

NAME: _____

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

1. If $f(x) = 5x - 3$ and $g(x) = x - 4$, find $g(f(-3))$.

2. If $f(x) = 5x - 2$ and $g(x) = x - 5$, find $f(g(2))$.

3. If $f(x) = 2x$ and $g(x) = x + 5$, find $g(f(3))$.
[A] 11 [B] 14 [C] 8 [D] 16 [E] 6

4. Given $f(x) = \frac{x+4}{x}$ and $g(x) = x^2 + 3$, find $(g \circ f)(6)$.

[A] $\frac{52}{9}$ [B] $\frac{84}{25}$ [C] $\frac{43}{39}$ [D] $\frac{14}{3}$

5. Given $f(x) = \frac{x+7}{x}$ and $g(x) = x^2 + 7$, find $(g \circ f)(5)$.

[A] $\frac{39}{32}$ [B] $\frac{1033}{144}$ [C] $\frac{319}{25}$ [D] $\frac{47}{5}$

6. If $g(x) = 2x^2$ and $f(x) = 3x + 8$, find $g(f(3))$ and $f(g(-2))$.

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7. Compare the quantity in Column A with the quantity in Column B.

$$f(x) = 2x - 5 \quad g(x) = \frac{1}{2}(x + 5)$$

Column A Column B

$$f(2) \qquad g(f(2))$$

- [A] The quantity in Column A is greater.
[B] The quantity in Column B is greater.
[C] The two quantities are equal.
[D] The relationship cannot be determined on the basis of the information supplied.

9. Write two function rules $f(x)$ and $g(x)$ such that $f(g(-1)) = 6$.

10. If $q(x) = 5 - x^2$ and $p(q(x)) = \frac{4 - x^2}{x^2}$ when

$x \neq 0$, then what is $p\left(\frac{1}{4}\right)$ equal to? Show

each of your steps in finding the answer.
Explain each of the steps.

8. Compare the quantity in Column A with the quantity in Column B.

$$f(x) = x + 2, \quad g(x) = 3x - 1$$

Column A Column B

$$f(g(3)) \qquad g(f(3))$$

- [A] The quantity in Column A is greater.
[B] The quantity in Column B is greater.
[C] The two quantities are equal.
[D] The relationship cannot be determined on the basis of the information supplied.

[1] $g(f(-3)) = -22$ _____

[2] $f(g(2)) = -17$ _____

[3] A _____

[4] A _____

[5] C _____

[6] $g(f(3)) = 578, f(g(-2)) = 32$ _____

[7] B _____

[8] B _____

[9] Answers may vary. Sample: $f(x) = 2x$ and $g(x) = x + 4$ _____

To get $p\left(\frac{1}{4}\right)$, $q(x)$ will have to equal $\frac{1}{4}$. That means $5 - x^2 = \frac{1}{4}$ or $x^2 = \frac{19}{4}$ which makes $x = \frac{\sqrt{19}}{2}$.

Substituting that into $p(q(x))$ gives $p\left(\frac{1}{4}\right) = \frac{4 - \frac{19}{4}}{\frac{19}{4}} = \frac{16 - 19}{19} = -\frac{3}{19}$.

OR

Find $p(x)$ by factoring $q(x) = 5 - x^2$ out of $p(q(x))$.

$$p(q(x)) = \frac{4 - x^2}{x^2} = \frac{(5 - x^2) - 1}{5 - (5 - x^2)} \Rightarrow p(x) = \frac{x - 1}{5 - x}, p(x) = \frac{\frac{1}{4} - 1}{5 - \frac{1}{4}} = \frac{-\frac{3}{4}}{\frac{19}{4}} = -\frac{3}{4} \cdot \frac{4}{19} = -\frac{3}{19}.$$

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