

**Effects on the Intercepts**

**Notes: Linear Parent Function:  $f(x) = x$**

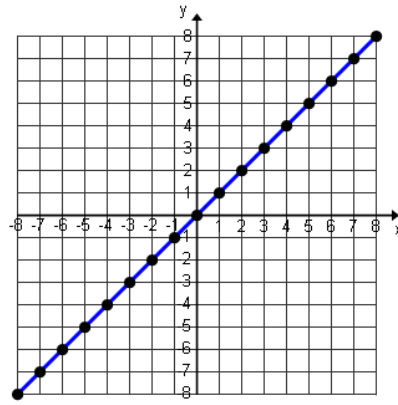
**Written in Slope - Intercept Form:  $f(x) = mx + b$**

$y = x$  or  $f(x) = x$

$m = \underline{\hspace{2cm}}$     $b = \underline{\hspace{2cm}}$

$f(x - c) = \underline{\hspace{4cm}}$

$f(x) + d = \underline{\hspace{4cm}}$



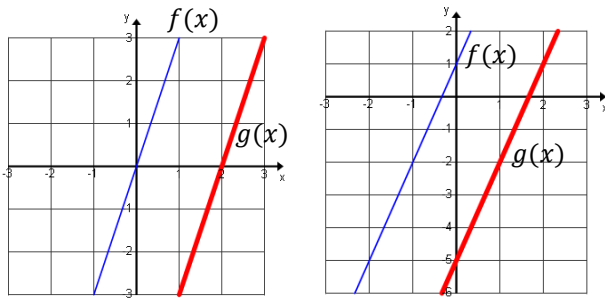
**Notes: How to Write The New Function**

**Inside Subtraction:  $f(x - c)$**

$f(x) = 3x$     $g(x) = f(x - 2)$     $f(x) = 3x + 1$     $g(x) = f(x - 2)$   
 $g(x) = 3(x - 2) = \underline{\hspace{2cm}}$     $g(x) = 3(x - 2) + 1 = \underline{\hspace{2cm}}$

$c = 2$

**x-intercept moves to the right 2 units**

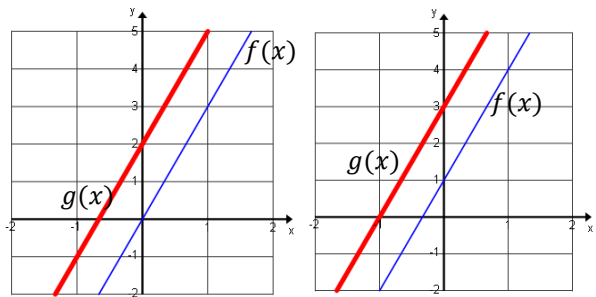


**Outside Addition:  $f(x) + d$**

$f(x) = 3x$     $g(x) = f(x) + 2$     $f(x) = 3x + 1$     $g(x) = f(x) + 2$   
 $g(x) = 3x + 2 = \underline{\hspace{2cm}}$     $g(x) = 3x + 1 + 2 = \underline{\hspace{2cm}}$

$d = 2$

**y-intercept moves up 2 units**

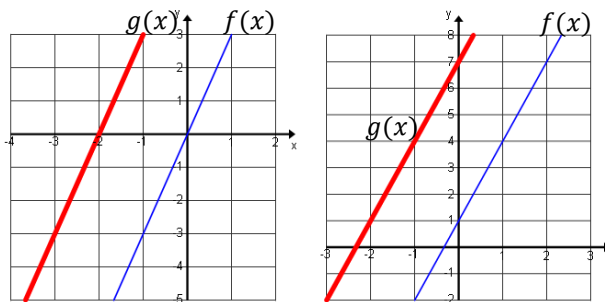


**Inside Addition:  $f(x - (-c))$**

$f(x) = 3x$     $g(x) = f(x + 2)$     $f(x) = 3x + 1$     $g(x) = f(x + 2)$   
 $g(x) = 3(x + 2) = \underline{\hspace{2cm}}$     $g(x) = 3(x + 2) + 1 = \underline{\hspace{2cm}}$

$c = -2$

**x-intercept moves to the left 2 units**

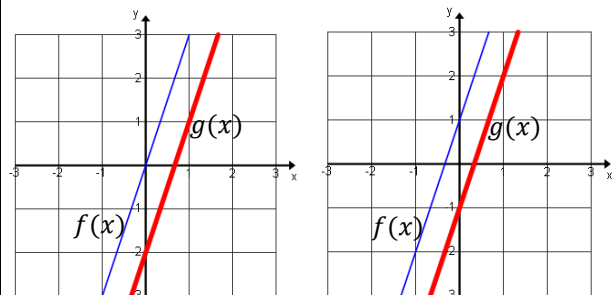


**Outside Subtraction:  $f(x) + -d$**

$f(x) = 3x$     $g(x) = f(x) - 2$     $f(x) = 3x + 1$     $g(x) = f(x) - 2$   
 $g(x) = 3x - 2 = \underline{\hspace{2cm}}$     $g(x) = 3x + 1 - 2 = \underline{\hspace{2cm}}$

$d = -2$

**y-intercept moves down 2 units**

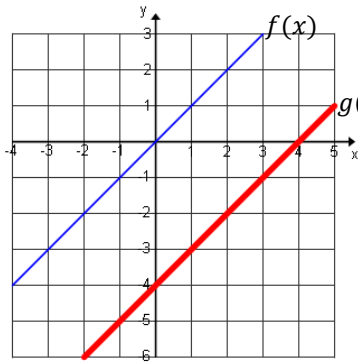


1.  $f(x) = x$        $g(x) = f(x - 4) =$  \_\_\_\_\_

$m =$  \_\_\_  $b =$  \_\_\_

$m =$  \_\_\_  $b =$  \_\_\_  
 $c =$  \_\_\_

**g(x) translates: Up      Down      Left      Right**



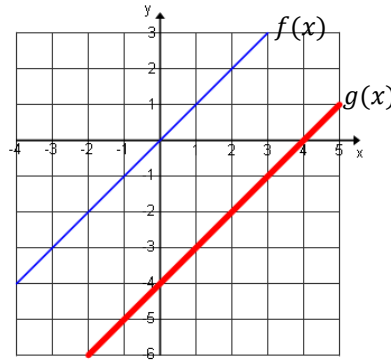
Same steepness and shifted \_\_\_\_\_ units

2.  $f(x) = x$        $g(x) = f(x) - 4 =$  \_\_\_\_\_

$m =$  \_\_\_  $b =$  \_\_\_

$m =$  \_\_\_  $b =$  \_\_\_  
 $d =$  \_\_\_

**g(x) translates: Up      Down      Left      Right**



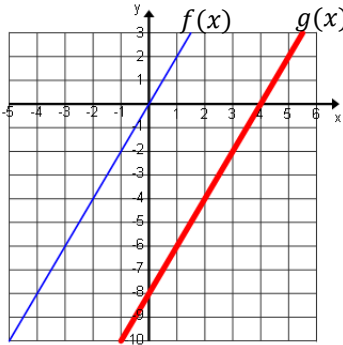
Same steepness and shifted \_\_\_\_\_ units

3.  $f(x) = 2x$        $g(x) = f(x - 4) =$  \_\_\_\_\_  
= \_\_\_\_\_

$m =$  \_\_\_  $b =$  \_\_\_

$m =$  \_\_\_  $b =$  \_\_\_  
 $c =$  \_\_\_

**g(x) translates: Up      Down      Left      Right**



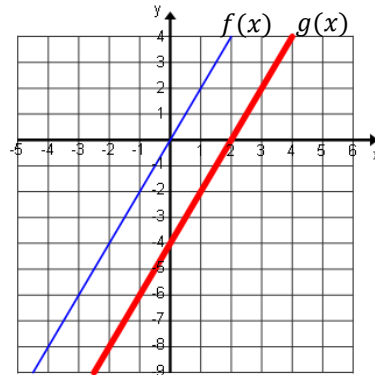
Same steepness and shifted \_\_\_\_\_ units

4.  $f(x) = 2x$        $g(x) = f(x) - 4 =$  \_\_\_\_\_

$m =$  \_\_\_  $b =$  \_\_\_

$m =$  \_\_\_  $b =$  \_\_\_  
 $d =$  \_\_\_

**g(x) translates: Up      Down      Left      Right**



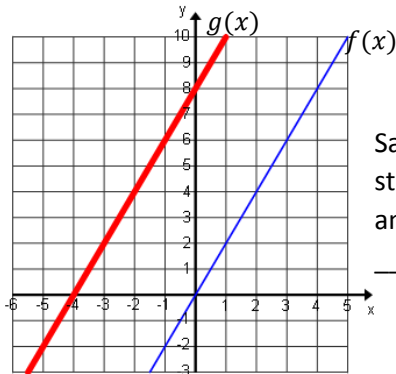
Same steepness and shifted \_\_\_\_\_ units

5.  $f(x) = 2x$        $g(x) = f(x + 4) =$  \_\_\_\_\_  
= \_\_\_\_\_

$m =$  \_\_\_  $b =$  \_\_\_

$m =$  \_\_\_  $b =$  \_\_\_  
 $c =$  \_\_\_

**g(x) translates: Up      Down      Left      Right**



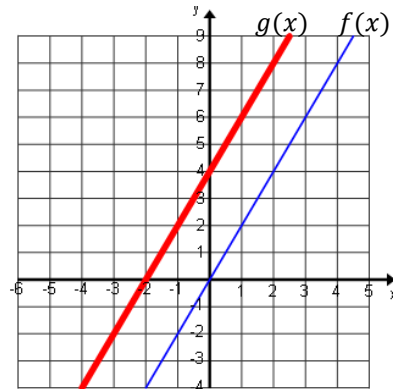
Same steepness and shifted \_\_\_\_\_ units

6.  $f(x) = 2x$        $g(x) = f(x) + 4 =$  \_\_\_\_\_

$m =$  \_\_\_  $b =$  \_\_\_

$m =$  \_\_\_  $b =$  \_\_\_  
 $d =$  \_\_\_

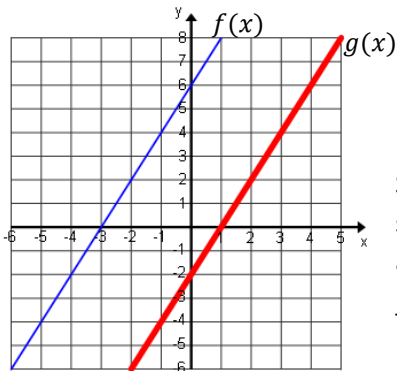
**g(x) translates: Up      Down      Left      Right**



Same steepness and shifted \_\_\_\_\_ units

7.  $f(x) = 2x + 6$      $g(x) = f(x - 4) =$  \_\_\_\_\_  
 = \_\_\_\_\_  
 = \_\_\_\_\_  
 m= \_\_\_\_\_ b= \_\_\_\_\_    m= \_\_\_\_\_ b= \_\_\_\_\_  
 c= \_\_\_\_\_

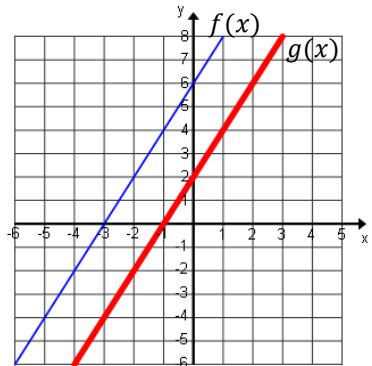
**g(x) translates: Up    Down    Left    Right**



Same steepness and shifted \_\_\_\_\_ units

8.  $f(x) = 2x + 6$      $g(x) = f(x) - 4 =$  \_\_\_\_\_  
 = \_\_\_\_\_  
 m= \_\_\_\_\_ b= \_\_\_\_\_    m= \_\_\_\_\_ b= \_\_\_\_\_  
 d= \_\_\_\_\_

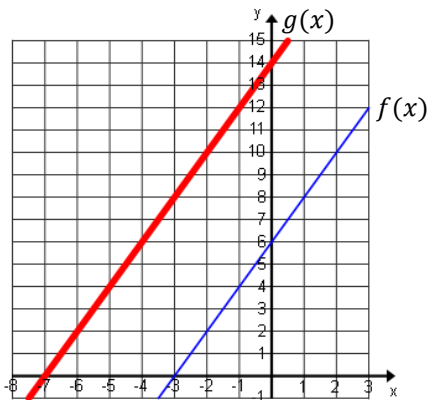
**g(x) translates: Up    Down    Left    Right**



Same steepness and shifted \_\_\_\_\_ units

9.  $f(x) = 2x + 6$      $g(x) = f(x + 4) =$  \_\_\_\_\_  
 = \_\_\_\_\_  
 = \_\_\_\_\_  
 m= \_\_\_\_\_ b= \_\_\_\_\_    m= \_\_\_\_\_ b= \_\_\_\_\_  
 c= \_\_\_\_\_

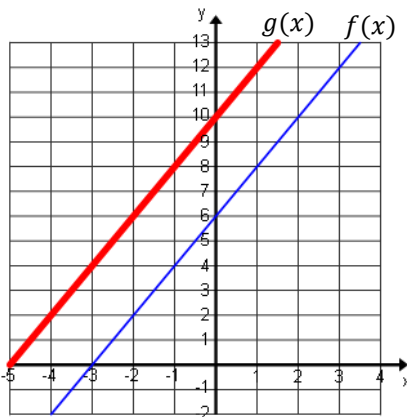
**g(x) translates: Up    Down    Left    Right**



Same steepness and shifted \_\_\_\_\_ units

10.  $f(x) = 2x + 6$      $g(x) = f(x) + 4 =$  \_\_\_\_\_  
 = \_\_\_\_\_  
 m= \_\_\_\_\_ b= \_\_\_\_\_    m= \_\_\_\_\_ b= \_\_\_\_\_  
 d= \_\_\_\_\_

**g(x) translates: Up    Down    Left    Right**



Same steepness and shifted \_\_\_\_\_ units

**Reflection: What do you remember?**

1. When does the new function translate up or down?
2. When does the new function translate left or right?
3. What does c tell you?
4. What does d tell you?

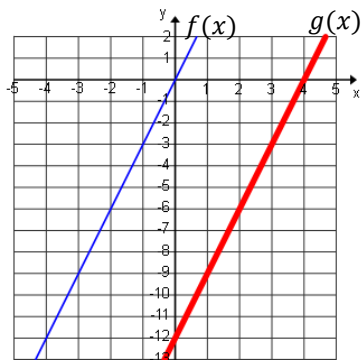
**Practice: Translation of the Intercepts**

1.  $f(x) = 3x$        $g(x) = f(x - 4) =$  \_\_\_\_\_  
 = \_\_\_\_\_

m = \_\_\_\_ b = \_\_\_\_

m = \_\_\_\_ b = \_\_\_\_  
 c = \_\_\_\_

**g(x) translates: Up      Down      Left      Right**



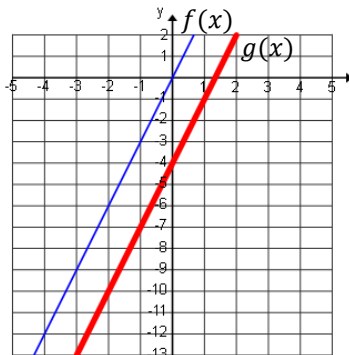
Same  
steepness  
and shifted  
\_\_\_\_ units

2.  $f(x) = 3x$        $g(x) = f(x) - 4 =$  \_\_\_\_\_

m = \_\_\_\_ b = \_\_\_\_

m = \_\_\_\_ b = \_\_\_\_  
 d = \_\_\_\_

**g(x) translates: Up      Down      Left      Right**



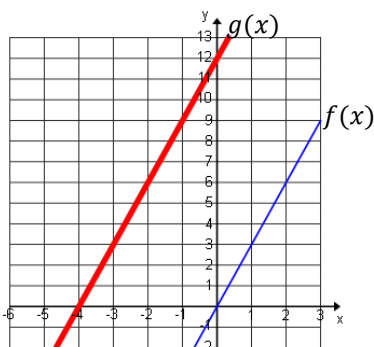
Same  
steepness  
and shifted  
\_\_\_\_ units

3.  $f(x) = 3x$        $g(x) = f(x + 4) =$  \_\_\_\_\_  
 = \_\_\_\_\_

m = \_\_\_\_ b = \_\_\_\_

m = \_\_\_\_ b = \_\_\_\_  
 c = \_\_\_\_

**g(x) translates: Up      Down      Left      Right**



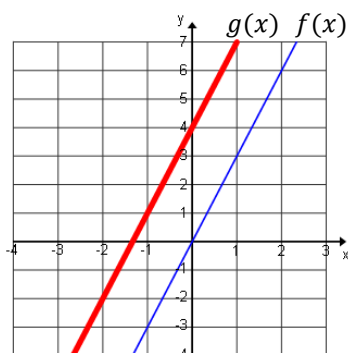
Same  
steepness  
and shifted  
\_\_\_\_ units

4.  $f(x) = 3x$        $g(x) = f(x) + 4 =$  \_\_\_\_\_

m = \_\_\_\_ b = \_\_\_\_

m = \_\_\_\_ b = \_\_\_\_  
 d = \_\_\_\_

**g(x) translates: Up      Down      Left      Right**



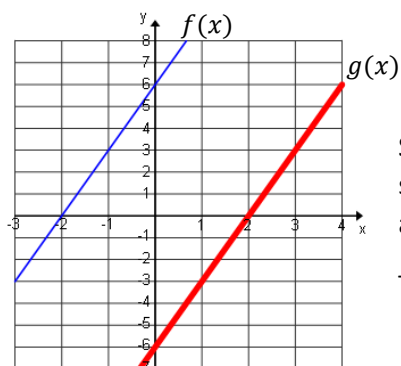
Same  
steepness  
and shifted  
\_\_\_\_ units

5.  $f(x) = 3x + 6$        $g(x) = f(x - 4) =$  \_\_\_\_\_  
 = \_\_\_\_\_  
 = \_\_\_\_\_

m = \_\_\_\_ b = \_\_\_\_

m = \_\_\_\_ b = \_\_\_\_  
 c = \_\_\_\_

**g(x) translates: Up      Down      Left      Right**



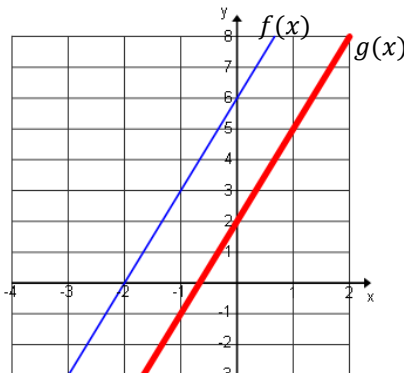
Same  
steepness  
and shifted  
\_\_\_\_ units

6.  $f(x) = 3x + 6$        $g(x) = f(x) - 4 =$  \_\_\_\_\_  
 = \_\_\_\_\_

m = \_\_\_\_ b = \_\_\_\_

m = \_\_\_\_ b = \_\_\_\_  
 d = \_\_\_\_

**g(x) translates: Up      Down      Left      Right**



Same  
steepness  
and shifted  
\_\_\_\_ units

7.  $f(x) = 3x + 6$      $g(x) = f(x + 4) =$  \_\_\_\_\_

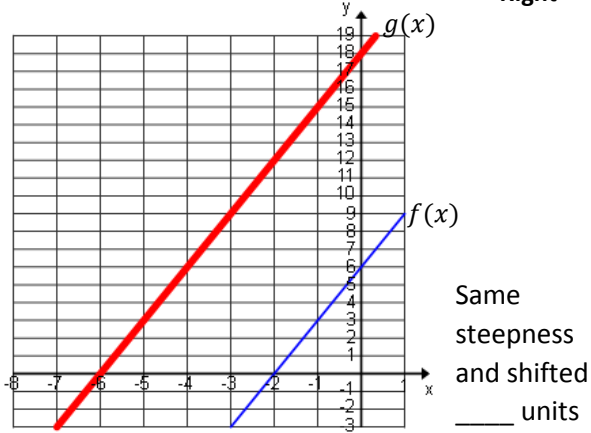
$=$  \_\_\_\_\_  
 $=$  \_\_\_\_\_

$m =$  \_\_\_  $b =$  \_\_\_

$m =$  \_\_\_  $b =$  \_\_\_

$c =$  \_\_\_

$g(x)$  translates: Up    Down    Left    Right



8.  $f(x) = 3x + 6$      $g(x) = f(x) + 4 =$  \_\_\_\_\_

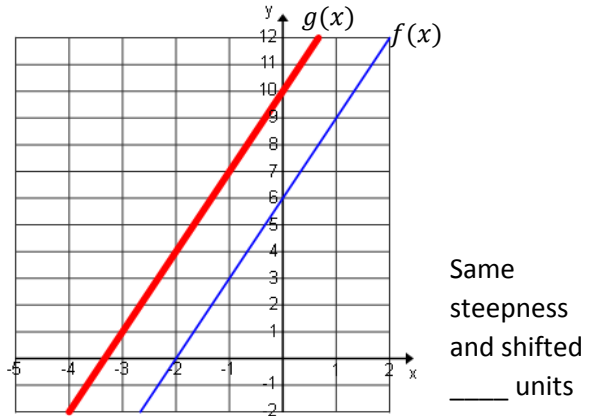
$=$  \_\_\_\_\_  
 $=$  \_\_\_\_\_

$m =$  \_\_\_  $b =$  \_\_\_

$m =$  \_\_\_  $b =$  \_\_\_

$d =$  \_\_\_

$g(x)$  translates: Up    Down    Left    Right



What conclusions can you make about the value of  $c$  and  $d$ ?

What conclusions can you make about the effects that  $f(x - c)$  has on the graph of a line?

What conclusions can you make about the effects that  $f(x) + d$  has on the graph of a line?