

Example 4 Using Composition

Matt and Mary made their way to Mega Mart for mammoth muffins on Monday. Mary has a coupon for \$5.00 off a box of muffins and Maryland sales tax is 6%. Let the cost of the muffins be x . Write a function $f(x)$ for the sale price of the muffins.

Write a function $g(x)$ for the cost of the muffins after tax.

Which composition of functions would calculate Matt and Mary's bill at the checkout?

Function Composition

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

To evaluate the function f composed with the function g , first evaluate $g(x)$ and then use that result to evaluate $f(x)$.

$$= (x)(f \circ g) \text{ [d]}$$

$$= (x)(f \circ g)(x) \text{ [c]}$$

$$= (h \circ g)\left(\frac{2}{1}\right) \text{ [B]}$$

$$= (f \circ j)(4) \text{ [A]}$$

$f(x) = 8x + 3$	$g(x) = 2x - 10$	$h(x) = x^2$	$j(x) = \frac{1}{x}$
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Evaluate the 2nd function first, then use that result to evaluate the first function.

Example 3 Composing Functions Algebraically

Example 1 Composing Functions from Tables

Evaluate the 2nd function first, then use that result to evaluate the first function.

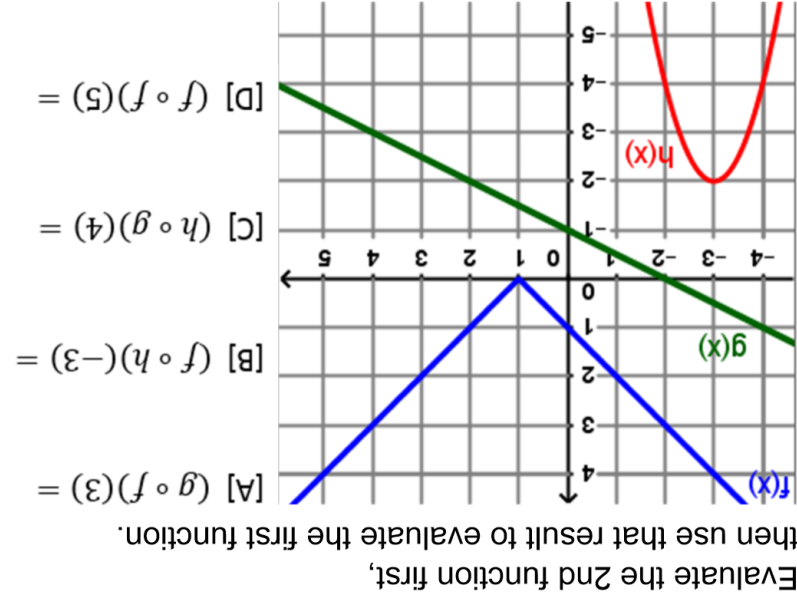
$f(x) = 3x + 2$		$g(x) = -x + 5$	
x	$f(x)$	x	$g(x)$
-3	-7	-4	9
-2	-4	-2	7
-1	-1	0	5
0	2	2	3
1	5	4	1
2	8	6	-1
3	11	8	-3

$$1] (f \circ g)(8) =$$

$$2] (g \circ f)(-2) =$$

$$3] (f \circ g)(2) =$$

$$4] (f \circ f)(0) =$$



Example 2 Composing Functions from Graphs