

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 9

Paper reference	1MA1/3H
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Mathematics

PAPER 3 (Calculator)

Higher Tier

37 marks 40 minutes



You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator, 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.

Information

- The total mark for this paper is 37. There are 12 questions.
- Questions have been broadly arranged in an ascending order of mean difficulty, as found by students achieving Grade 9 in the Summer and November 2023 examinations.
- Questions marked with an asterisk (*) also appear on the Higher 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 (a) Factorise $a^2 - b^2$

.....

(1)

(b) Show that $2^{40} - 1$ is the product of two consecutive odd numbers.

(2)

(Total for Question 1 is 3 marks)

2 A circle has equation $x^2 + y^2 = 25$

The point P with coordinates $(-3, 4)$ lies on the circle.

Alex says that the tangent to the circle at P crosses the x -axis at the point $(-8, 0)$

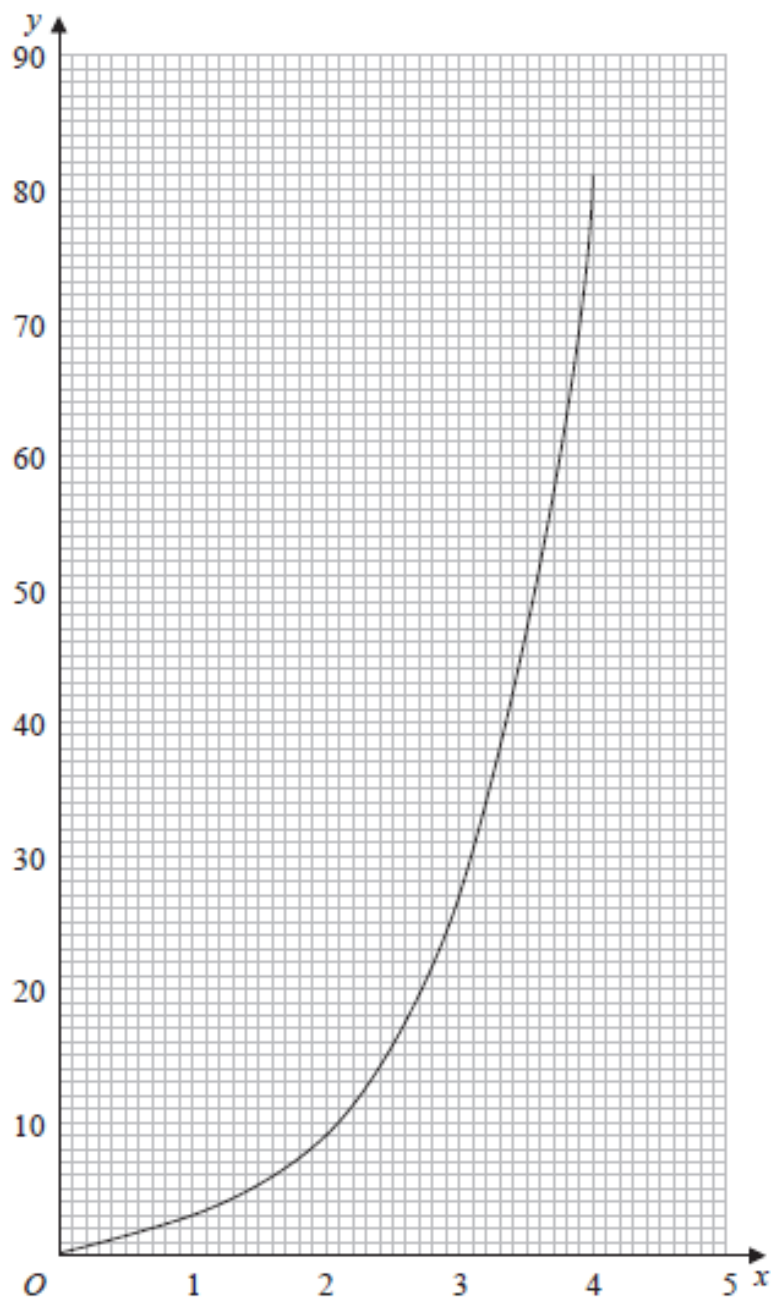
Is Alex correct?

You must show how you get your answer.

(Total for Question 2 is 4 marks)

3 Sana needs to draw the graph of $y = 3^x$ for $0 \leq x \leq 4$

She draws the graph shown on the grid.



Write down one thing Sana has done wrong.

.....

.....

.....

(Total for Question 3 is 1 mark)



- Label your image **Q**.

(2)

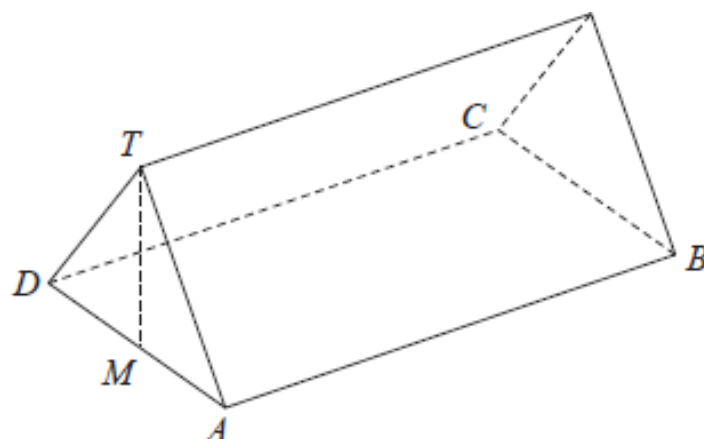
Exactly one vertex of triangle **P** is invariant under the combined transformation.

- $$\left(\begin{array}{c} \\ \text{-----} \\ \\ \text{-----} \end{array} \right)$$

(1)

(Total for Question 4 is 3 marks)

- 5 The diagram shows a triangular prism with a horizontal rectangular base $ABCD$.



M is the midpoint of AD .

The vertex T of the prism is vertically above M .

$$AB = 14.7 \text{ cm} \quad BC = 3.8 \text{ cm} \quad MT = 2.3 \text{ cm}$$

P is the point on AB such that

$$AP : PB = 5 : 2$$

Calculate the size of the angle between TP and the base $ABCD$ of the prism.

Give your answer correct to 1 decimal place.

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

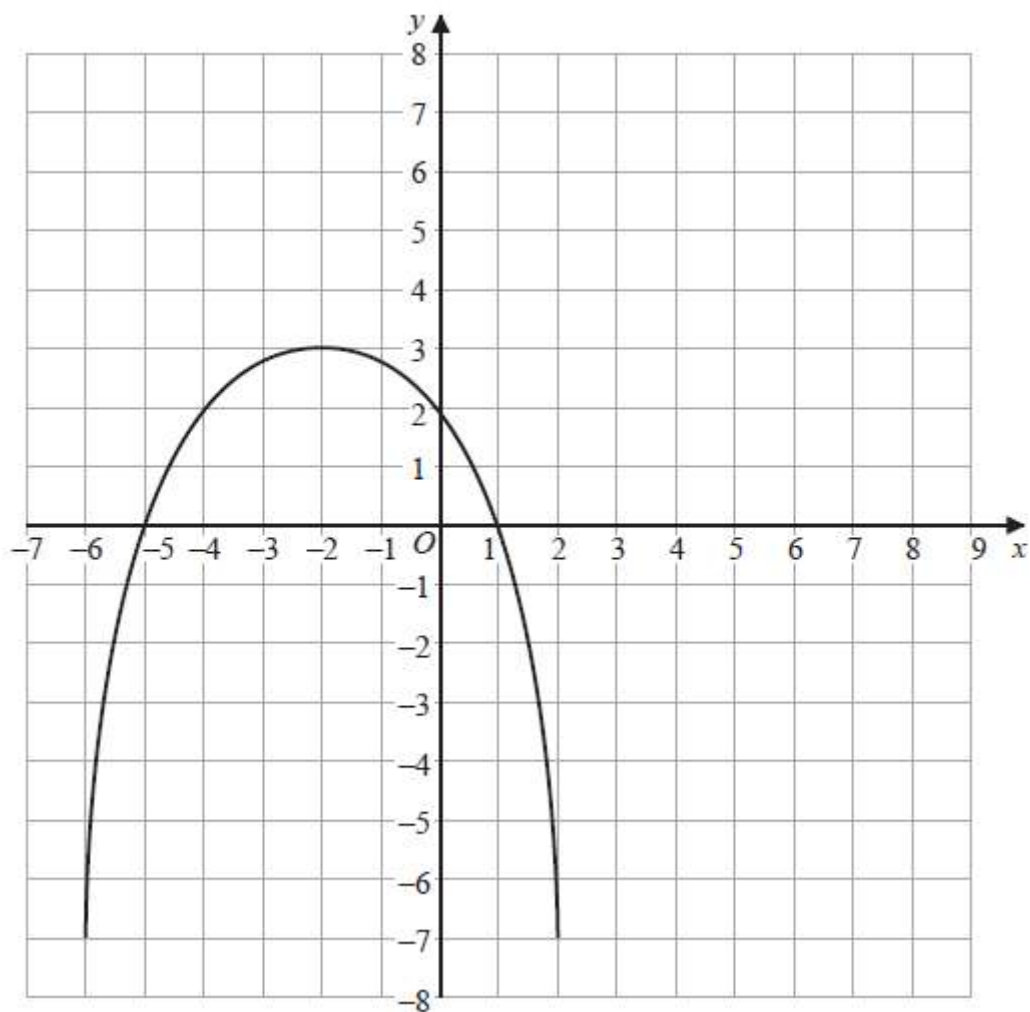
- 6 An expression for the n th term of the sequence of triangular numbers is $\frac{n(n+1)}{2}$
Prove that the sum of any two consecutive triangular numbers is a square number.

(Total for Question 6 is 3 marks)

- 7 The floor plan of a house is drawn using a scale of 1 : 50
On the plan, a room in the house has a floor area of 48 cm^2
Work out the real area of the floor of this room.
Give your answer in m^2

..... m^2
(Total for Question 7 is 3 marks)

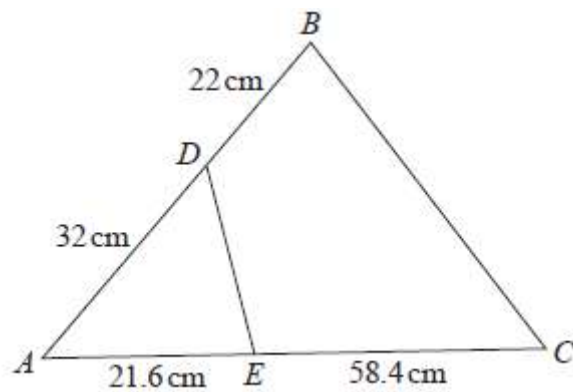
- 8 The graph of $y = f(x)$ is shown on the grid.



On the grid, sketch the graph of $y = f(-x) + 3$

(Total for Question 8 is 2 marks)

- 9 The diagram shows triangle ABC and triangle AED .



Show that triangle ABC and triangle AED are similar.

(Total for Question 9 is 2 marks)

10 There is a total of y counters in a box.

There are x pink counters and 5 blue counters in the box.

The rest of the counters are green.

$$x : y = 1 : 3$$

Freda takes at random two counters from the box.

Find, in terms of x , an expression for the probability that Freda takes two counters of the same colour.

Give your answer as a fraction in the form $\frac{ax^2 + bx + c}{dx^2 + ex}$ where a , b , c , d and e are integers.

.....
(Total for Question 10 is 5 marks)

11 Ebony makes some bracelets to sell.

The materials to make all the bracelets cost £190, correct to the nearest £5

Ebony sells all the bracelets for a total of £875, correct to the nearest £5

The total time taken to make and sell all these bracelets was 72 hours, correct to the nearest hour.

Ebony uses this method to calculate her hourly rate of pay

$$\text{Hourly rate of pay} = \frac{\text{total selling price} - \text{total cost of materials}}{\text{total time taken}}$$

The minimum hourly rate of pay for someone of Ebony's age is £8.20

By considering bounds, determine if Ebony's hourly rate of pay was definitely more than £8.20

You must show all your working.

(Total for Question 11 is 4 marks)

- 12 Given that the vector $a\begin{pmatrix} 2 \\ 6 \end{pmatrix} + b\begin{pmatrix} 8 \\ 2 \end{pmatrix}$ is parallel to the vector $\begin{pmatrix} 13 \\ 6 \end{pmatrix}$
find an expression for b in terms of a .

.....
(Total for Question 12 is 3 marks)

TOTAL FOR PAPER IS 37 MARKS