adamjee maths

A-LEVEL MATHS / EDEXCEL / FREE RESOURCES

Composite and inverse functions

Question paper

3 questions

Exam questions and marking instructions remain credited to their board.

Contents

1 June 2024 - Paper 1 - Q8

2 June 2023 - Paper 1 - Q7

3 October 2021 - Paper 2 - Q2

8. The functions f and g are defined by

$$f(x) = 4 - 3x^2 \qquad x \in \mathbb{R}$$

$$g(x) = \frac{5}{2x - 9} \qquad x \in \mathbb{R},\ x \neq \frac{9}{2}$$

(a) Find fg(2)

(2)

(b) Find g^{-1}

(3)

(c) (i) Find gf(x), giving your answer as a simplified fraction.

(ii) Deduce the range of gf(x).

(3)

The function h is defined by

$$h(x) = 2x^2 - 6x + k \qquad x \in \mathbb{R}$$

where k is a constant.

(d) Find the range of values of k for which the equation

$$f(x) = h(x)$$

has no real solutions.

(3)

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Question 8 continued

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Question 8 continued

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Question 8 continued

(Total for Question 8 is 11 marks)

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7. The function f is defined by

$$f(x) = 3 + \sqrt{x - 2} \qquad x \in \mathbb{R} \quad x > 2$$

(a) State the range of f

(1)

(b) Find f^{-1}

(3)

The function g is defined by

$$g(x) = \frac{15}{x - 3} \qquad x \in \mathbb{R} \quad x \neq 3$$

(c) Find gf(6)

(2)

(d) Find the exact value of the constant a for which

$$f(a^2 + 2) = g(a)$$

(2)

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Question 7 continued

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Question 7 continued

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Question 7 continued

(Total for Question 7 is 8 marks)

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2. The functions f and g are defined by

$$f(x) = 7 - 2x^2 \qquad x \in \mathbb{R}$$

$$g(x) = \frac{3x}{5x-1} \qquad x \in \mathbb{R} \qquad x \neq \frac{1}{5}$$

(a) State the range of f

(1)

(b) Find gf(1.8)

(2)

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

(2)

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Question 2 continued

(Total for Question 2 is 5 marks)

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