

"Last into first"  $(f \circ g)(x)$  or  $f(g(x))$

- ① write the first function you see with ( ) in place of  $x$   
② put the 2nd function in the ( ) and simplify

Name: \_\_\_\_\_ Hr: \_\_\_\_\_

Sec. 4.8

Key

Composition and Combinations of Functions

Find  $(f \circ g)(x)$  of the following functions:

1.  $f(x) = 2x - 3$ ,  $g(x) = 3x$

$$2(3x) - 3$$

$$6x - 3$$

2.  $f(x) = \frac{1}{2}x - 3$ ,  $g(x) = \frac{1}{4}x$

$$\frac{1}{2}\left(\frac{1}{4}x\right) - 3$$

$$\frac{1}{8}x - 3 \text{ or } .125x - 3$$

Find  $(g \circ f)(x)$  of the following functions:

3.  $f(x) = x^2$ ,  $g(x) = 5x$

$$5x^2$$

4.  $f(x) = -3x + 3$ ,  $g(x) = 6x$

$$-18x + 18$$

Given the following functions, find each composite function value.

$$f(x) = -\frac{1}{2}x + 4$$

$$g(x) = x^2 - 1$$

$$h(x) = 2x + 5$$

5.  $(h \circ g)(-1)$

$$g(-1) = (-1)^2 - 1 = 0$$

$$2(0) + 5 = 5$$

6.  $(f \circ g)(-6)$

$$\frac{-27}{2}$$

7.  $(g \circ g)(-3)$

$$63$$

8.  $g(f(-6))$

$$48$$

9.  $(h \circ f)(5)$

$$8$$

10.  $(h \circ h)\left(\frac{1}{2}\right)$

$$17$$

Given:  $f(x) = 2x - 5$

$g(x) = 3x^2$

$h(x) = \frac{3x-1}{2}$

$k(x) = x^2 - 3x + 2$

Find the following:

11.  $f(-4)$

$-13$

12.  $(f \circ g)(-1)$

$1$

13.  $(g+k)(2)$

$g(2) = 3(2)^2$   $k(2) = (2)^2 - 3(2) + 2$   
 $12 + 0$   
 $12$

14.  $(k-f)(3)$

$1$

15.  $(f \cdot g)(6)$

$756$

16.  $f(g(x))$

$6x^2 - 5$

17.  $\left(\frac{g}{k}\right)(0)$

$0$

18.  $(h \circ k)(-2)$

$\frac{35}{2}$  or  $17.5$

19.  $\frac{f(1)+k(-1)}{3}$   $f(1) = -3$   
 $k(-1) = 6$

$\frac{-3+6}{3} = \frac{3}{3} = 1$

20.  $(f+k)(x)$

$x^2 - x - 3$

21.  $(k \circ g)(x)$

$9x^4 - 9x^2 + 2$

22.  $(h+g)(1)$

$4$

23.  $\frac{(f-k)(0)}{2}$

$-\frac{7}{2}$

24.  $g(h(0))$

$\frac{3}{4}$

25.  $\left(\frac{f}{g}\right)(x)$

$\frac{2x-5}{3x^2} \quad x \neq 0$

26.  $(g \cdot k)(x)$

$3x^4 - 9x^3 + 6x^2$