

## Composition of Functions Bonus Assignment:

Congratulations! You found your first Easter Egg.

Complete the following on a separate sheet of paper. Include the original functions and problems. Box your answers. You cannot ask me about this assignment, or where to put it. If you're not sure how to do it, see the modeled problem and google "composite functions". Be careful not to spread it around...the number of points you will get depends on how many people find the Easter Egg--so don't tell everyone!

It must be turned into your class specific tray. After you turn it in, we can talk about it.

### Composition of Functions

#### I. Model Problems

In this example we will evaluate a function for a given value of  $x$ .

*Example 1: If  $f(x) = 5x + 3$  and  $g(x) = 3x^2$ , find  $f(g(4))$ .*

Substitute 4 for  $x$  for the function  $g(x)$ . Simplify.

$$f(g(4))$$

$$f(3 \cdot 4^2)$$

$$f(3 \cdot 16)$$

$$f(48)$$

Substitute 48 for  $x$  for the function  $f(x)$ . Simplify.

$$5(48) + 3$$

$$240 + 3$$

$$243$$

**Answer:  $f(g(4)) = 243$**

#### A word on notation

$f \circ g(4)$  is another way of expressing  $f(g(4))$

### PRACTICE PROBLEMS:

1. If  $f(x) = 2x + 7$  and  $g(x) = 3x - 2$ , find  $f(g(6))$ .
2. If  $f(x) = 2x + 7$  and  $g(x) = 3x - 2$ , find  $g \circ f(6)$
3. If  $f(x) = -5x + 2$  and  $g(x) = \frac{1}{2}x + 4$ , find  $f(g(12))$ .
4. If  $f(x) = -5x + 2$  and  $g(x) = \frac{1}{2}x + 4$ , find  $g(f(12))$ .
5. If  $g(x) = -3x^2 + 6$  and  $h(x) = 9x + 3$ , find  $g \circ h\left(\frac{1}{3}\right)$ .
6. If  $g(x) = -3x^2 + 6$  and  $h(x) = 9x + 3$ , find  $h\left(g\left(\frac{1}{3}\right)\right)$ .
7. If  $f(x) = -\frac{1}{5}x + 4$  and  $g(x) = 4x^2$ , find  $f \circ g(10)$ .
8. If  $f(x) = -\frac{1}{5}x + 4$  and  $g(x) = 4x^2$ , find  $g \circ f(10)$ .
9. If  $f(x) = 4x - 7$  and  $g(x) = |2x - 9|$ , find  $f(g(-6))$ .
10. If  $f(x) = 4x - 7$  and  $g(x) = |2x - 9|$ , find  $g(f(-6))$ .