

Name: _____

Period: _____

5.1 – Operations on Functions/Composition

I can use function notation when adding, subtracting, multiplying and dividing two functions.

I understand what a composition of functions is & can find $f(g(x))$ & $g(f(x))$ when given two sets of ordered pairs.

I can find $f(g(x))$ and $g(f(x))$ when given functions $f(x)$ and $g(x)$.

I can find the domain and range of a composite function.

Operations on Functions:

Operations of Functions and their Domains

#9 $f(x) = x - 1$ and $g(x) = 5x - 2$

Find the functions of $f + g$, $f - g$, fg , and $\frac{f}{g}$ and their domains.

#11 $f(x) = 3x$ and $g(x) = -2x + 6$

Find the functions of $f + g$, $f - g$, fg , and $\frac{f}{g}$ and their domains.

Composition of Functions

Given two functions f and g , the

composite function $f \circ g$ is defined by:

Example 1: Compose Functions

For each pair of functions, find $[f \circ g](x)$ and $[g \circ f](x)$, if they exist. State the domain and range for each composed function.

$$f = \{(1, 8), (0, 13), (15, 11), (14, 9)\}, g = \{(8, 15), (5, 1), (10, 14), (9, 0)\}$$

To find $f \circ g$, evaluate $g(x)$ first. Then use the range to evaluate $f(x)$.

To find $g \circ f$, evaluate $f(x)$ first. Then use the range to evaluate $g(x)$.

For each pair of functions, find $f \circ g$ and $g \circ f$, if they exist. State the domain and range for each composed function.

17. $f = \{(-8, -4), (0, 4), (2, 6), (-6, -2)\}$
 $g = \{(4, -4), (-2, -1), (-4, 0), (6, -5)\}$

19. $f = \{(5, 13), (-4, -2), (-8, -11), (3, 1)\}$
 $g = \{(-8, 2), (-4, 1), (3, -3), (5, 7)\}$

Example 2: Compose Functions:

b. $f(x) = 2a - 5, g(x) = 4a$

$$[f \circ g](x) = f[g(x)]$$

Composition of functions

$$[g \circ f](x) = g[f(x)]$$

27. $f(x) = 2x$
 $g(x) = x + 5$

29. $f(x) = x + 5$
 $g(x) = 3x - 7$

31. $f(x) = x^2 + 6x - 2$
 $g(x) = x - 6$

$f(x) = 5x$, and $g(x) = -2x + 1$, $h(x) = x^2 + 6x + 8$

Find each value,

41. $f[g(-2)]$

42. $g[h(3)]$