

Answer on Question #55753 – Math – Calculus

6. If $f(x) = 2x + 1$ and $g(x) = x^2 - 7$, find $(f/g)(x)$

A. $\frac{x^2 - 7}{2x + 1}, x \neq -\frac{1}{2}$; B. $\frac{2x + 1}{x^2 - 7}, x \neq \pm\sqrt{7}$; C. $\frac{x^2 - 7}{2x + 1}$; D. $\frac{2x + 1}{x^2 - 7}$;

Solution

$(f/g)(x) = \frac{2x+1}{x^2-7}$ and denominator cannot be 0, so $x^2 - 7 \neq 0 \rightarrow x^2 \neq 7 \rightarrow x \neq \pm\sqrt{7}$

Answer: B. $\frac{2x+1}{x^2-7}$

7. $f(x) = 4x + 1$ and $g(x) = x^2 - 5$, find $(g/f)(x)$

A. $\frac{4x + 1}{x^2 - 5}, x \neq \pm\sqrt{5}$; B. $\frac{x^2 - 5}{4x + 1}, x \neq -\frac{1}{4}$; C. $\frac{x^2 - 5}{4x + 1}$; D. $\frac{4x + 1}{x^2 - 5}$;

Solution

$(g/f)(x) = \frac{x^2-5}{4x+1}$ and denominator cannot be 0, so $4x + 1 \neq 0 \rightarrow 4x \neq -1 \rightarrow x \neq -\frac{1}{4}$

Answer: B. $\frac{x^2-5}{4x+1}$

8. For $f(x) = 3x + 1$ and $g(x) = x^2 - 7$, find $(f \circ g)(4)$

Solution

$$(f \circ g)(x) = f(g(x)) = 3g(x) + 1 = 3(x^2 - 7) + 1 = 3x^2 - 21 + 1 = 3x^2 - 20$$

$$(f \circ g)(4) = 3 \cdot (4)^2 - 20 = 3 \cdot 16 - 20 = 48 - 20 = 28.$$

Answer: $(f \circ g)(4) = 28$

9. If $h(x) = (f \circ g)(x)$ and $h(x) = \sqrt{x+5}$, find $g(x)$ if $f(x) = \sqrt{x+2}$. The root goes over both the x and the $+5$ as well the x and $+2$.

Solution

$$(f \circ g)(x) = f(g(x)) = h(x) = \sqrt{x+5}, f(x) = \sqrt{x+2}, \text{ so } g(x) = x + 3$$

Answer: $g(x) = x + 3$.

10. If $f(x) = 2x$, $g(x) = 2x - 1$ and $h(x) = \sqrt{x}$ find $(f \circ g \circ h)(9)$

Solution

$$(f \circ g \circ h)(x) = f(g(h(x))) = 2g(h(x)) = 2(2h(x) - 1) = 2(2\sqrt{x} - 1) = 4\sqrt{x} - 2$$

$$(f \circ g \circ h)(9) = 4\sqrt{9} - 2 = 4 \cdot 3 - 2 = 10$$

Answer: $(f \circ g \circ h)(9) = 10$.