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P.I. A2.A.42: Find the composition of functions

1. Find $g(f(x))$ where $f(x) = x - 9$ and $g(x) = \frac{x+2}{2}$.

[A] $\frac{3x-16}{2}$

[B] $\frac{x-16}{2}$

[C] $\frac{x-7}{2}$

[D] $\frac{x^2-7x-18}{2}$

2. Find $g(f(x))$ where $f(x) = x - 5$ and $g(x) = \frac{x-2}{7}$.

[A] $\frac{x^2-7x+10}{7}$

[B] $\frac{x-37}{7}$

[C] $\frac{8x-37}{7}$

[D] $\frac{x-7}{7}$

3. Given $f(x) = \frac{x+3}{x}$ and $g(x) = x+6$, find $(g \circ f)(x)$ and state the domain.

[A] $\frac{x+6}{x+9}$, $\{x|x \neq -9\}$

[B] $\frac{x^2+7x+3}{x}$, $\{x|x \neq 0\}$

[C] $\frac{x+9}{x+6}$, $\{x|x \neq -6\}$

[D] $\frac{x^2+9x+18}{x}$, $\{x|x \neq 0\}$

4. Given $f(x) = \frac{x+7}{x}$ and $g(x) = x+3$, find $(g \circ f)(x)$ and state the domain.

[A] $\frac{x+10}{x+3}$, $\{x|x \neq -3\}$

[B] $\frac{x^2+4x+7}{x}$, $\{x|x \neq 0\}$

[C] $\frac{x+3}{x+10}$, $\{x|x \neq -10\}$

[D] $\frac{x^2+10x+21}{x}$, $\{x|x \neq 0\}$

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5. Given $f(x) = -8x^2$, $g(x) = -3x+9$, and $h(x) = \sqrt{x}$, find $[(f+g) \circ h](x)$.

[A] $-8x - 3\sqrt{x} + 9$ [B] $24x + \sqrt{x} + 9$

[C] $-8\sqrt{x} - 3x + 9$

[D] $-8x^2 - 3\sqrt{x} + 9$

6. Given $f(x) = 7x^2$, $g(x) = 8x-3$, and $h(x) = \sqrt{x}$, find $[(f+g) \circ h](x)$.

[A] $7x^2 + 8\sqrt{x} - 3$ [B] $7x + 8\sqrt{x} - 3$

[C] $7\sqrt{x} + 8x - 3$ [D] $56x + \sqrt{x} - 3$

7. Given $f(x) = \frac{3}{8}x+4$ and $g(x) = x^3$, find $(g^{-1} \circ f^{-1})(19,683)$.

[A] 3 [B] -1 [C] 4 [D] -3

8. Given $f(x) = \frac{2}{3}x+8$ and $g(x) = x^3$, find $(f^{-1} \circ g^{-1})(-8)$. Round to the nearest tenth.

[A] -15.0

[B] -4.2

[C] -2.9

[D] -16.3

9. Given $f(x) = \frac{2}{7}x+1$ and $g(x) = x^3$, find $(f^{-1} \circ g^{-1})(-2)$. Round to the nearest tenth.

10. Given $f(x) = \frac{1}{6}x+3$ and $g(x) = x^3$, find $(g^{-1} \circ f^{-1})(-4)$. Round to the nearest tenth.

[1] C

[2] D

[3] C

[4] A

[5] A

[6] B

[7] A

[8] A

[9] -40.3

[10] -3.5