

Please check the examination details below before entering your candidate information

Candidate surname					Other names				
Centre Number					Candidate Number				

Pearson Edexcel Level 1/Level 2 GCSE (9-1)

Aiming for Grade 8

Paper reference	1MA1/1H
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Mathematics
PAPER 1 (Non-Calculator)
Higher Tier
38 marks 40 minutes

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, Formulae Sheet (enclosed). 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.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**

Information

- The total mark for this paper is 38. There are 12 questions.
- Questions have been broadly arranged in an ascending order of mean difficulty, as found by students achieving Grade 8 in the Summer and November 2023 examinations.
- Questions marked with an asterisk (*) also appear on the Foundation Tier paper.
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer all questions.
Write your answers in the spaces provided.
You must write down all the stages in your working.

- 1** At the start of year n the population of a species is P_n
At the start of the following year the population of the species is given by
 $P_{n+1} = kP_n$ where k is a positive constant.

The population of the species at the start of year 1 is 8 million.
The population of the species at the start of year 2 is 6 million.

- (a) Work out the population of the species at the start of year 3

..... million
(3)

At the start of year 5 the value of k is increased by 0.3 to a new constant value.
Louise thinks that from the start of year 5 the population of the species would increase year on year.

- (b) Is Louise correct? You must give a reason for your answer.

.....
.....
.....
(1)

(Total for Question 1 is 4 marks)

***2** (a) Factorise $6x^2 - 5x - 4$

.....
(2)

(b) Hence, or otherwise, solve $6x^2 - 5x - 4 < 0$

.....
(2)

(Total for Question 2 is 4 marks)

3 The straight line **L** has equation $2y = 3x - 7$

Find an equation of the straight line perpendicular to **L** that passes through $(6, -5)$

.....
(Total for Question 3 is 3 marks)

- 4 The circumference of a circle is 10 m.
Work out the area of the circle.
Give your answer in terms of π .

..... m²
(Total for Question 4 is 3 marks)

- 5 Make x the subject of the formula $y = \frac{4(2x-7)}{5x+3}$

.....
(Total for Question 5 is 4 marks)

6 For $x \geq 0$, the functions f and g are such that

$$f(x) = 3x + 4 \qquad g(x) = \frac{\sqrt{x+2}}{5}$$

(a) Find $g^{-1}(x)$

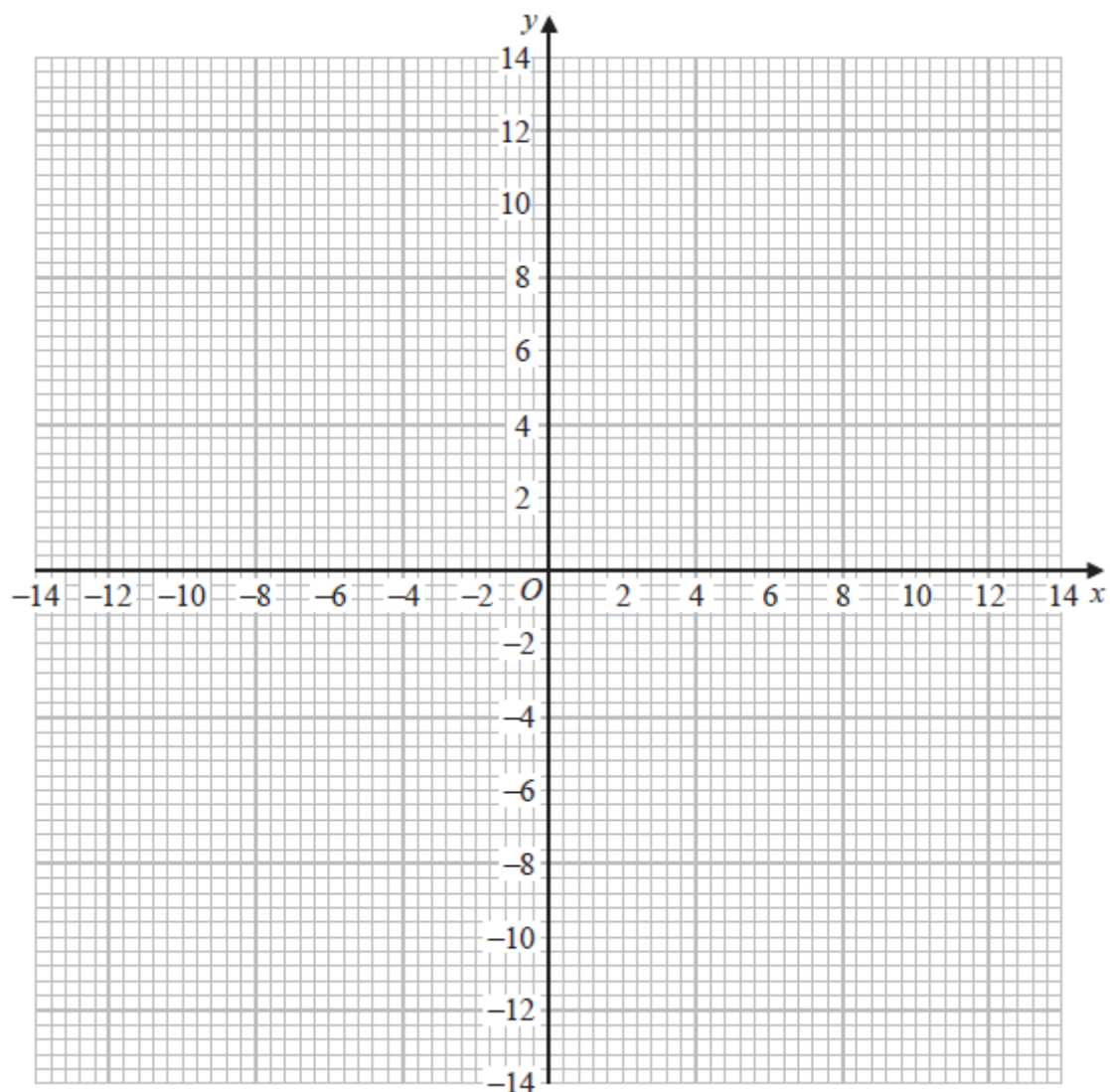
$$g^{-1}(x) = \dots\dots\dots (2)$$

(b) Solve $gf(x) = 3$

$$x = \dots\dots\dots (3)$$

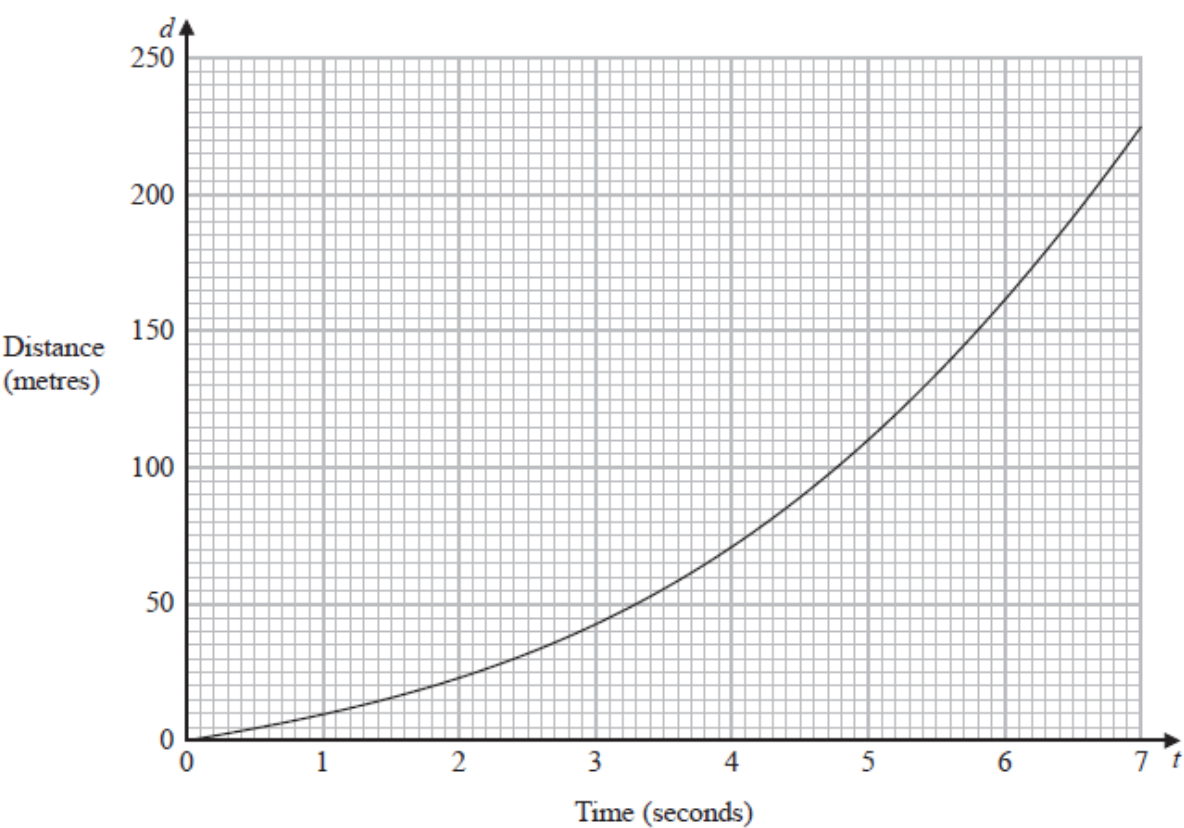
(Total for Question 6 is 5 marks)

- 7 On the grid, draw the graph of $x^2 + y^2 = 169$



(Total for Question 7 is 2 marks)

- 8 An object falls from rest.
Here is the distance-time graph for the distance (d metres) fallen by the object t seconds after it starts to fall.



Work out an estimate for the gradient of the graph at $t = 3$
You must show how you get your answer.

.....
(Total for Question 8 is 3 marks)

- 9 The equation of line L_1 is $y = 2x - 5$
The equation of line L_2 is $6y + kx - 12 = 0$

L_1 is perpendicular to L_2

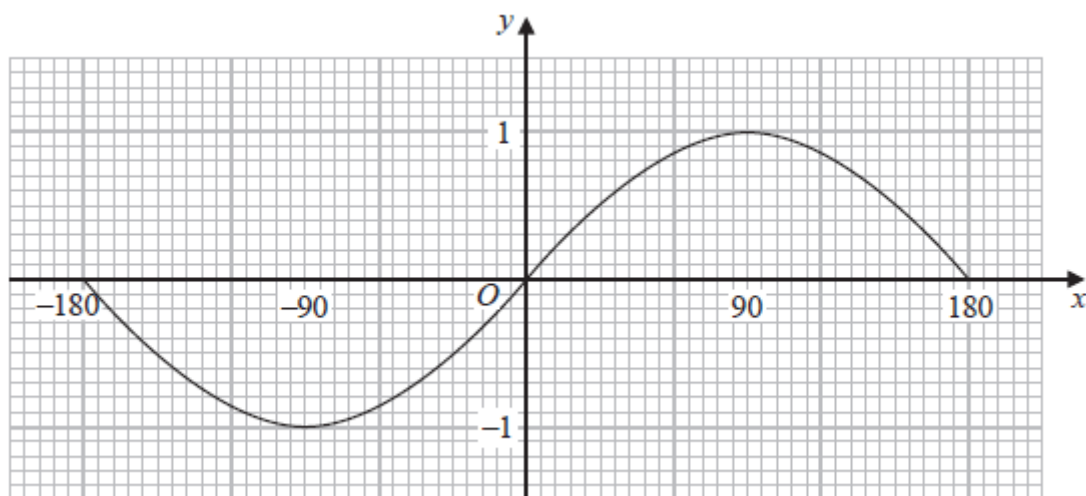
Find the value of k .

You must show all your working.

$k = \dots\dots\dots$

(Total for Question 9 is 3 marks)

- 10 Here is the graph of $y = \sin x^\circ$ for $-180 \leq x \leq 180$



- (a) Use the graph to find estimates for the solutions of

$$y = \sin x^\circ = 0.3 \text{ for } -180 \leq x \leq 180$$

$\dots\dots\dots$
(2)

(b) Write down a value of x such that

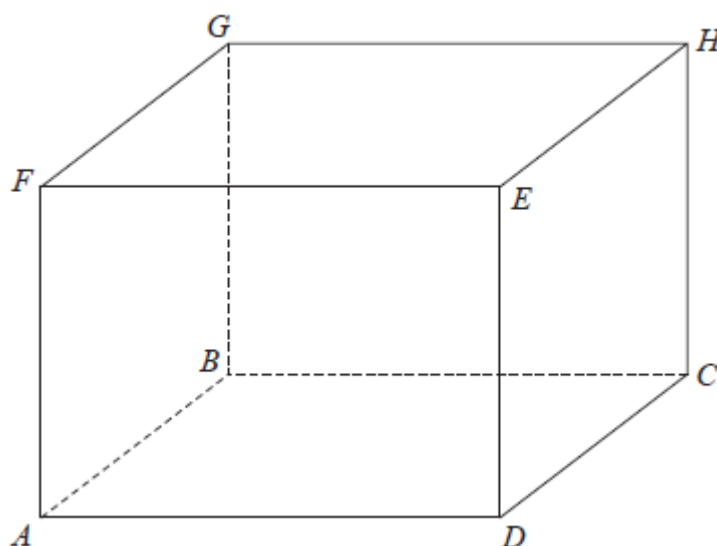
$$\sin(x + 20)^\circ = 0 \text{ for } -180 \leq x \leq 180$$

$x = \dots\dots\dots$

(1)

(Total for Question 10 is 3 marks)

- 11 $ABCDEFGH$ is a cuboid.



$$AF = 6.8 \text{ cm}$$

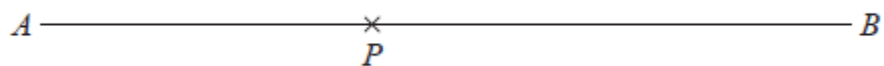
$$FC = 13.6 \text{ cm}$$

Work out the size of the angle between FC and the plane $ABCD$.

$\dots\dots\dots^\circ$

(Total for Question 11 is 2 marks)

- *12** The point P lies on the line AB .
Use ruler and compasses to construct an angle of 90° at P .
You must show all your construction lines.



(Total for Question 12 is 2 marks)

TOTAL FOR PAPER IS 38 MARKS