2.7A Composition of Functions (Part 1)

AP Precalculus

Solutions

2.7A Practice

Let $f(x) = 2 - x$ and $g(x) = \sqrt{3 - x}$.

1. Find $(f \circ g)(-2)$.

$g(-2) = \sqrt{3-(-2)} = \sqrt{5}$

$f(\sqrt{5}) = 2 - \sqrt{5}$

2. Find $f(g(2))$.

$g(2) = \sqrt{3-2} = 1$

$f(1) = 2 - 1 = 1$

3. Find $g(f(8))$.

$f(8) = 2 - 8 = -6$

$g(-6) = \sqrt{3-(-6)} = \sqrt{9}$

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Let $f(x) = 4^x$ and $g(x) = x - x^2$.

4. Find $f(g(-1))$.

$g(-1) = (-1) - (-1)^2 = -2$

$f(-2) = 4^{-2} = \frac{1}{4^2}$

$\frac{1}{16}$

5. Find $g\left(f\left(\frac{1}{2}\right)\right)$.

$f(\frac{1}{2}) = 4^{\frac{1}{2}} = \sqrt{4} = 2$

$g(2) = 2 - 2^2 = 2 - 4$

-2

6. Find $(g \circ f)(-1)$.

$f(-1) = 4^{-1} = \frac{1}{4}$

$g(\frac{1}{4}) = \frac{1}{4} - (\frac{1}{4})^2 = \frac{1}{4} - \frac{1}{16}$

$\frac{4}{16} - \frac{1}{16}$

$\frac{3}{16}$

Let $f(x) = \frac{1}{x^2}$ and $g(x) = 2^x$.

7. Find $(f \circ g)(-1)$.

$g(-1) = 2^{-1} = \frac{1}{2}$

$f(\frac{1}{2}) = \frac{1}{(\frac{1}{2})^2} = \frac{1}{\frac{1}{4}}$ $\cdot 4$ $\cdot 4$

4

8. Find $g\left(f\left(\frac{1}{2}\right)\right)$.

$f(\frac{1}{2}) = = 4$

$g(4) = 2^4 = 16$

9. Find $g(f(2))$.

$f(2) = \frac{1}{4}$

$g(\frac{1}{4}) = 2^{\frac{1}{4}}$

$\sqrt[4]{2}$

10. Let $f(x) = 1 - 2x$ and $h(x) = f(g(x))$. Fill in the table.

x	$g(x)$	$h(x)$
-3	-2	5
-1	1	-1
0	2	-3

$f(g(-3)) = f(-2) = 1-2(-2)$

$f(g(-1)) = f(1) = 1-2(1)$

$f(g(0)) = f(2) = 1-2(2)$

11. Let $g(x) = 3^x$ and $h(x) = g(f(x))$. Fill in the table.

x	$f(x)$	$h(x)$
1	-2	$1/9$
3	0	1
5	1	3

$g(f(1)) = g(-2) = 3^{-2}$

$g(f(3)) = g(0) = 3^0$

$g(f(5)) = g(1) = 3^1$

12. Let $f(x) = x^2 - 4x$ and $h(x) = f(g(x))$. Fill in the table.

x	$g(x)$	$h(x)$
-5	1	-3
-3	2	-4
-1	-2	12

$f(g(-5)) = f(1) = 1^2 - 4(1)$

$f(g(-3)) = f(2) = 4 - 8$

$f(g(-1)) = f(-2) = 4 + 8$

13. Fill in the following table, given that $h(x) = f(g(x))$.

$f(g(-3)) = f(0) = 3$

$f(g(-2)) = f(-2) = -4$

$f(g(-1)) = f(-3) = 7$

$f(g(0)) = f(1) = 0$

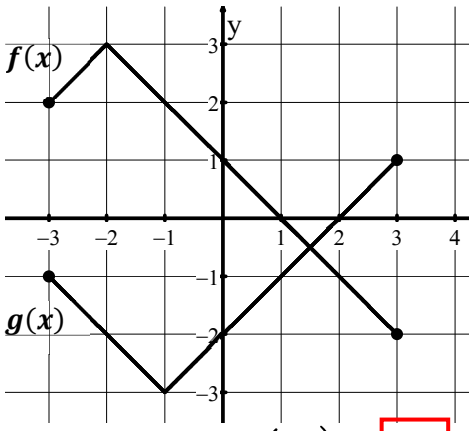
x	$g(x)$	$f(x)$	$h(x)$
-3	0	7	3
-2	-2	-4	-4
-1	-3	-1	7
0	1	3	0
1	2	0	4
2	3	4	9
3	-1	9	-1

$f(g(1)) = f(2) = 4$

$f(g(2)) = f(3) = 9$

$f(g(3)) = f(-1) = -1$

14. Use the graph to find the each value.

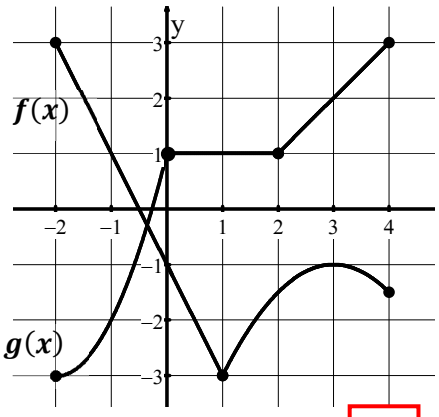


a. Find $f(g(-2))$. $= f(-2) = 3$

b. Find $f \circ g(0)$. $= f(-2) = 3$

c. Find $g(f(3))$. $= g(-2) = -2$

15. Use the graph to find the each value.



a. Find $f(g(0))$. $= f(1) = -3$

b. Find $g(f(3))$. $= g(-1) = -2$

c. Find $g \circ f(-2)$. $= g(3) = 2$

16. Given $f(x) = 5x - 2b$ while $g(x) = 4bx$. If $f(g(1)) = 36$, what is $g(f(1))$?

$g(1) = 4b$

$f(4b) = 36$

$5(4b) - 2b = 36$

$20b - 2b = 36$

$18b = 36$

$b = 2$

$f(x) = 5x - 4$

$g(x) = 8x$

$f(1) = 5(1) - 4 = 1$

$g(f(1)) = g(1) = 8(1)$

$\boxed{8}$