

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

1 If $f(x) = \frac{1}{2}x - 3$ and $g(x) = 2x + 5$, what is the value of $(g \circ f)(4)$?

2 If $g(x) = \frac{1}{2}x + 8$ and $h(x) = \frac{1}{2}x - 2$, what is the value of $g(h(-8))$?

3 If $f(x) = -2x + 7$ and $g(x) = x^2 - 2$, then $f(g(3))$ is equal to

4 If $f(x) = 2x^2 + 1$ and $g(x) = 3x - 2$, what is the value of $f(g(-2))$?

5 If $f(x) = 3x^2$ and $g(x) = \sqrt{2x}$, what is the value of $(f \circ g)(8)$?

6 If $f(x) = 5x^2$ and $g(x) = \sqrt{2x}$, what is the value of $(f \circ g)(8)$?

7 If $f(x) = x^2 + 4$ and $g(x) = \sqrt{1-x}$, what is the value of $f(g(-3))$?

8 If $g(x) = \sqrt{x}$ and $h(x) = x^3 - 1$, what is $g(h(4))$?

9 If $f(x) = x - 3$ and $g(x) = x^3$, find $f(g(3))$.

10 If $f(x) = 4x - x^2$ and $g(x) = \frac{1}{x}$, then $(f \circ g)\left(\frac{1}{2}\right)$ is equal to

11 The temperature generated by an electrical circuit is represented by $t = f(m) = 0.3m^2$, where m is the number of moving parts. The resistance of the same circuit is represented by $r = g(t) = 150 + 5t$, where t is the temperature. What is the resistance in a circuit that has four moving parts?

12 If $f(x) = x + 1$ and $g(x) = x^2 - 1$, the expression $(g \circ f)(x)$ equals 0 when x is equal to

13 If $f(x) = 2x^2 + 4$ and $g(x) = x - 3$, which number satisfies $f(x) = (f \circ g)(x)$?

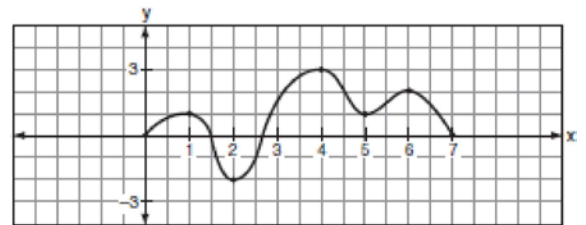
14 The accompanying tables define functions f and g .

| | | | | | |
|--------|---|---|---|---|---|
| x | 1 | 2 | 3 | 4 | 5 |
| $f(x)$ | 3 | 4 | 5 | 6 | 7 |

| | | | | | |
|--------|---|---|---|----|----|
| x | 3 | 4 | 5 | 6 | 7 |
| $g(x)$ | 4 | 6 | 8 | 10 | 12 |

What is $(g \circ f)(3)$?

15 The accompanying graph is a sketch of the function $y = f(x)$ over the interval $0 \leq x \leq 7$.



What is the value of $(f \circ f)(6)$?

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Answer Section

1 ANS:

3

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

REF: fall0902a2

2 ANS:

5

$$h(-8) = \frac{1}{2}(-8) - 2 = -4 - 2 = -6. \quad g(-6) = \frac{1}{2}(-6) + 8 = -3 + 8 = 5$$

REF: 011403a2

3 ANS:

-7

$$g(3) = 3^2 - 2$$

$$= 7$$

$$f(7) = -2(7) + 7$$

$$= -7$$

REF: 010501b

4 ANS:

129

$$g(-2) = 3(-2) - 2 = -8 \quad f(-8) = 2(-8)^2 + 1 = 128 + 1 = 129$$

REF: 061503a2

5 ANS:

48

REF: 069915siii

6 ANS:

80

$$g(8) = \sqrt{2 \cdot 8} = 4$$

$$f(4) = 5(4)^2 = 80$$

REF: 010207b

7 ANS:

8

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

$$f(2) = 2^2 + 4 = 8$$

REF: 060806b

8 ANS:

$$\sqrt{63}$$

REF: 069423siii

9 ANS:

24

REF: 019820siii

10 ANS:

4

$$g\left(\frac{1}{2}\right) = \frac{1}{\frac{1}{2}} = 2. \quad f(2) = 4(2) - 2^2 = 4$$

REF: 011204a2

11 ANS:

174

$$f(4) = 0.3(4)^2 = 4.8. \quad g(4.8) = 150 + 5(4.8) = 174$$

REF: 060605b

12 ANS:

0 and -2

$$\begin{array}{l} f(x) = x + 1 \\ g(x+1) = (x+1)^2 - 1 \\ \quad = x^2 + 2x \end{array} \quad \begin{array}{l} (g \circ f)(x) = 0 \\ x^2 + 2x = 0 \\ x(x+2) = 0 \\ x = 0 \text{ or } x = -2 \end{array}$$

REF: 060417b

13 ANS:

$$\frac{3}{2}$$

$$\begin{array}{l} g(x) = x - 3 \\ f(x-3) = 2(x-3)^2 + 4 \\ \quad = 2(x^2 - 6x + 9) + 4 \\ \quad = 2x^2 - 12x + 22 \end{array} \quad \begin{array}{l} f(x) = (f \circ g)(x) \\ 2x^2 + 4 = 2x^2 - 12x + 22 \\ 4 = -12x + 22 \\ 12x = 18 \\ x = \frac{3}{2} \end{array}$$

REF: 060210b

14 ANS:

8

$$f(3) = 5, g(5) = 8$$

REF: 010812b

15 ANS:

-2

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

REF: 080520b