

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

GCSE MATHEMATICS

Higher Tier Paper 2 Calculator

H

Monday 3 June 2024

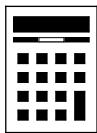
Morning

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a calculator
- mathematical instruments
- the Formulae Sheet (enclosed).



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 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

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	
TOTAL	

Advice

In all calculations, show clearly how you work out your answer.



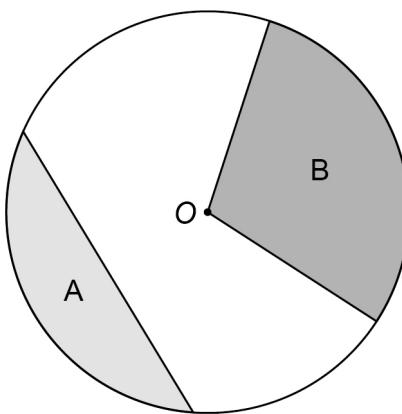
J U N 2 4 8 3 0 0 2 H 0 1

IB/M/Jun24/G4007/E10

8300/2H

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

1 The diagram shows a circle, centre O, and three straight lines.



Use **one** word to describe each shaded region.

Choose from

 arc chord sector segment tangent

[2 marks]

Region A _____

Region B _____



0 2

IB/M/Jun24/8300/2H

2 The mass of an iceberg is 2200 000 kg

This value is a 12% reduction from the **original** mass of the iceberg.

Work out the **original** mass of the iceberg.

Give your answer in standard form.

[3 marks]

Answer _____ kg

Turn over for the next question

*Do not write
outside the
box*

5

Turn over ►



0 3

IB/M/Jun24/8300/2H

3 A chef has a tub of blueberries.

She wants to

use all the blueberries
put the same number of blueberries on each dessert.

$$D = \frac{k}{b}$$

D is the number of desserts.

b is the number of blueberries on each dessert.

3 (a) What does the constant k represent?

Tick the correct box.

[1 mark]

The number of blueberries in the tub

The number of desserts

The number of blueberries on each dessert

None of the above

3 (b) Complete the table.

[2 marks]

b	2	6	
D	120		30

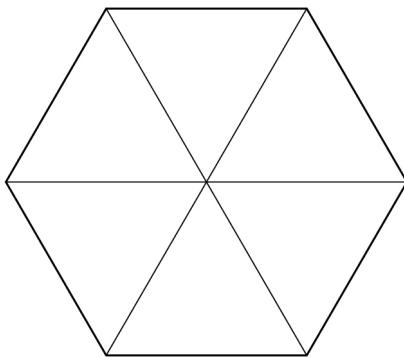


4 (a) A fair spinner has six equal sections, each with the number 5, 6, 7 or 8
 Each number appears at least once.
 $P(\text{even number}) = P(7)$

Work out $P(5)$

You may use the blank spinner to help you.

[3 marks]



Answer _____

4 (b) A different spinner has ten sections, each labelled A, B, C or D.

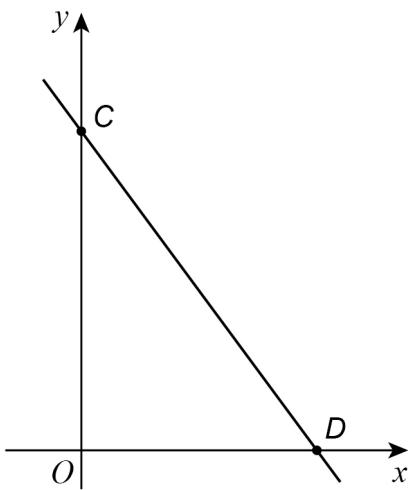
	A	B	C	D
Probability	0.1	0.5	0.2	0.3

Give **one** reason why there **must** be a mistake in the table.

[1 mark]



5 (a) Here is a sketch of the graph $y = -2x + 6$

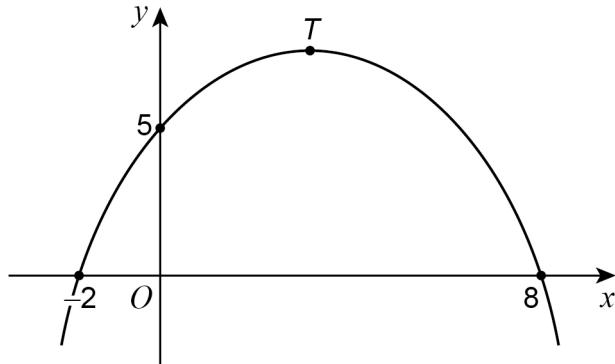


Complete the coordinates of C and D.

[2 marks]

$$C(0, \underline{\hspace{2cm}}) \quad D(\underline{\hspace{2cm}}, 0)$$

5 (b) Here is a sketch of a quadratic graph.



Complete the following statements.

[2 marks]

The value of the **y -intercept** is

The **x -coordinate** of the turning point, T , is



6Work out $(2.5 \times 10^4)^{-3}$

Give your answer in standard form.

[1 mark]

Answer _____

7

Archie flips a biased coin 200 times.

Here is some information about the outcomes after each 50 flips.

Total number of flips	50	100	150	200
Number of heads	10	27	37	52

Work out the best estimate for the probability of flipping a head.

Give a reason for your answer.

[2 marks]

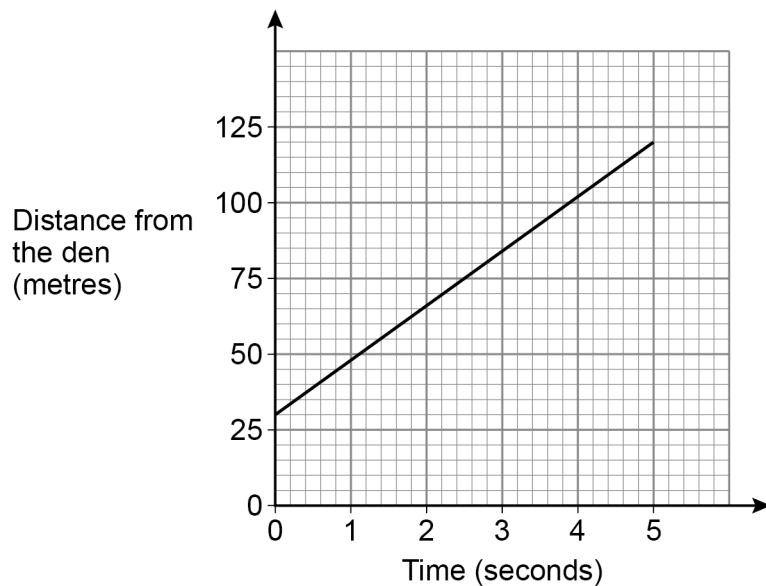
Answer _____

Reason _____



8 A lion is sprinting in a straight line away from its den.
The graph shows the lion's distance from the den.

Do not write
outside the
box



Work out the speed of the lion in metres per second.

[3 marks]

Answer _____ m/s



0 8

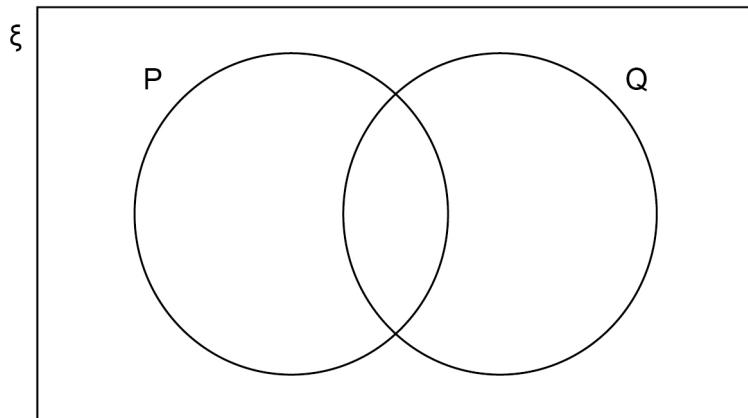
IB/M/Jun24/8300/2H

9

On the Venn diagram, shade the section represented by $P \cap Q$

[1 mark]

Do not write
outside the
box



10

A bus route had 90 000 passengers last year.

The number of passengers was predicted to increase

by 3% this year

and then

by 8% next year.

Is the predicted number of passengers for **next** year more than 100 000 ?

You **must** show your working.

[3 marks]



11

A map has a scale of 1:20 000

Two churches are 15 cm apart on the map.

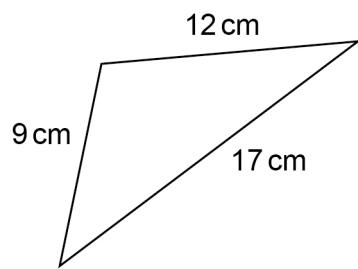
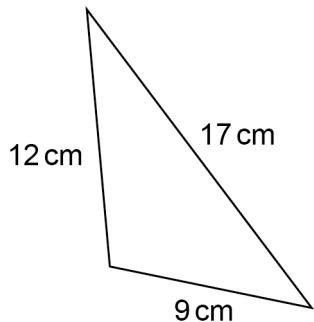
Work out the actual distance between them.

Give your answer in **kilometres**.

[3 marks]

Answer _____ km

12



Not drawn
accurately

Circle the reason why these triangles are congruent.

[1 mark]

ASA

RHS

SAS

SSS



1 0

13 Liam takes part in long jump

Here is some information about 40 of his jumps.

Length of jump, d metres	Number of jumps	Midpoint	
$7.0 \leq d < 7.4$	15		
$7.4 \leq d < 7.8$	18		
$7.8 \leq d < 8.2$	7		
Total = 40			

Work out an estimate of the mean distance of these 40 jumps.

Give your answer as a decimal.

[3 marks]

Answer _____ m



14 A graph passes through the points $(3, 15)$ and $(7, w)$

14 (a) Assume that the equation of the graph has the form $y = x^2 + c$

Work out the value of w that this would give.

[3 marks]

$w =$

14 (b) In fact, the graph is a straight line.

What does this mean about the actual value of w ?

Tick one box.

[1 mark]

It must be the same as the value in part (a)

1

It must be different to the value in part (a)

1

It is impossible to tell



15

Concrete from a truck is poured at 10.9kg **per second** for 30 minutes.

$$1000 \text{ kg} = 1 \text{ tonne}$$

Is more than 20 tonnes of concrete poured?

Tick a box.

Yes

1

No

1

You **must** show your working.

[4 marks]



16

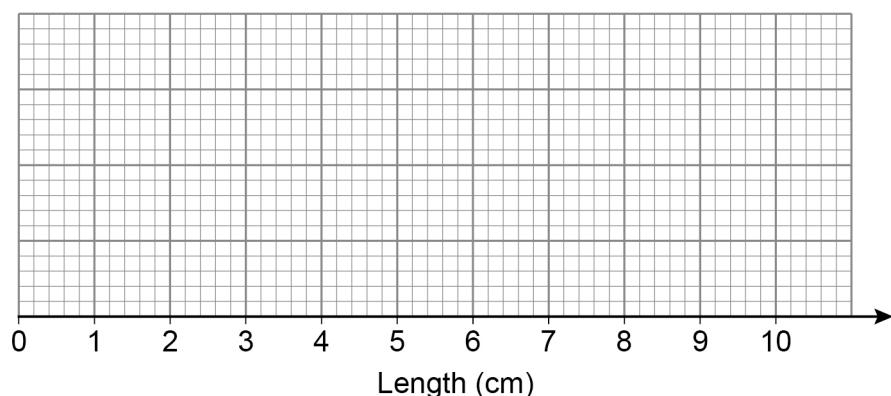
Here is some information about the lengths, in cm, of leaves.

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outside the
box*

- Shortest length = 2.4
- Longest length = 9
- Upper quartile = 7
- Median length = 6
- Interquartile range = 3

Draw a box plot to show this information.

[3 marks]



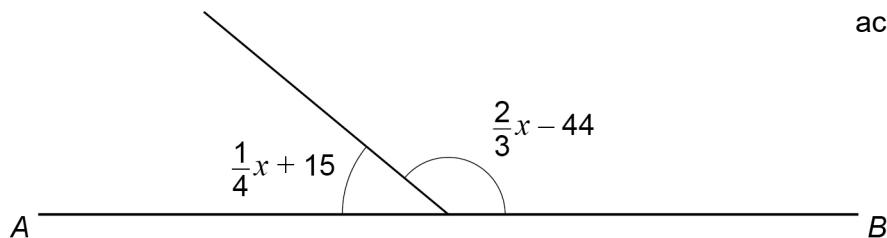
1 4

17

AB is a straight line.

Both angles are given in degrees.

Not drawn accurately



By working out the value of x ,

work out the ratio smaller angle : larger angle

[4 marks]

Answer _____ :



18 A diagonal of a rectangle is 23.7 cm long.

The diagonal makes an angle of 52° with a side of length x cm

Work out the value of x .

[3 marks]

$x =$



19 (a) Show that $4x(3x + 2) - 2x^2\left(6 - \frac{5}{x}\right) - 6x\left(3 + \frac{7}{x}\right)$ simplifies to an integer.

[3 marks]

19 (b) Factorise $8x^2 - 18x - 35$

[2 marks]

Answer



20
$$(x - 9) = \frac{2(6 - x^2)}{x + 3} \quad \text{and} \quad x = \frac{d \pm \sqrt{e}}{f}$$

Work out one set of possible values for d , e and f .

[4 marks]

$$d =$$

e =

$$f = \underline{\hspace{2cm}}$$



21 People in a stadium are in the North Stand, East Stand, South Stand or West Stand. Of the people in the stadium,

$\frac{1}{4}$ are in the North Stand

$\frac{3}{10}$ are in the East Stand

number in South Stand : number in West Stand = 2 : 7

There are 4480 people in the West Stand.

How many people are in the stadium?

[4 marks]

Answer

Turn over for the next question



22

$$x_{n+1} = 5 - \frac{1}{x_n}$$

Use $x_1 = 1$ to work out an approximate solution to $x = 5 - \frac{1}{x}$

Give your answer to 4 significant figures.

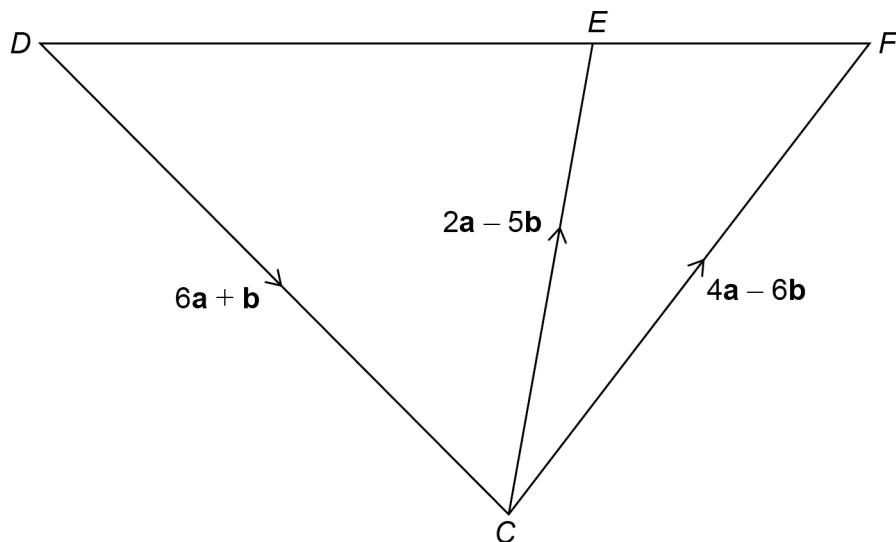
[3 marks]

$$x = \underline{\hspace{2cm}}$$

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23



Do not write
outside the
box

Not drawn
accurately

Prove that DEF is a straight line.

[4 marks]

7

Turn over ►



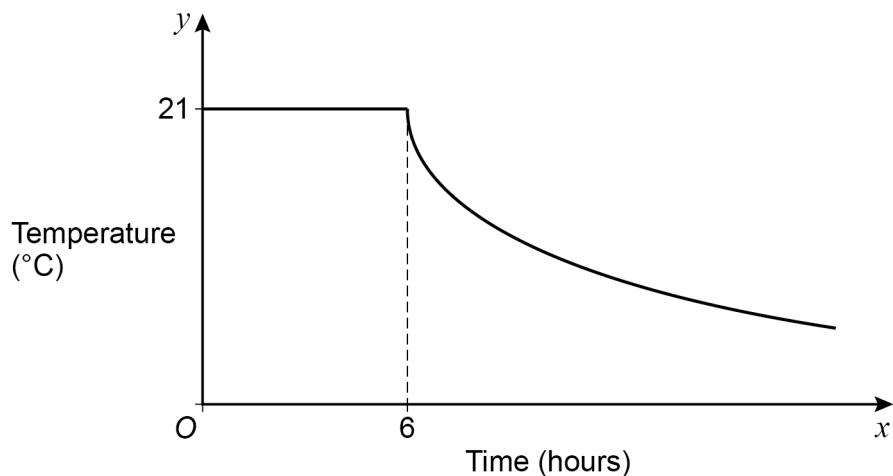
2 1

24

A room is kept at a constant temperature of 21°C for 6 hours.

The heating is then turned off and the room begins to cool.

Here is a sketch graph showing the temperature, $y^{\circ}\text{C}$, of the room at time x hours.



24 (a) Assume the equation of the curved part is $y = \frac{k}{x}$ where k is a constant.

Work out the value of y when $x = 12$

[2 marks]

$$y = \underline{\hspace{2cm}}$$



24 (b) In fact,

the equation of the curved part is $y = A \times \left(\frac{1}{3}\right)^{\frac{1}{6}x}$ where A is a **different** constant.

How does this affect the value of y when $x = 12$?

Tick **one** box.

You **must** show working to support your answer.

[2 marks]

The value of y is greater than the answer to part (a).

The value of y is less than the answer to part (a).

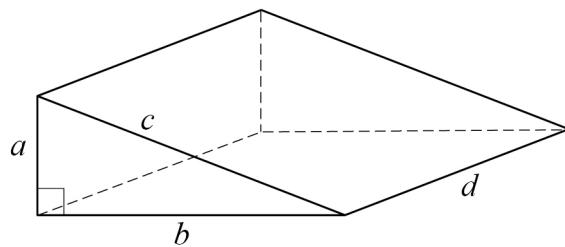
The value of y is the same as the answer to part (a).

Turn over for the next question



25

Here is a right-angled triangular prism.



The ratio of the edges is $a : b : c : d = 3 : 4 : 5 : 12$

The **volume** of the prism is 1125cm^3

Work out the total length of **all** of the edges of the prism.

[5 marks]

Answer cm

END OF QUESTIONS

There are no questions printed on this page

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outside the
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ANSWER IN THE SPACES PROVIDED**



2 5

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Question number	<p style="text-align: center;">Additional page, if required. Write the question numbers in the left-hand margin.</p>



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