



Functions and Graphs

Questions

Suitable for:

Pearson Edexcel International A-Level (iAL) — Pure Mathematics 3



Question 1

The function f is defined by

$$f(x) = |2x - 5|, \quad x \in \mathbb{R}$$

(a) Find $f(1)$, $f(3)$ and $f(4)$.

(2 marks)

(b) Solve $f(x) = 3$.

(3 marks)

Total for question = 5 marks





Question 2

Sketch the graph of

$$y = |x^2 - 4|$$

marking clearly the coordinates of all points where the curve meets the coordinate axes.

(4 marks)

Total for question = 4 marks



Join students already acing their iAL exams.

Book your FREE lesson at www.eclassroom.org.uk



Question 3

The function f is defined by

$$f(x) = x^2 - 3x, \quad x \in \mathbb{R}$$

(a) Sketch the graph of $y = f(|x|)$, marking clearly any points where the curve meets the coordinate axes.

(4 marks)

(b) Write down all the roots of the equation $f(|x|) = 0$.

(2 marks)

Total for question = 6 marks





Question 4

The function f is defined by

$$f(x) = \sqrt{x - 2} + 3, \quad x \geq 2$$

(a) State the range of f .

(1 marks)

(b) Explain why f is a one-to-one function.

(1 marks)

(c) Find $f^{-1}(x)$ and state its domain and range.

(4 marks)

Total for question = 6 marks





Question 5

The functions f and g are defined by

$$f(x) = 2x + 1, \quad g(x) = x^2 - 3, \quad x \in \mathbb{R}$$

(a) Find $fg(x)$ and $gf(x)$, simplifying your answers.

(4 marks)

(b) Hence solve $fg(x) = 27$.

(3 marks)

Total for question = 7 marks





Question 6

The function f is defined by

$$f(x) = \frac{1}{x-2}, \quad x \in \mathbb{R}, \quad x \neq 2$$

(a) Find $ff(x)$, giving your answer as a single simplified fraction.

(4 marks)

(b) State the domain of $ff(x)$.

(2 marks)

Total for question = 6 marks





Question 7

The function f is defined by

$$f(x) = 3x - 2, \quad x \in \mathbb{R}$$

(a) Find $f^{-1}(x)$.

(2 marks)

(b) State the domain of $f^{-1}(x)$.

(1 marks)

(c) Solve $f(x) = f^{-1}(x)$.

(3 marks)

Total for question = 6 marks





Question 8

The function g is defined by

$$g(x) = (x + 1)^2 - 4, \quad x \geq -1$$

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

(3 marks)

(b) State the domain and range of $g^{-1}(x)$.

(2 marks)

(c) On the same axes, sketch $y = g(x)$ and $y = g^{-1}(x)$, marking clearly any intersections with the coordinate axes.

(3 marks)

Total for question = 8 marks



Question 9

Solve

$$|3x - 2| = |x + 4|$$

(4 marks)

Total for question = 4 marks



Question 10

Solve

$$|x^2 - 5| = 4$$

(4 marks)

Total for question = 4 marks



Join students already acing their iAL exams.

Book your FREE lesson at www.eclassroom.org.uk



Question 11

The function f is defined by $f(x) = x^2$.

- (a) Describe the sequence of transformations that maps the graph of $y = f(x)$ onto the graph of

$$y = 2f(x - 3) + 1$$

(3 marks)

- (b) State the coordinates of the vertex of the graph of $y = 2f(x - 3) + 1$.

(1 marks)

Total for question = 4 marks





Question 12

- (a) On the same axes, sketch the graphs of

$$y = |2x - 6| \quad \text{and} \quad y = x + 1$$

marking clearly the coordinates of any points where the graphs meet the coordinate axes.

(3 marks)

- (b) Hence solve

$$|2x - 6| = x + 1$$

(4 marks)

Total for question = 7 marks