

## 4.3 Composite Functions

Note Title

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A composite function is when the output from one function becomes the input for another.

$(f \circ g)(x)$  means  $f(g(x))$   
say "f of g of x"

$x$	$f(x)$
-1	2
0	5
1	0
2	1
3	3

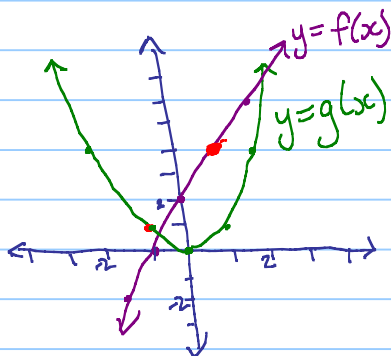
$x$	$g(x)$
0	-4
1	-2
2	0
3	1
5	4

Find:

$$a) f(g(3)) = f(1) = 0$$

$$b) g(f(-1)) = g(2) = 0$$

$$c) g(g(2)) = g(0) = -4$$



For  $y=f(x)$  and  $y=g(x)$  shown, find:

$$a) (f \circ g)(-1) = f(g(-1)) = f(-2) = 4$$

$$b) (f \circ f)(0) = f(f(0)) = f(5) = 6$$

For  $f(x) = x-2$  and  $g(x) = -x^2+1$ , find

$$a) (g \circ f)(1) = g(f(1)) = g(1-2) = g(-1)$$

$$b) (g \circ g)(-2) = g(g(-2)) = g(-(-2)^2+1) = g(-3)$$

$$c) (g \circ f)(x) = g(f(x)) = g(x-2) = -(x-2)^2+1$$

$$= -(-1)^2 + 1$$

$$= -1 + 1$$

$$= 0$$

$$= -(-3)^2 + 1$$

$$= -8$$

$$= -(x^2 - 4x + 4) + 1$$

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

$$\text{check: } (g \circ f)(1) = -(1)^2 + 4(1) - 3$$

$$= -1 + 4 - 3$$

$$= 0$$
