

## Practice Worksheet:

### Operations & Composition with Functions

Perform the indicated operation and simplify completely. Show all work to get credit.

$$f(x) = 10x$$

$$g(x) = -5x$$

$$h(x) = 8$$

$$j(x) = -10$$

$$1] (f + j)(x) = \boxed{10x - 10}$$

$$2] (f - g)(x) = (10x) - (-5x) = \boxed{15x}$$

$$3] (g \cdot h)(x) = (-5x)(8) = \boxed{-40x}$$

$$4] \left(\frac{g}{j}\right)(x) = \frac{g(x)}{j(x)} = \frac{-5x}{-10} = \boxed{\frac{x}{2}}$$

$$5] (h - g)(5) = h(5) - g(5) = \\ = 8 - (-5 \cdot 5) = \boxed{33}$$

$$6] (f \cdot g)(-1) = f(-1) \cdot g(-1) = \\ = 10 \cdot (-1) \cdot (-5) \cdot (-1) = \boxed{-50}$$

$$f(x) = 6x + 4$$

$$g(x) = 4 - 6x$$

$$h(x) = 2x$$

$$j(x) = -2$$

$$7] (f + g)(x) = (6x + 4) + (4 - 6x) = \\ = \boxed{8}$$

$$8] (f - g)(x) = (6x + 4) - (4 - 6x) = \\ = \boxed{12x}$$

$$9] (f \cdot j)(x) = (6x + 4) \cdot (-2) = \\ = \boxed{-12x - 8}$$

$$10] \left(\frac{g}{j}\right)(x) = \frac{4 - 6x}{-2} = \boxed{3x - 2}$$

$$11] (h - g)\left(\frac{1}{2}\right) = h\left(\frac{1}{2}\right) - g\left(\frac{1}{2}\right) = \\ = 2 \cdot \frac{1}{2} - (4 - 6 \cdot \frac{1}{2}) = 1 - (4 - 3) = \boxed{0}$$

$$12] (f \cdot g)\left(-\frac{1}{6}\right) = f\left(-\frac{1}{6}\right) \cdot g\left(-\frac{1}{6}\right) = \\ = (6 \cdot -\frac{1}{6} + 4) \cdot (4 - 6 \cdot -\frac{1}{6}) = 3 \cdot 5 = \boxed{15}$$

$$f(x) = x^2$$

$$g(x) = 10x + 5$$

$$h(x) = \sqrt{x}$$

$$j(x) = 5$$

$$13] (f + g)(x) = \boxed{x^2 + 10x + 5}$$

$$14] (f - g)(x) = x^2 - (10x + 5) = \boxed{x^2 - 10x - 5}$$

$$15] (f \cdot j)(x) = x^2 \cdot 5 = \boxed{5x^2}$$

$$16] \left(\frac{g}{j}\right)(x) = \frac{10x + 5}{5} = \boxed{2x + 1}$$

$$17] (h + j)(49) = h(49) + j(49) = \\ = \sqrt{49} + 5 = \boxed{12}$$

$$18] (f \cdot h)(4) = f(4) \cdot h(4) = \\ = 4^2 \cdot \sqrt{4} = 16 \cdot 2 = \boxed{32}$$

Use the tables of ordered pairs to determine the value of each composite function.

$f(x) = x^2 - 15$		$g(x) = \sqrt{x}$		
$x$	$f(x)$	$x$	$g(x)$	
1	-14	1	1	
2	-11	4	2	
3	-6	9	3	
4	1	16	4	
5	10	25	5	
6	21	36	6	
7	34	49	7	

19]  $(f \circ g)(36) = f(6) = \boxed{21}$

20]  $(g \circ g)(16) = g(4) = \boxed{2}$

21]  $(g \circ f)(4) = g(1) = \boxed{1}$

22]  $(f \circ f)(4) = f(1) = \boxed{-14}$

Use the graph to determine the value of each composite function.

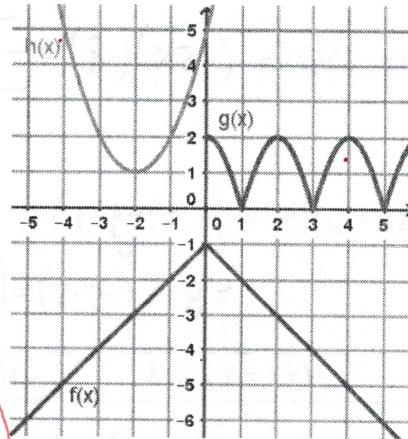
23]  $(h \circ f)(3) = h(-4) = \boxed{5}$

24]  $(f \circ g)(4) = f(2) = \boxed{-3}$

25]  $(f \circ f)(-4) = f(-5) = \boxed{-6}$

26]  $(g \circ g)(1) = g(0) = \boxed{2}$

27]  $(g \circ h)(0) = g(5) = \boxed{0}$



Easier:  
 $h(j(12)) = h(\frac{1}{2}) = 3 - \frac{9}{2} = \boxed{0}$

$f(x) = 2x^2$	$g(x) = 3x - 2$	$h(x) = 3 - 4x$	$j(x) = \frac{6}{x}$
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28]  $(f \circ g)(3) = 2(3^2 - 2)^2 = \boxed{98}$  29]  $(h \circ j)(12) = 3 - 4 \cdot \frac{6}{12} = \boxed{1}$  30]  $(g \circ h)(x) = 7 - 12x$  31]  $(h \circ g)(x) = 11 - 12x$

$(f \circ g)(x) = f(g(x)) = 2(3x - 2)^2$   $h(\frac{6}{x}) = 3 - 4 \cdot \frac{6}{x}$   $g(3 - 4x) =$

$f(3x - 2) = 2(3x - 2)^2$   $Easier:$   $f(g(3)) = f(7) = \boxed{98}$   $3(3 - 4x) - 2 = 7 - 12x$   $h(3x - 2) =$

$3 - 4(3x - 2) =$

$\boxed{11 - 12x}$

32] Sally Salesperson sells shoes part time at Super Shoes in the South Street Mall. She earns a 2% commission on total sales over \$5,000, which is paid as a bonus at the end of the year.

Let her total sales be represented by  $x$ .  $f(x) = x - 5000$  and  $g(x) = 0.02x$

Which composition of functions would calculate her bonus at the end of the year?  $(f \circ g)(x)$  or  $(g \circ f)(x)$ ? Explain your reasoning.

$(g \circ f)(x)$

First, subtract \$5,000  $\leftarrow f$   
Then, take 2%  $\leftarrow g$

33] Sally sold \$9,172 in shoes this year. Use composition of functions to calculate her bonus. Show work.

$(g \circ f)(x) = g(f(x)) : 0.02(x - 5000) = \boxed{\$83.44}$

$\uparrow$   
 $\$9,172$