

F.BF.A.1: Compositions of Functions 2

- 1 If $f(x) = 2^x - 1$ and $g(x) = x^2 - 1$, determine the value of $(f \circ g)(3)$.
- 2 If $f(x) = 5x^2 - 1$ and $g(x) = 3x - 1$, find $g(f(1))$.
- 3 If $f(x) = \log_2 x$ and $g(x) = 2x^2 + 14$, determine the value of $(f \circ g)(5)$.
- 4 If $f(x) = x^2 + 4$ and $g(x) = 2x + 3$, find $f(g(-2))$.
- 5 If $f(x) = 3x + 1$ and $g(x) = x^2 - 1$, find $(f \circ g)(2)$.
- 6 If $h(x) = 2x - 1$ and $g(x) = 3x + 1$, what is the value of $(h \circ g)(2)$?
- 7 If $f(x) = x - 3$ and $g(x) = x^2$, what is the value of $(f \circ g)(2)$?
- 8 If $f(x) = 5x - 2$ and $g(x) = \sqrt[3]{x}$, evaluate $(f \circ g)(-8)$.
- 9 If $f(x) = x^2$ and $g(x) = x + 1$, what is $(f \circ g)(2)$?
- 10 If $f(x) = x - 2$ and $g(x) = x^2$, find $f(g(3))$.
- 11 If $f(x) = x^2$ and $g(x) = 2x - 1$, find $(f \circ g)(4)$.
- 12 If $f(x) = \frac{2}{\sqrt{5-x^2}}$ and $g(x) = x + 1$, evaluate $(f \circ g)(0)$.
- 13 If $f(x) = 2x + 4$ and $g(x) = x^2 + 1$, find $(f \circ g)(3)$.
- 14 If $f(x) = 2x - 5$ and $g(x) = \sqrt{x}$, evaluate $(f \circ g)(36)$.
- 15 If $f(x) = x^2 + 3$ and $g(x) = x - 2$, find $(f \circ g)(2)$.
- 16 If $f(x) = 2x + 1$ and $g(x) = x^2$, find $(g \circ f)(2)$.
- 17 If $f(x) = \frac{x^3}{3}$ and $g(x) = \sqrt[3]{x}$, find $f(g(9))$.
- 18 If $f(x) = x^3 + 1$ and $g(x) = x + 4$, find $(f \circ g)(-6)$.
- 19 If $f(x) = 3x + 2$ and $g(x) = x^2 - 5$, find the value of $(f \circ g)(-3)$.
- 20 If $f(x) = x^2 - 6$ and $g(x) = 2^x - 1$, determine the value of $(g \circ f)(-3)$.
- 21 A certain drug raises a patient's heart rate, $h(x)$, in beats per minute, according to the function $h(x) = 70 + 0.2x$, where x is the bloodstream drug level, in milligrams. The level of the drug in the patient's bloodstream is a function of time, t , in hours, according to the formula $g(t) = 300(0.8)^t$. Find the value of $h(g(4))$, the patient's heart rate in beats per minute, to the *nearest whole number*.
- 22 If $f(x) = 3x^2 + 1$ and $g(x) = 2x + 2$, find
a $g^{-1}(x)$, the inverse of $g(x)$.
b $(f \circ g^{-1})(2)$.

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Answer Section

1 ANS:

$$\begin{aligned}g(3) &= 3^2 - 1 \\ &= 8\end{aligned}$$

255.

$$\begin{aligned}f(8) &= 2^8 - 1 \\ &= 255\end{aligned}$$

REF: 060322b

2 ANS:

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

$$\begin{aligned}11. \quad g(4) &= 3(4) - 1 \\ &= 11\end{aligned}$$

REF: 010621b

3 ANS:

$$g(x) = 2x^2 + 14$$

$$6. \quad g(5) = 2(5)^2 + 14 = 64$$

$$f(x) = \log_2 x$$

$$f(64) = \log_2 64 = 6$$

REF: 060725b

4 ANS:

$$5. \quad g(-2) = 2(-2) + 3 = -1. \quad f(-1) = (-1)^2 + 4 = 5.$$

REF: 060921b

5 ANS:

10

REF: 011021b

6 ANS:

13

REF: 069608siii

7 ANS:

1

REF: 019710siii

8 ANS:

-12

REF: 069715siii

- 9 ANS:
9
REF: 089709siii
- 10 ANS:
7
REF: 089802siii
- 11 ANS:
49
REF: 089907siii
- 12 ANS:
1
REF: 010106siii
- 13 ANS:
24
REF: 060105siii
- 14 ANS:
7
REF: 080105siii
- 15 ANS:
3
REF: 010211siii
- 16 ANS:
25
REF: 060207siii
- 17 ANS:
3
REF: 080208siii
- 18 ANS:
-7
REF: 010311siii
- 19 ANS:
14
REF: 060305siii
- 20 ANS:
7. $f(-3) = (-3)^2 - 6 = 3$. $g(x) = 2^3 - 1 = 7$.
REF: 061135a2

21 ANS:

$$95. \quad g(4) = 300(0.8)^4 = 122.88. \quad h(122.8) = 70 + 0.2(122.8) = 94.576 \approx 95$$

REF: 060526b

22 ANS:

$$a \quad y = \frac{x-2}{2}$$

 $b \quad 1$

REF: 089340siii