

Subject - Math AA(Standard Level)

Topic - Functions

Year - May 2021 - Nov 2022

Paper -1

Questions

Question 1

[Maximum mark: 5]

The functions f and g are defined such that $f(x) = \frac{x+3}{4}$ and $g(x) = 8x+5$.

(a) Show that $(g \circ f)(x) = 2x + 11$. [2]

(b) Given that $(g \circ f)^{-1}(a) = 4$, find the value of a . [3]

Question 2

[Maximum mark: 14]

Let $f(x) = mx^2 - 2mx$, where $x \in \mathbb{R}$ and $m \in \mathbb{R}$. The line $y = mx - 9$ meets the graph of f at exactly one point.

(a) Show that $m = 4$. [6]

The function f can be expressed in the form $f(x) = 4(x-p)(x-q)$, where $p, q \in \mathbb{R}$.

(b) Find the value of p and the value of q . [2]

The function f can also be expressed in the form $f(x) = 4(x-h)^2 + k$, where $h, k \in \mathbb{R}$.

(c) Find the value of h and the value of k . [3]

(d) Hence find the values of x where the graph of f is both negative and increasing. [3]

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Terry C. Jones



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