

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

- 1 If $f(x) = \frac{1}{2}x - 3$ and $g(x) = 2x + 5$, what is the value of $(g \circ f)(4)$?
 - 1) -13
 - 2) 3.5
 - 3) 3
 - 4) 6

- 2 If $g(x) = \frac{1}{2}x + 8$ and $h(x) = \frac{1}{2}x - 2$, what is the value of $g(h(-8))$?
 - 1) 0
 - 2) 9
 - 3) 5
 - 4) 4

- 3 If $f(x) = -2x + 7$ and $g(x) = x^2 - 2$, then $f(g(3))$ is equal to
 - 1) -7
 - 2) -3
 - 3) -1
 - 4) 7

- 4 If $f(x) = 2x^2 + 1$ and $g(x) = 3x - 2$, what is the value of $f(g(-2))$?
 - 1) -127
 - 2) -23
 - 3) 25
 - 4) 129

- 5 If $f(x) = 3x^2$ and $g(x) = \sqrt{2x}$, what is the value of $(f \circ g)(8)$?
 - 1) $8\sqrt{6}$
 - 2) 16
 - 3) 48
 - 4) 144

- 6 If $f(x) = 5x^2$ and $g(x) = \sqrt{2x}$, what is the value of $(f \circ g)(8)$?
 - 1) $8\sqrt{10}$
 - 2) 16
 - 3) 80
 - 4) 1,280

- 7 If $f(x) = x^2 + 4$ and $g(x) = \sqrt{1-x}$, what is the value of $f(g(-3))$?
 - 1) $2i\sqrt{3}$
 - 2) 2
 - 3) 8
 - 4) 13

- 8 If $g(x) = \sqrt{x}$ and $h(x) = x^3 - 1$, what is $g(h(4))$?
 - 1) 5
 - 2) 7
 - 3) $\sqrt{11}$
 - 4) $\sqrt{63}$

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

- 1) 0
- 2) 6
- 3) 24
- 4) 30

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

- 1) $\frac{4}{7}$
- 2) -2
- 3) $\frac{7}{2}$
- 4) 4

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?

- 1) 51
- 2) 156
- 3) 174
- 4) 8,670

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

- 1) 1 and -1
- 2) 0, only
- 3) -2 , only
- 4) 0 and -2

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

- 1) $\frac{3}{2}$
- 2) $\frac{3}{4}$
- 3) 5
- 4) 4

14 The accompanying tables define functions f and g .

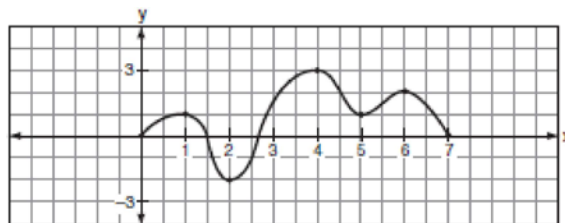
x	1	2	3	4	5
$f(x)$	3	4	5	6	7

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

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

- 1) 6
- 2) 2
- 3) 8
- 4) 4

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 $(f \circ f)(6)$?

- 1) 1
- 2) 2
- 3) 0
- 4) -2

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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: 3

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

REF: 011403a2

3 ANS: 1

$$\begin{aligned} g(3) &= 3^2 - 2 \\ &= 7 \end{aligned}$$

$$\begin{aligned} f(7) &= -2(7) + 7 \\ &= -7 \end{aligned}$$

REF: 010501b

4 ANS: 4

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

REF: 061503a2

5 ANS: 3

REF: 069915siii

6 ANS: 3

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

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

REF: 010207b

7 ANS: 3

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

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

REF: 060806b

8 ANS: 4

REF: 069423siii

9 ANS: 3

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: 3

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

REF: 060605b

12 ANS: 4

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

REF: 060417b

13 ANS: 1

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

REF: 060210b

14 ANS: 3

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

REF: 010812b

15 ANS: 4

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

REF: 080520b