

Name \_\_\_\_\_

Date \_\_\_\_\_

Advanced Algebra

Unit 2: Family of Functions

Composition of Functions:

Assignment #14

**For the following problems, find  $f(g(x))$  and  $g(f(x))$**

1)  $f(x) = x+1$  and  $g(x) = 2x$

fog  
 $f(2x)$   $2x+1$

gof  
 $g(x+1)$   $2(x+1)$   $2x+2$

2)  $f(x) = 2x+1$  and  $g(x) = x-3$

fog  
 $f(x-3)$   $2(x-3)+1$   
 $2x-6+1$   
 $2x-5$

gof  
 $g(2x+1)$   $2x+1-3$   
 $2x-2$

3)  $f(x) = x^2$  and  $g(x) = x-1$

fog  
 $f(x-1)$   $(x-1)^2$

gof  
 $g(f(x))$   
 $g(x^2)$   $x^2-1$

4)  $f(x) = x^2-1$  and  $g(x) = x+2$

fog  
 $f(g(x))$   
 $f(x+2)$   $(x+2)^2-1$

gof  
 $g(f(x))$   
 $g(x^2-1)$   
 $g(f(x)) = x^2+1$

5)  $f(x) = x-3$  and  $g(x) = x+3$

Fog

$$f(g(x))$$

$$f(x+3)$$

$$x+3-3$$

$$x$$

gof

$$g(f(x))$$

$$g(x-3)$$

$$x-3+3$$

$$x$$

6)  $f(x) = -x^2 - 1$  and  $g(x) = x+5$

fog

$$f(g(x))$$

$$-(x+5)^2 - 1$$

gof

$$g(f(x))$$

$$-x^2 - 1 + 5$$

$$-x^2 + 4$$

7) Find  $f(x)$  and  $g(x)$  such that  $f(g(x)) = (x+1)^2$

$g(f(x))$  is  $(x+1)^2$

What is  $f(x)$ ?  $(x+1)$

What is  $g(x)$ ?  $x^2$

check  $f(g(x))$

$f(x^2)$

$(x^2 + 1)$

$g(f(x))$

$g(x+1)$

$$(x+1)^2$$