Write your name here

Surname	Other names

Pearson Edexcel International GCSE

Centre Number	Candidate Number

Mathematics A

Practice paper 4H



Higher Tier

Time: 2 hours

Paper Reference **4MA1/PP4H**

You must have:
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

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.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – *there may be more space than you need*.
- **Calculators may be used.**
- You must **NOT** write anything on the formula page.
  Anything you write on the formulae page will gain no credit.

Information

- The total mark for this paper is 100.
- 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.
- Check your answers if you have time at the end.

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Arithmetic series

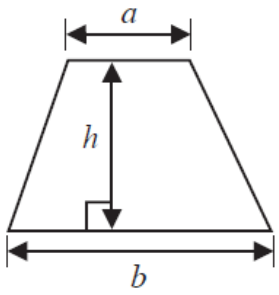
Sum to n terms, $S_n = \frac{n}{2}[2a + (n-1)d]$

The quadratic equation

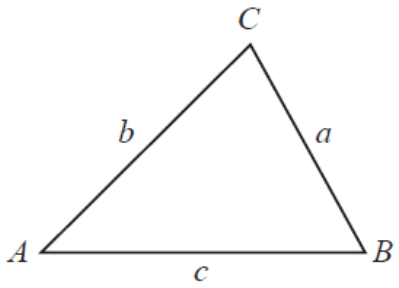
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Area of trapezium $= \frac{1}{2}(a+b)h$



Trigonometry



In any triangle ABC

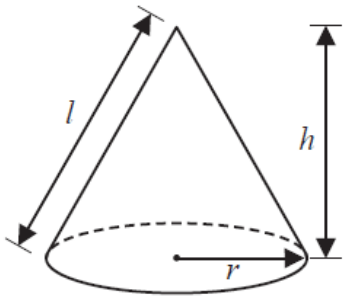
Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc\cos A$

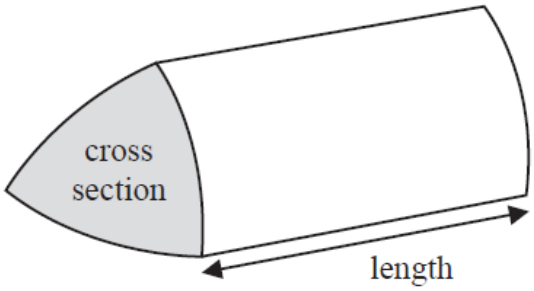
Area of triangle $= \frac{1}{2}ab\sin C$

Volume of cone $= \frac{1}{3}\pi r^2 h$

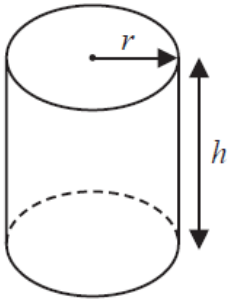
Curved surface area of cone $= \pi r l$



Volume of prism
= area of cross section × length

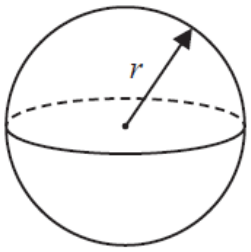


Volume of cylinder $= \pi r^2 h$
Curved surface area of cylinder $= 2\pi r h$



Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of sphere $= 4\pi r^2$

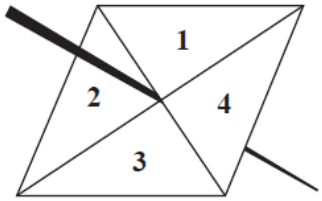


Answer ALL TWENTY THREE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Here is a biased 4-sided spinner.



The spinner is spun.

The table shows the probability that the spinner lands on 1 and the probability that it lands on 2.

Number	1	2	3	4
Probability	0.15	0.4		

(*a*) Work out the probability that the spinner will land on 1 or on 2.

.....

(1)

The probability that the spinner will land on 3 is twice the probability that the spinner will land on 4.

(*b*) Work out the probability that the spinner will land on 3.

.....

(2)

Daljit is going to spin the spinner 160 times.

(*c*) Work out an estimate for the number of times the spinner will land on 2.

.....

(2)

(Total for Question 1 is 5 marks)

2 y is an integer.

$-2 < y \leqslant 3$

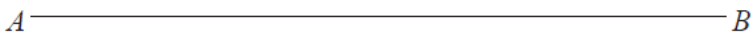
Write down all the possible values of y.

.....

(Total for Question 2 is 2 marks)

---

3 Use ruler and compasses only to construct the perpendicular bisector of line AB.
You must show all your construction lines.



(Total for Question 3 is 2 marks)

---

4 2.2×10^7 passengers passed through Beijing Capital International Airport in 2014.

(*a*) Write 2.2×10^7 as an ordinary number.

.....

(1)

950 000 tonnes of cargo traffic passed through Tokyo International Airport in 2014.

(*b*) Write 950 000 as a number in standard form.

.....

(1)

(*c*) Work out $\dfrac{4.2 \times 10^4}{700\,000}$

Give your answer in standard form.

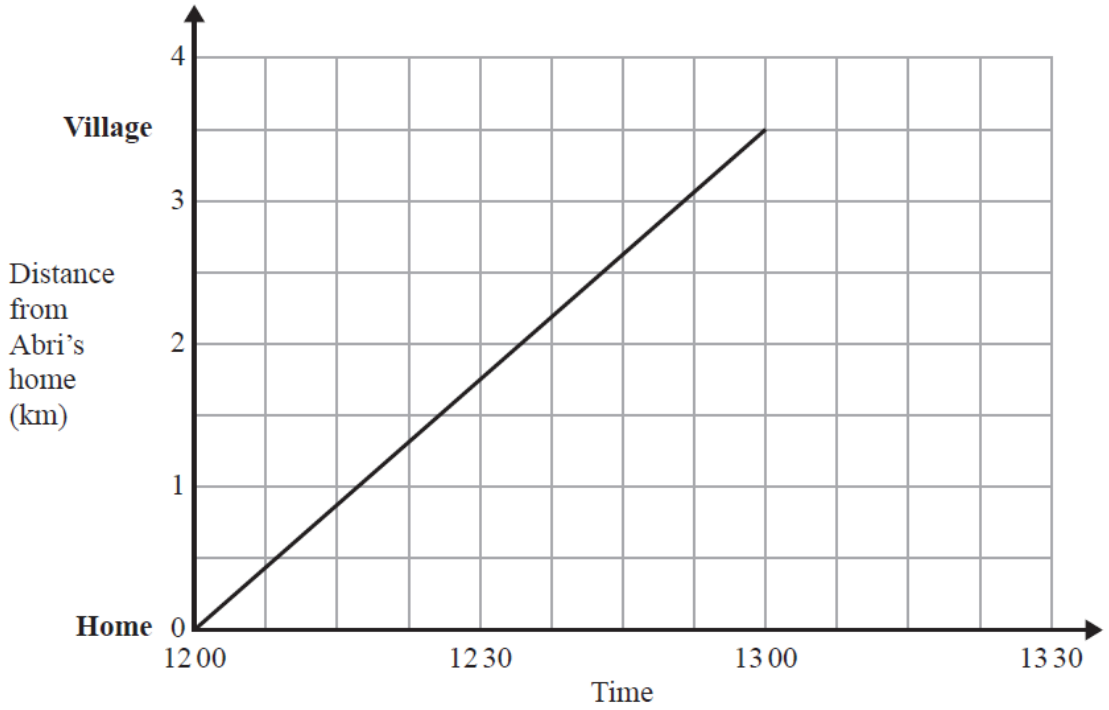
.....

(1)

(Total for Question 4 is 4 marks)

---

5 Abri walks along a path from her home to a local village.
Here is the distance-time graph for her journey from her home to the village.



Benito leaves the village at 12 30 and walks at a constant speed along the same path to Abri's home.
He arrives at Abri's home at 13 15

(*a*) Show the information about Benito's journey on the grid.

(2)

(*b*) How far from the village were Abri and Benito when they passed each other?

..... km

(1)

(Total for Question 5 is 3 marks)

6 $P \cup Q = \{a, b, c, d, e, f\}$

$P \cap Q = \{e\}$

$a \in P, \quad c \in Q, \quad f \notin Q, \quad \{b, d\} \cap Q = \varnothing$

(*a*) List the members of the set *P*.

.....

(2)

(*b*) List the members of the set *Q*.

.....

(1)

(Total for Question 6 is 3 marks)

---

7 Solve $\frac{3-5m}{4} = 8$

Show clear algebraic working.

m = ...

(Total for Question 7 is 3 marks)

---

8 The diagram shows the positions of two towns, A and B.

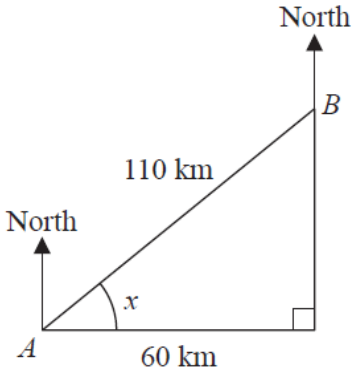


Diagram **NOT** accurately drawn

The distance from A to B is 110 km.
B is 60 km east of A.

(a) Work out the size of angle x.
Give your answer correct to 1 decimal place.

.....°
(3)

(b) Work out the bearing of B from A.
Give your answer correct to the nearest degree.

..... °
(2)

The distance from A to B is 110 km correct to 2 significant figures.

(c) (i) Write down the lower bound for the distance from A to B.

..... km

(ii) Write down the upper bound for the distance from A to B.

..... km
(2)

(Total for Question 8 is 7 marks)

9 Solve the simultaneous equations

$$5x - 2y = 33$$

$$5x + 8y = 18$$

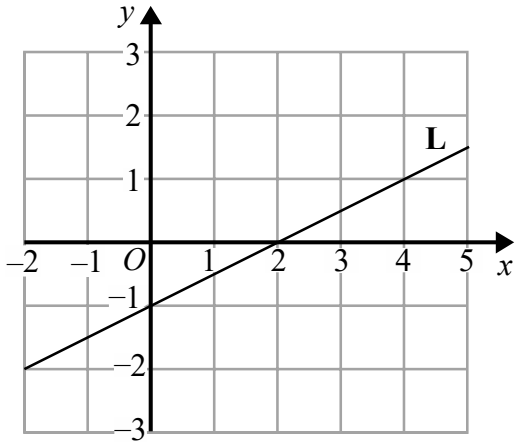
Show clear algebraic working.

$x =$ .....

$y =$ .....

(Total for Question 9 is 3 marks)

10 The straight line **L** is shown on the grid.



(*a*) Find an equation of **L**.

.....

(2)

(*b*) Find an equation of the line that is parallel to **L** and passes through the point (5, 4)

.....

(2)

(Total for Question 10 is 4 marks)

11 Here is a regular 10-sided polygon.

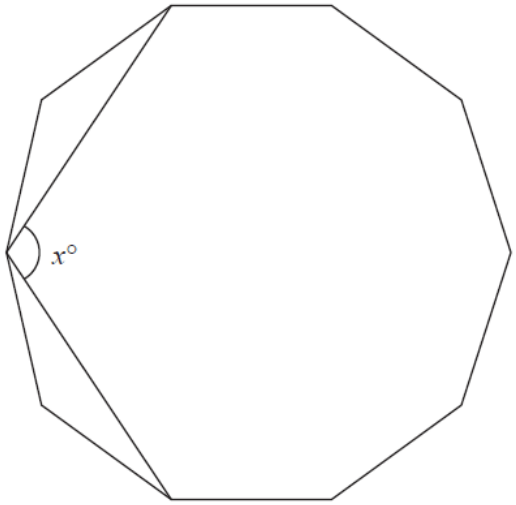


Diagram **NOT** accurately drawn

Work out the value of x.
Show your working clearly.

x = ...

(Total for Question 11 is 4 marks)

12 Make t the subject of $5(t - g) = 2t + 7$

.....

(Total for Question 12 is 3 marks)

---

13 Amil invests £9000 for 3 years in a savings account.
He gets 1.8% per year compound interest.

How much money will Amil have in his savings account at the end of 3 years?

£.....

(Total for Question 13 is 3 marks)

14

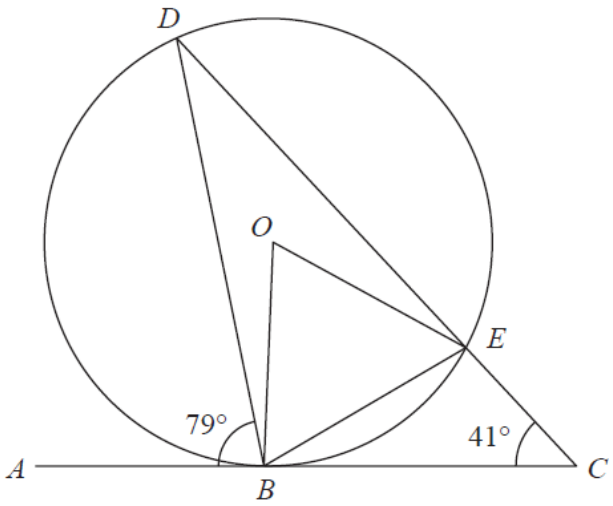


Diagram **NOT** accurately drawn

B, *D* and *E* are points on a circle, centre *O*.
ABC is a tangent to the circle.
DEC is a straight line.
Angle *ABD* = 79° and angle *ECB* = 41°

(*a*) Write down the size of angle *BED*.

..... °
(1)

(*b*) Work out the size of angle *BOE*.

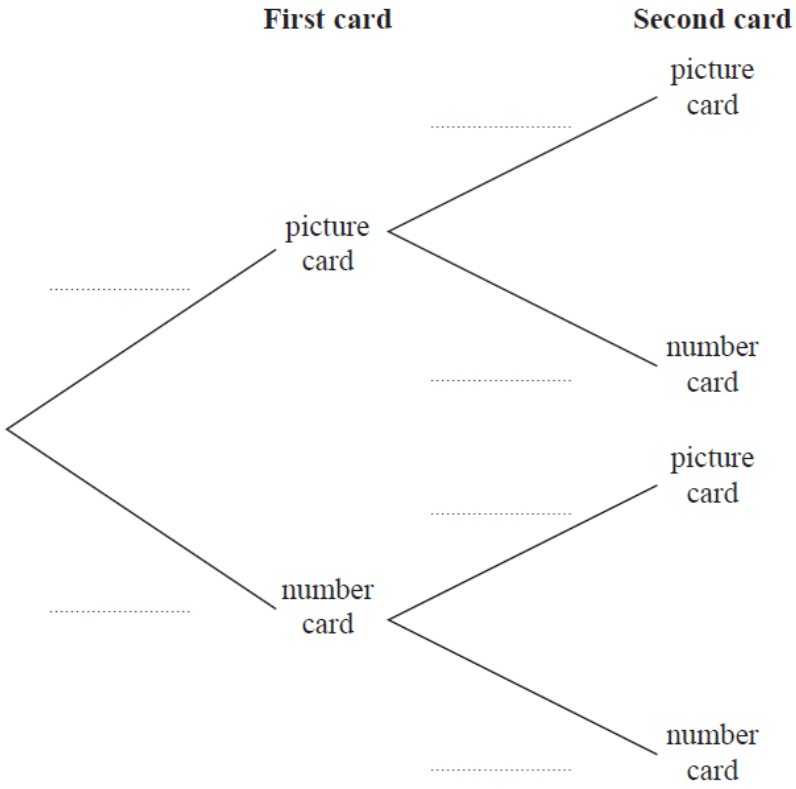
..... °
(2)

(Total for Question 14 is 3 marks)

15 There are 52 cards in a pack.
12 cards are picture cards.
40 cards are number cards.

Melina takes at random a card from the pack.
She keeps the card and then takes at random a second card from the remainder of the pack.

(*a*) Complete the probability tree diagram.



(3)

(*b*) Work out the probability that the two cards Melina takes are both picture cards or both number cards.

.....

(3)

(Total for Question 15 is 6 marks)

16 P is directly proportional to r^3
$P = 343$ when $r = 3.5$

Find a formula for P in terms of r.

.....

(Total for Question 16 is 3 marks)

17

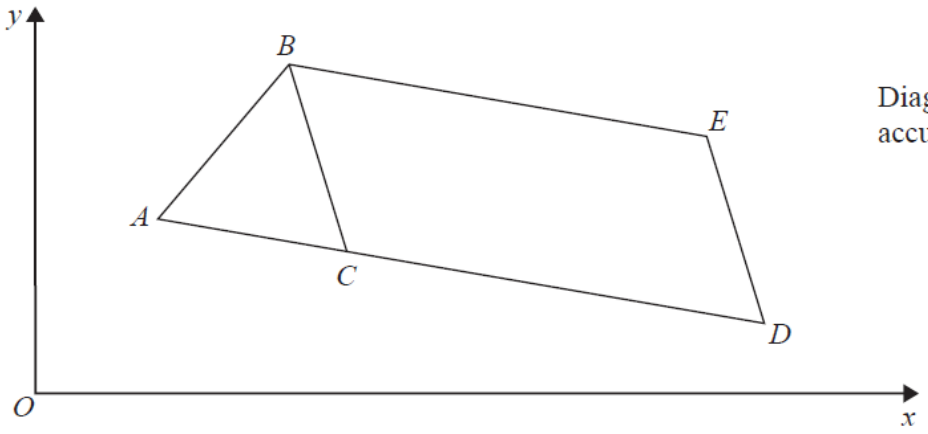


Diagram **NOT** accurately drawn

$\overrightarrow{AB} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ and $\overrightarrow{AC} = \begin{pmatrix} 4 \\ -1 \end{pmatrix}$

(*a*) Find, as a column vector, $\overrightarrow{BC}$

.....

(2)

BCDE is a parallelogram.

$\overrightarrow{CD} = 2\overrightarrow{AC}$

(*b*) Find the length of *CE*.
Give your answer correct to 2 decimal places.

.....

(3)

(Total for Question 17 is 5 marks)

18 $g = 2^3 \times 3 \times 7^2$ $h = 2 \times 3 \times 7^3$

(*a*) Express gh as a product of powers of its prime factors.
Simplify your answer.

.....

(2)

$$\frac{g}{h} = 2^a \times 3^b \times 7^c$$

(*b*) Find the value of a, the value of b and the value of c.

a = ...

b = ...

c = ...

(2)

(*c*) Show that $(7 - 2\sqrt{5})(7 + 2\sqrt{5}) = 29$
Show your working clearly.

(2)

$$\frac{1}{\sqrt[3]{9^4}} = 3^n$$

(*d*) Work out the exact value of *n*.

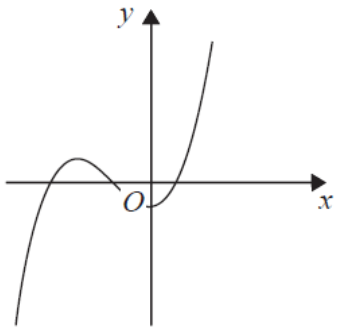
.....

(3)

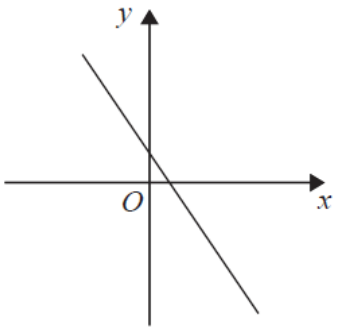
(Total for Question 18 is 9 marks)

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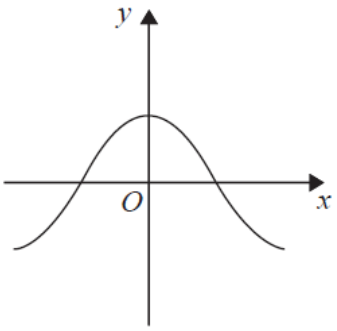
19 Here are nine graphs.



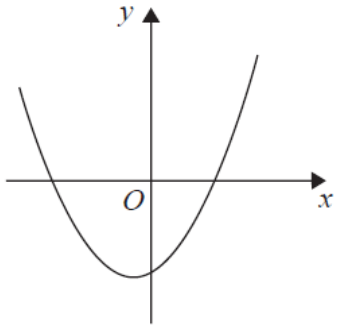
Graph A



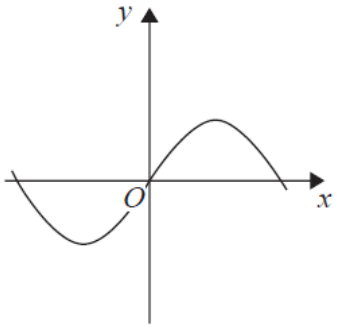
Graph B



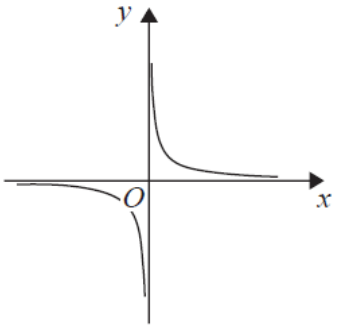
Graph C



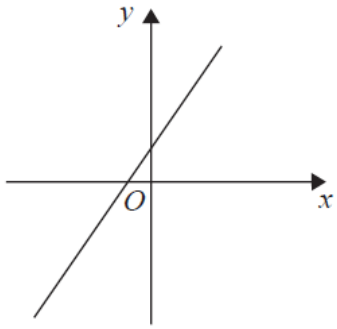
Graph D



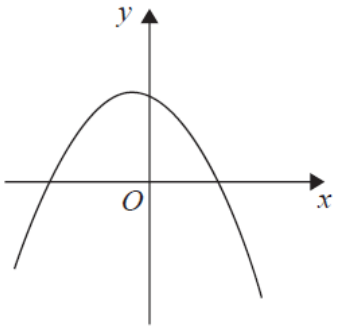
Graph E



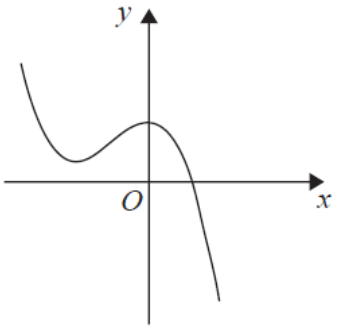
Graph F



Graph G



Graph H



Graph I

Complete the table below with the letter of the graph that could represent each given equation.

Equation	Graph
$y = \sin x$	
$y = 2 - 3x$	
$y = x^2 + x - 6$	
$y = x^3 + 3x^2 - 2$	

(Total for Question 19 is 3 marks)

20 The function f is such that $f(x) = \dfrac{2x}{3x+5}$

(*a*) Find f(−2)

.....

(1)

The function g is such that $g(x) = \dfrac{3}{x+4}$

(*b*) Find $g^{-1}(6)$

.....

(2)

(*a*) Find fg (−5)

.....

(2)

(*d*) Solve the equation f (*x*) = g (*x*)
Show clear algebraic working.

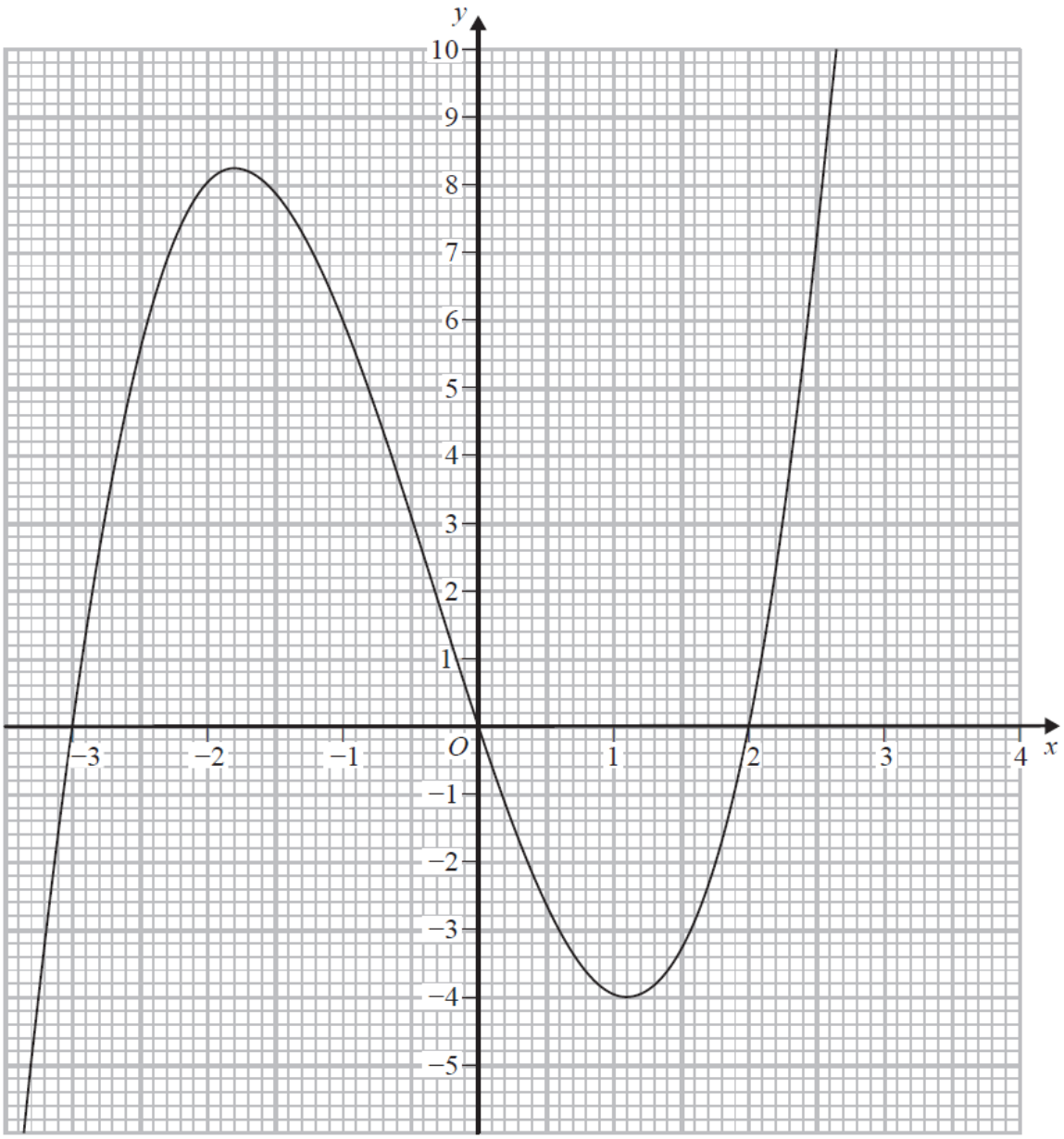
.....

(4)

(Total for Question 20 is 9 marks)

---

21 Here is the graph of $y = \text{h}(x)$



(*a*) Use the graph to find an estimate for the gradient of the curve $y = \text{h}(x)$ at $(-1, 6)$

.....

(3)

(*b*) By drawing a suitable straight line on the grid, find an estimate for the solution of the equation $\text{h}(x) = 7 - 2x$

Give your answer correct to 1 decimal place.

.....

(2)

The equation $\text{h}(x) = k$ has 3 different solutions for $a < k < b$

(*c*) Use the graph to find an estimate for the value of a and the value of b.

$a =$ .....

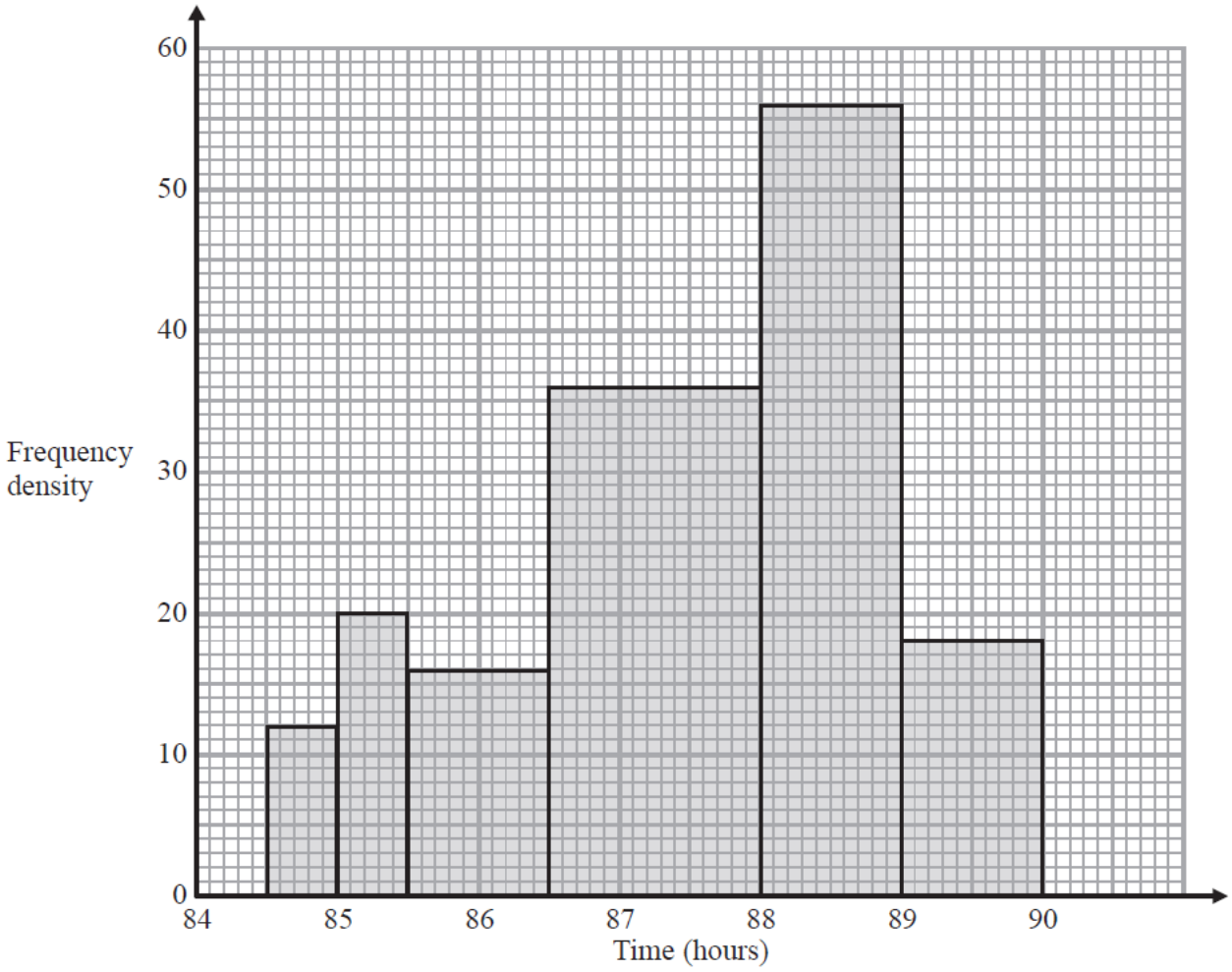
$b =$ .....

(2)

(Total for Question 21 is 7 marks)

---

22 The histogram shows information about the times taken by 160 cyclists to complete the Tour de France cycle race.



6 cyclists took less than 85 hours.

(*a*) Work out an estimate for the number of the 160 cyclists who took less than 86 hours.

.....

(2)

(*b*) For these 160 cyclists, work out an estimate for the time taken by the cyclist who finished in 50th position.

..... hours

(2)

(Total for Question 22 is 4 marks)

---

23 The diagram shows a cuboid *ABCDEFGH*.

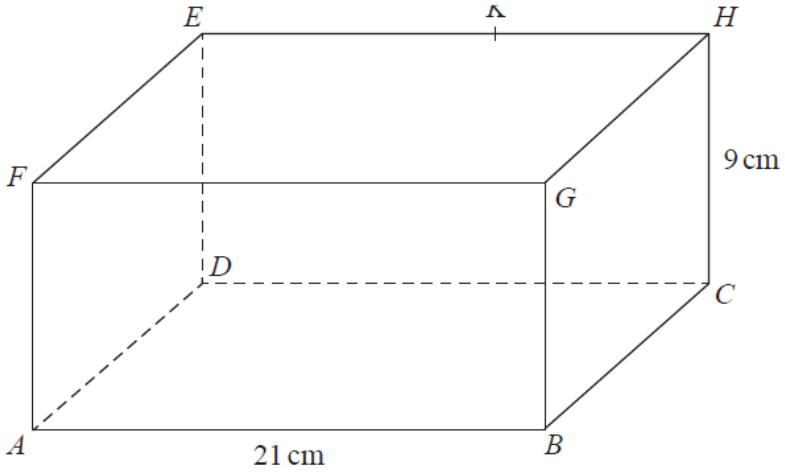


Diagram **NOT** accurately drawn

AB = 21 cm and *CH* = 9 cm.
K is the point on *EH* such that angle *AKB* = 68° and *BK* = 16.5 cm.

(*a*) Calculate the size of angle *BAK*.
Give your answer correct to 1 decimal place.

..... °

(3)

(*b*) Calculate the size of the angle between the line *BK* and the plane *ABCD*.
Give your answer correct to 1 decimal place.

..... °

(2)

(Total for Question 23 is 5 marks)

TOTAL FOR PAPER: 100 MARKS