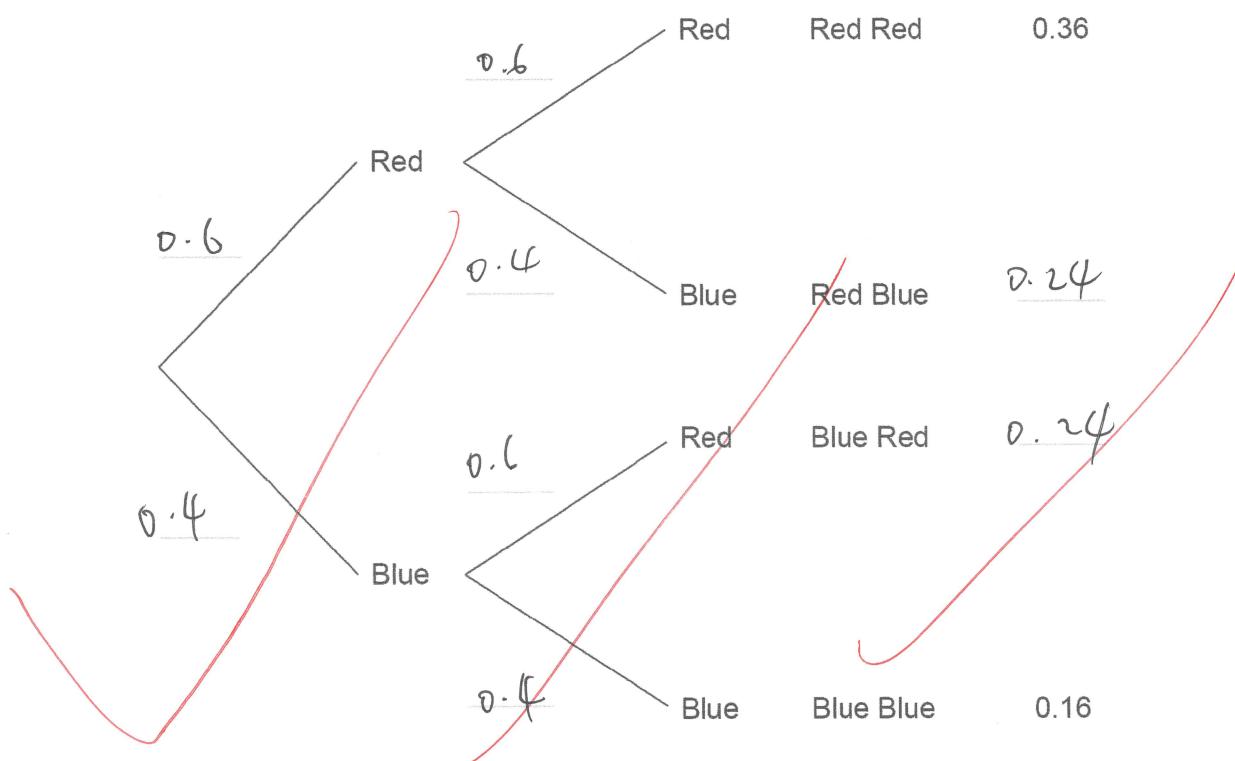
In a game, Indira takes a counter at random from the bag and then replaces it. Javed then takes a counter at random from the bag.

15 (a) Fill in all eight missing probabilities on the tree diagram.

[4 marks]

Do not write outside the box

Indira	Javed	Outcome	Probability
--------	-------	---------	-------------



- 15 (b) Indira wins if the counters are the same colour.
 Javed wins if the counters are different colours.
 Indira says,

"I am more likely to win than Javed is."

Is Indira correct?

You must show your working.

[2 marks]

$$\begin{aligned} P(I_{\text{win}}) &= 0.36 + 0.36 = 0.72 \\ &= 0.72 \quad \text{True.} \\ P(J_{\text{win}}) &= 0.24 + 0.24 \\ &= 0.48 \quad \text{Indira is more likely to win.} \end{aligned}$$

- 16 m is directly proportional to the cube of r .

$$m = 1000 \quad \text{when} \quad r = 2.5$$

Work out the value of m when $r = 6.5$

[4 marks]

$$k = 4 \quad m = 400r^3$$

$$m = 6.5 \times 400$$

$$m = 2600$$

$$1000 = k(2.5)^3$$

$$k = 64$$

$$m = 64k^3$$

$$m = 17576$$

Answer

$$\cancel{2600} \quad 17576$$

Do not write outside the box



1985
100 cm

Do not write outside the box

- 17 (a) Aakif's height is 2.00 metres, correct to the nearest centimetre.

Circle the minimum height, in metres, Aakif could be.

0.5 cm
1.95

[1 mark]

1.9

1.95

1.995

1.99

- 17 (b) Bags of sweets each have mass 250 grams, correct to the nearest 10 grams.

Work out the upper bound for the total mass of 80 bags of sweets.

Give your answer in kilograms.

[3 marks]

$$250 + 10 = 255 \text{ g}$$

$$255 \text{ g} = 0.255 \text{ kg}$$

$$0.255 \times 80 = 20.4$$

Answer

0.255 20.4

kilograms

18 $y = 5x^2 - 4x$

- 18 (a) Work out the coordinates of the two points where the curve intersects the x -axis. [3 marks]

Do not write outside the box

Answer $(\frac{4}{5}, 0)$ and $(0, 0)$

- 18 (b) The gradient of the curve at the point (n, p) is 1

Work out the values of n and p .

[4 marks]

~~$\frac{dy}{dx} (5x^2 - 4x) / \cancel{x} = 1$~~

$$\begin{aligned} y' &= 10x - 4 \\ 10x - 4 &= 1 \end{aligned}$$

$$10x = 5$$

$$x = \frac{1}{2}$$

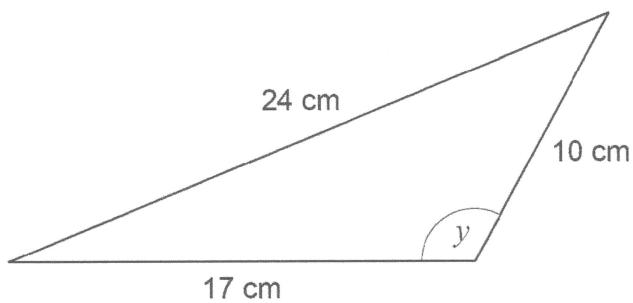
$$(y_2)^2 + 5 - 4 \times \frac{1}{2} = \frac{5}{4} - 2 = -\frac{3}{4}$$

$$n = \frac{1}{2} \quad p = -\frac{3}{4}$$



19

Here is a triangle.

Do not write
outside the
boxNot drawn
accuratelyWork out the size of angle y .

Give your answer to 1 decimal place.

[4 marks]

$$\cos(y) =$$

$$a^2 = b^2 + c^2 - 2ab \cos(y)$$

$$24^2 = 17^2 + 10^2 - 2 \times 17 \times 10 \times \cos(y)$$

$$187 = -340 \cos(y)$$

$$\cos(y) = -\frac{11}{20}$$

$$y = 123.367^\circ$$

Answer

123.367

°

20

Solve $-12x < 3$

Circle your answer.

$$x > -\frac{1}{4}$$

[1 mark]

$$x < -4$$

$$x > -4$$

$$x < -\frac{1}{4}$$

$$x > -\frac{1}{4}$$



21

The ratio of the lengths of two similar solids is 1 : 4

Circle the ratio of their surface areas.

Do not write outside the box

[1 mark]

1 : 4

1 : 8

1 : 16

1 : 64

22 (a) Circle the number that is written in standard form.

[1 mark]

35×10^8

3.5×10^6

$3.5 \times 10^{0.4}$

0.35×10^2

22 (b) $4b \times 10^{2b}$ is a number written in standard form.

Work out all the possible values of b .

[2 marks]

$$2b > 1 \quad 1 \leq b < 10$$

$$b > \frac{1}{2} \quad \cancel{\frac{1}{4} \leq b \leq \frac{5}{2}} \quad \frac{1}{4} \leq b < \frac{5}{2}$$

Answer

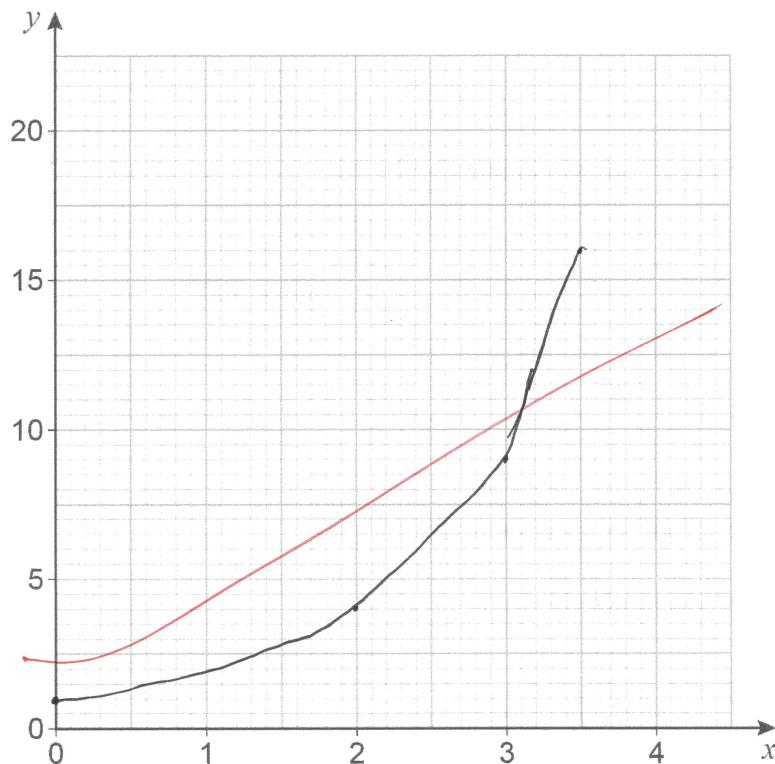
0.5, 1, 1.5, 2



23 (a) Draw the graph of $y = 2^x$ for $0 \leq x \leq 4$

[2 marks]

x	0	1	2	3	4
y					



23 (b) Use your graph to estimate the solution of $2^x = 10$

[1 mark]

Answer

3.32



24 $A = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$ $B = \begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$

24 (a) Work out the matrix BA

[1 mark]

Answer $\begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$

24 (b) Describe geometrically the transformations represented by the following matrices.

[3 marks]

A _____

B _____

BA _____

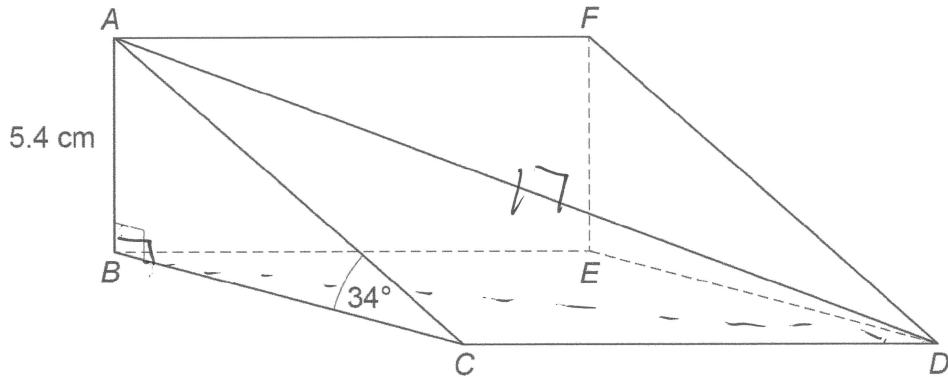
Turn over for the next question



25

ABCDEF is a right-angled triangular prism.

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25 (a) Work out BC.

[2 marks]

$$\tan(34^\circ) = \frac{5.4}{BC}$$

Answer 8.00582923 cm25 (b) $AD = 17$ cm

Work out the size of angle ADB.

[2 marks]

$$BD = \sqrt{17^2 - 5.4^2} = \frac{4}{5}\sqrt{406}.$$

$$\cos \angle ADB = \frac{17^2 + (\frac{4}{5}\sqrt{406})^2 - 5.4^2}{2 \times 17 \times \frac{4}{5}\sqrt{406}}$$

Answer 18.52068851 °

26

By rationalising the denominator, show that $\frac{4+6\sqrt{5}}{4+2\sqrt{5}}$

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box

can be written in the form $a + b\sqrt{5}$ where a and b are integers.

[4 marks]

$$\begin{aligned}
 &= \frac{(4+6\sqrt{5})(4-2\sqrt{5})}{(4+2\sqrt{5})(4-2\sqrt{5})} \\
 &= \frac{16 - 8\sqrt{5} + 24\sqrt{5} - 12\sqrt{5}}{16 - 20} \\
 &= \frac{-44 + 16\sqrt{5}}{-4} \\
 &= 11 - 4\cancel{\sqrt{5}}
 \end{aligned}$$

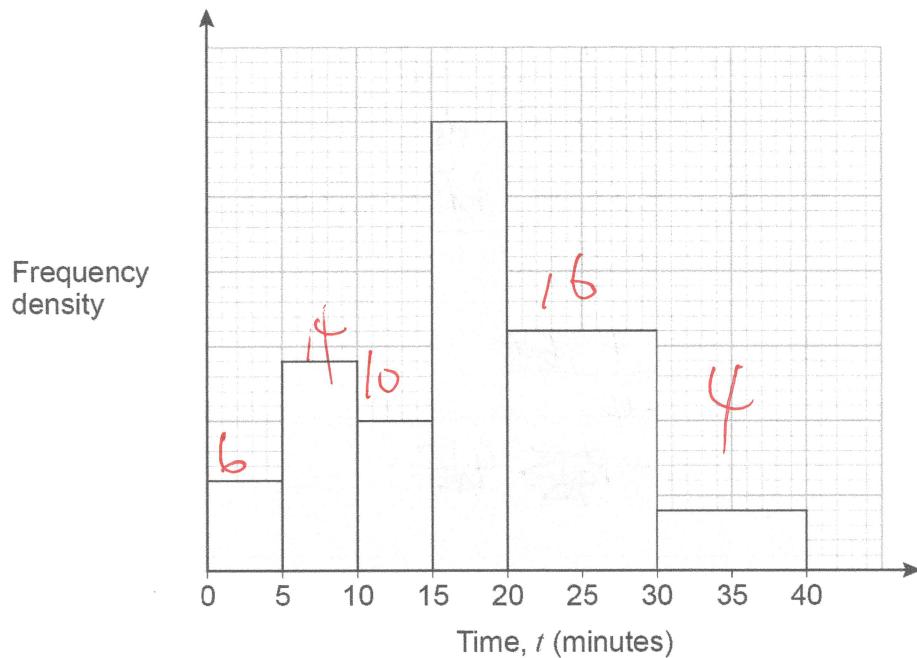
Turn over for the next question



27

The histogram shows information about the total time that patients spent at a doctors' surgery in one month.

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27 (a) Work out the percentage of patients with a total time in the interval $20 < t \leq 30$

[3 marks]

Answer

32%

%



2 2

- 27 (b) 120 patients spent 5 minutes or less at the surgery.

Work out the total number of patients at the surgery that month.

[2 marks]

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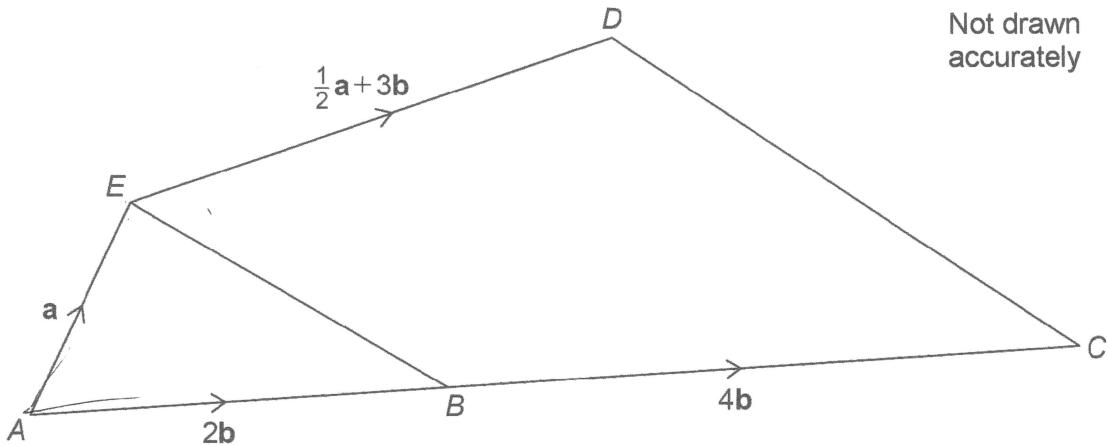
Answer

200

Turn over for the next question



28

Do not write
outside the
boxShow that BE is parallel to CD .

[3 marks]

$$\begin{aligned} \cancel{\overrightarrow{EB}} \cdot \cancel{\overrightarrow{BE}} &= a \cancel{+ 2b} - 2b \cdot 2b = a - 2b \\ \cancel{\overrightarrow{CD}} \cdot \cancel{\overrightarrow{DC}} &= 2b + 4b = \\ &\quad \cancel{|(-a + 2b)} \end{aligned}$$

$$\begin{aligned} \overrightarrow{EB} &= -a + 2b \\ \overrightarrow{DC} &= -\frac{1}{2}a - 3b - a + 2b + 4b \\ &= -\frac{3}{2}a + 3b \\ \overrightarrow{EB} \times \frac{3}{2} &= \overrightarrow{DC} \\ \therefore \overrightarrow{BE} &\parallel \overrightarrow{CD}. \end{aligned}$$

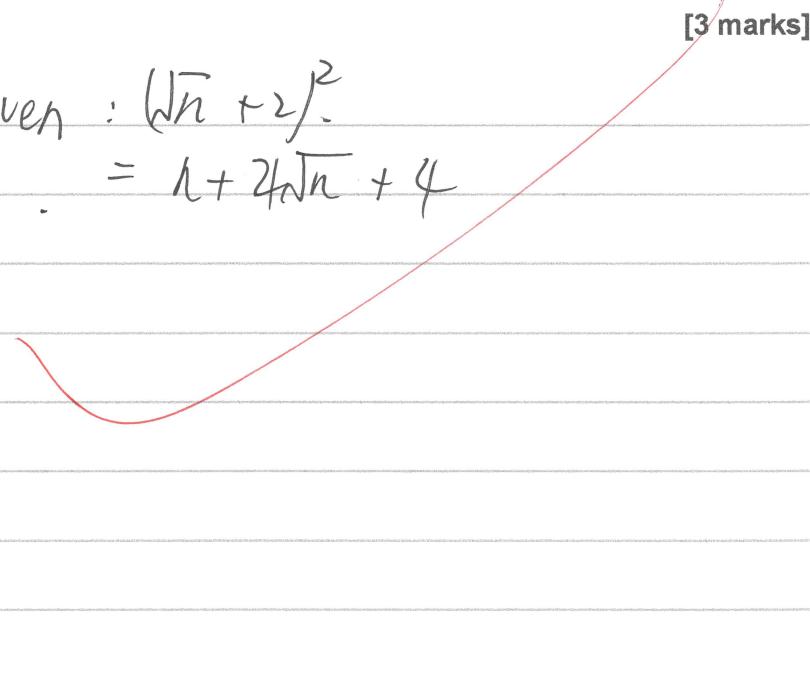


29

n is an even square number.Do not write
outside the
box

Show that the next even square number can be written in the form $n + a\sqrt{n} + a$
 where a is an integer.

[3 marks]

$$\begin{aligned}\text{Next even : } & (\sqrt{n} + 2)^2 \\ & = n + 2\sqrt{n} + 4\end{aligned}$$


Turn over for the next question

6

Turn over ►



2 5

IB/M/Nov19/9260/1E

30 $f(x) = x^2 - x - 1$

$$g(x) = 1 + \frac{1}{x} \quad x \neq 0$$

30 (a) Write $f(x)$ in the form $(x - a)^2 - b$ where a and b are constants.

[2 marks]

$$f(x) = (x - \frac{1}{2})^2 - \frac{5}{4}$$

Answer $f(x) = (x - \frac{1}{2})^2 - \frac{5}{4}$

30 (b) State the range of $f(x)$

[1 mark]

$$x \geq \frac{1}{2}, y$$

Answer $f(x) \geq -\frac{5}{4}$



2 6

30 (c) Work out an expression for $g^{-1}(x)$

[3 marks]

Do not write outside the box

$$x = 1 + \frac{1}{y}$$

$$xy = y + 1$$

$$xy - y = 1$$

$$y(x-1) = 1$$

$$y = \frac{1}{x-1}$$

Answer

$$f = g^{-1}(x) = \frac{1}{x-1}$$

END OF QUESTIONS



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2 8

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3 2



1 9 B Y 9 2 6 0 / 1 E

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