







eClassroom

Question 2

Figure 1 shows a sketch of part of the curve with equation $y = g(x)$. The curve has a maximum point $A(-3, 5)$, a minimum point $B(4, -7)$, and passes through the origin O .

- (a) Sketch Figure 1 based on the given description of $g(x)$. Clearly label the coordinates of A , B , and O .

(3 marks)

- (b) On a new set of axes, sketch $y = -2g(x)$. Clearly label the transformed coordinates of A, B , and O .

(3 marks)

- (c) On another set of axes, sketch $y = g(x) + 3$. Clearly label the transformed coordinates of A , B , and O .

(3 marks)

(Total for question = 9 marks)

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on its right side, suggesting it's resting on a surface.



Question 3



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Figure 1 shows a sketch of the curve with equation $y = h(x)$, where

$$h(x) = (x + 3)^2(x - 4).$$

The curve **touches** the x -axis at $(-3, 0)$, **crosses** the x -axis at $(4, 0)$, and **crosses** the y -axis at $(0, -36)$.

(a) Sketch Figure 1 based on the given description of $h(x)$. Clearly label all intercepts and the turning point at $(-3, 0)$.

(3 marks)

(b) Write down the equation of the curve $y = h(x - 2)$.

(1 mark)

(c) Sketch the curve $y = h(x - 2)$. Clearly label all intercepts.

(3 marks)

(Total for question = 7 marks)

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Question 4

The curve C passes through the point $(-2, 0)$, touches the x -axis at the point $(3, 0)$, and has a maximum at $(0, 6)$.

(a) Sketch Figure 1 based on this description of C . Clearly label all intercepts and the turning points.

(4 marks)

(b) The equation of C is of the form:

$$y = x^3 + px^2 + qx + r.$$

Use the given points to find the values of p , q , and r .

(4 marks)

(Total for question = 8 marks)

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Question 5

The curve C has equation $y = \frac{2}{x+1}$, $x \neq -1$. The curve crosses the y -axis at A .

- (a) Sketch Figure 1 showing the graph of C . Clearly label any asymptotes and the coordinate of A .
(3 marks)
- (b) The curve D has equation $y = x(x - 3)^2$. Sketch Figure 1 for D , and label all intercepts.
(3 marks)
- (c) Using your sketches, state the number of real solutions to the equation

$$x(x-3)^2 = \frac{2}{x+1}.$$

(1 mark)

(Total for question = 7 marks)

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Question 6

(a) On separate axes, sketch Figure 1 for the following:

- (i) $y = -2x + b$, where b is a positive constant.
(ii) $y = \frac{4}{x} - 2$.

In each case, clearly label any asymptotes and the point where the graph crosses the y -axis (if it exists).

(4 marks)

(b) Given that $y = -2x + b$, where b is a positive constant, meets $y = \frac{4}{x} - 2$ at two distinct points, show that

$$(b + 2)^2 > 32.$$

(3 marks)

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This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

