Date Completed: _____
Mentor Initials: _____

Function Operations

1. Given that $f(x) = 3x^2 + 8$, what is $f(4)$?

A. 16
B. 24
C. 48
D. 56
E. 152

2. A function, $f(x)$, is defined as $f(x) = -\frac{x^2}{4}$, what is $f(-8) - f(4)$?

A. -60
B. -12
C. 2
D. 4
E. 20

3.

$$f(x) = 5x + 3$$
$$g(x) = 12x - 6$$

The functions f and g are defined above. Which of the following is equivalent to $f(3) + g(3)$?

A. 12
B. 41
C. 48
D. 54
E. 57

4.

$$f(x) = 3x^2 + 2x$$
$$g(x) = x^2 - 4$$

The functions f and g are defined above. Which of the following is equivalent to $f(3) - g(3)$?

A. 20
B. 28
C. 32
D. 33
E. 38

5.

$$f(x) = x + 5$$
$$g(x) = x - 9$$

The functions f and g are defined above. Which of the following is equivalent to $f(-3) \cdot g(-3)$?

A. -48
B. -24
C. 24
D. 32
E. 48

6. The table of values for the two functions f and g are shown below. What is the value of $f(g(10))$?

x	$f(x)$
-5	10
-3	12
0	4
8	7

x	$g(x)$
-3	4
0	10
10	0
12	7

A. 0
B. 4
C. 7
D. 10
E. 12

7.

$$g(x) = kx^2 - 10x$$

For the function g above, k is a constant and $g(2) = 4$. What is the value of $g(-2)$?

A. -6
B. -4
C. 6
D. 36
E. 44

8. $g(x) = 3^x - 3$

The function g is defined by the equation above. Which of the following points in the xy-plane is a y-intercept of the graph of the equation $y = g(x)$?

A. $-3, g(-3)$
B. $-2, g(-2)$
C. $-1, g(-1)$
D. $0, g(0)$
E. $1, g(1)$

9. Given that $f(x) = 8x + 8$ and $g(x) = \frac{x^2}{4}$, what is the value of $f\big(g(4)\big)$?

A. 4
B. 8
C. 40
D. 80
E. 400

10. Given that $f(x) = 8x + 8$ and $g(x) = \frac{x^2}{4}$, what is the value of $g\big(f(4)\big)$?

A. 4
B. 8
C. 40
D. 80
E. 400

11. If two functions are defined as $f(x) = 5x + 7$ and $g(x) = x^2 + 4$, which of the following expressions is equivalent to $f\big(g(x)\big)$?

A. $x^2 + 20$
B. $5x^2 + 20$
C. $5x^2 + 27$
D. $12x^2 + 27$
E. $12x^2 + 48$

12. If two functions are defined as $f(x) = 5x + 7$ and $g(x) = x^2 + 4$, which of the following expressions is equivalent to $g\big(f(x)\big)$?

A. $5x^2 + 27$
B. $5x^2 + 53$
C. $25x^2 + 53$
D. $25x^2 + 70x + 49$
E. $25x^2 + 70x + 53$

13. Two functions are defined as $f(x) = x^2 + 7$ and $g(x) = x^2 + 5x - 7$, which of the following expressions represents of $g\big(f(3)\big)$?

A. 249
B. 256
C. 329
D. 336
E. 343

14. The table of values for the two functions f and g are shown below. What is the value of $g(f(-3))$?

x	$f(x)$
-5	10
-3	12
0	4
8	7

x	$g(x)$
-3	4
0	10
10	0
12	7

A. 0
B. 4
C. 7
D. 10
E. 12

15. Given the functions $f(x) = x^2 + 1$ and $g(x) = \frac{4}{x-4}$, what is $g(f(x))$?

A. $\frac{4}{x^2-3}$

B. $\frac{4}{x^2-4}$

C. $\frac{4}{x^2-5}$

D. $\frac{4}{x^2-8x+15}$

E. $\frac{4}{x^2-8x+16}$

16. Given that $h(x) = \frac{x-2}{x^2}$, which of the following expressions is equal to $h(x+2)$ for all x in its domain?

A. $\frac{x}{x^2+4}$

B. $\frac{x}{x^2+4x+4}$

C. $\frac{x+2}{x^2+4}$

D. $\frac{x+2}{x^2+4x+4}$

E. $\frac{1}{x-2}$

17. Let $(f \circ g) = \sqrt{x-6} + 2$ and $g(x) = x - 6$. Which of the following expressions defines $(g \circ f)(x)$?

A. $\sqrt{x} - 6$

B. $\sqrt{x} - 4$

C. $\sqrt{x} + 2$

D. $\sqrt{x+2} - 6$

E. $\sqrt{x-6} - 6$

18. The function g is defined by $g(q) = (q-3)(q+4)^2$. If $g(k-2) = 0$, what is one possible value of k ?

A. -4

B. -3

C. -2

D. 2

E. 3