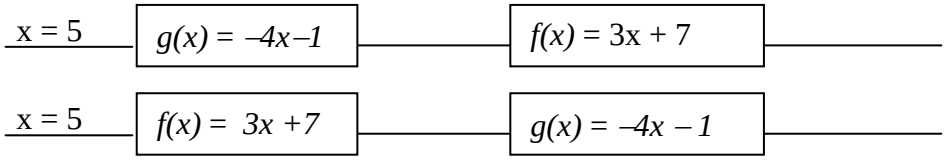
Unit 1, Activity 11, Composite Function Discovery Worksheet

Name_____ Date_____

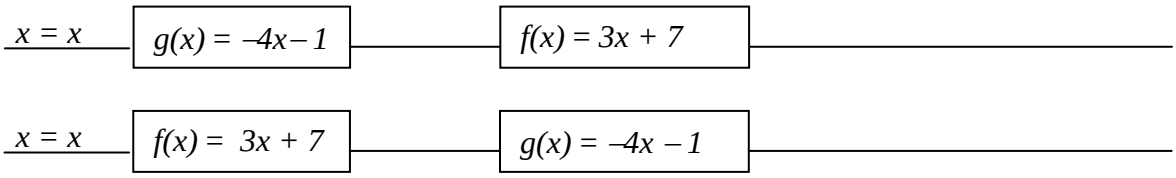
Composite Functions in a Double Function Machine

(1) $f(x) = 3x + 7$ and $g(x) = -4x - 1$. Find $f(g(5))$ and $g(f(5))$ with the function machine.



$f(g(5))$=_____ $g(f(5))$=_____

(2) Using the following function machine to find a rule for $f(g(x))$ and $g(f(x))$.

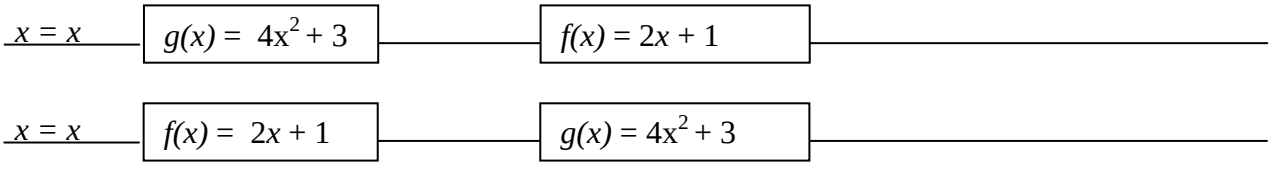


$f(g(x))$ =_____ $g(f(x))$ =_____

Finding Equations of Composite Functions and Graphing Them on the Calculator

- In order to graph the composition $f(g(x))$ on a graphing calculator, enter $g(x)$ into $y_1 = -4x - 1$ and turn it off so it will not graph. *(Note: To turn an equation off, use your left arrow to move the cursor over the = sign and press ENTER.)*
- Next, enter $f(x)$ into y_2 as follows $y_2 = 3(y_1) + 7$ and graph. *(Note: y_1 is under ❺, Y–VARS, 1: Function, 1: Y_1.)*
- Graph the answer to $f(g(x))$ from the function machine in #2 above in y_3, to see if they are the same graph.

(3) Practice with the polynomial functions: $f(x) = 2x + 1$ and $g(x) = 4x^2 + 3$. Find $f(g(x))$ and $g(f(x))$ and check on the calculator.



$f(g(x))$ =_____ $g(f(x))$ =_____

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Composite Functions in a Table: Use the table to calculate the following compositions:

(11) $f(g(2))$ =_____

(12) $g(f(2))$ =_____

(13) $f(g(3))$ =_____

(14) $g(f(3))$ =_____

x	*f(x)*	*g(x)*
2	4	5
3	8	4
4	9	12
5	3	7

Decomposition of Composite Functions:

Most functions are compositions of basic functions. Work backwards to determine the basic functions that created the composition.

	f(g(x))	*f(x)*	*g(x)*
(15)	$(x+4)^2+5$		
(16)	$\sqrt{x-4}$		
(17)	$(4x-1)^2$		
(18)	$\lvert x+2\rvert$		
(19)	$\lvert x-2\rvert+4$		

Domain & Range of Composite Functions:

Find the domains and composition *f(g(x))* to fill in the table below to discover the rule for the domain of a composite function:

	f(x)	*g(x)*	**Domain of *f(x)***	**Domain of *g(x)***	*f(g(x))*	**Domain of *f(g(x))***
(20)	$\sqrt{x-3}$	$x+1$				
(21)	$x+1$	$\sqrt{x-3}$				
(22)	$\frac{1}{x}$	$2x+4$				
(23)	$2x+4$	$\frac{1}{x}$				
(24)	$\sqrt{x}$	x^2				
(25)	x^2	$\sqrt{x}$				

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(26) Develop a rule for determining the domain of a composition: _____

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