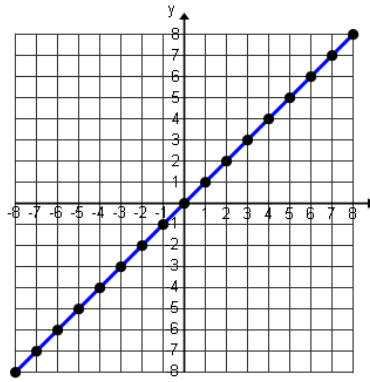Name _____ Date ___/___/___

Effects on Slope

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

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

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

m=_____   b=_____

$f(bx) = $ _____

$af(x) = $ _____

Notes: How to Write The New Function

Inside Multiplication: $f(bx)$	**Outside Multiplication:** $af(x)$
$f(x) = 3x$ $g(x) = f(2x)$ | $f(x) = 5x - 1$ $g(x) = f(2x)$	$f(x) = 3x$, $g(x) = 2f(x)$ | $f(x) = 5x - 1$ $g(x) = 2f(x)$
$g(x) = 3(2x) = $ _____ | $g(x) = 5(2x) - 1 = $ _____	$g(x) = 2(3x) = $ _____ | $g(x) = 2(5x - 1) = $ _____

1. $f(x) = x$ $g(x) = f(3x) = $ _____

  m=____ b= _____   m=____ b= _____

g(x): Steeper   Less Steep   Same Steepness
                              reflection

rotation about the origin

2. $f(x) = x$ $g(x) = 3f(x) = $ _____

  m=____ b= _____   m=____ b= _____

g(x): Steeper   Less Steep   Same Steepness
                              reflection

rotation about the origin

3. $f(x) = 2x$ $g(x) = f(3x) = $ _____
                              = _____

  m=____ b= _____   m=____ b= _____

g(x): Steeper   Less Steep   Same Steepness
                              reflection

rotation about the origin

4. $f(x) = 2x$ $g(x) = 3f(x) = $ _____
                              = _____

  m=____ b= _____   m=____ b= _____

g(x): Steeper   Less Steep   Same Steepness
                              reflection

rotation about the origin

5. $f(x) = x$ $g(x) = f(-x) =$ _____

m=____ b= _____   m=____ b= _____

g(x): Steeper   Less Steep   Same Steepness

reflection

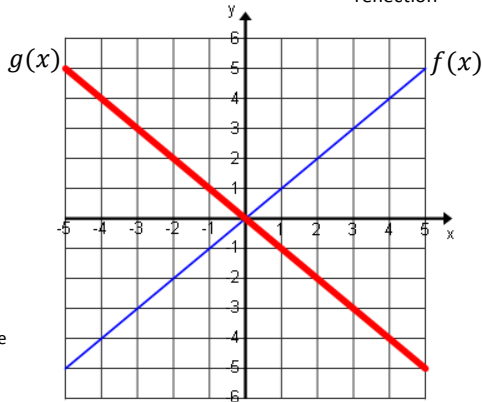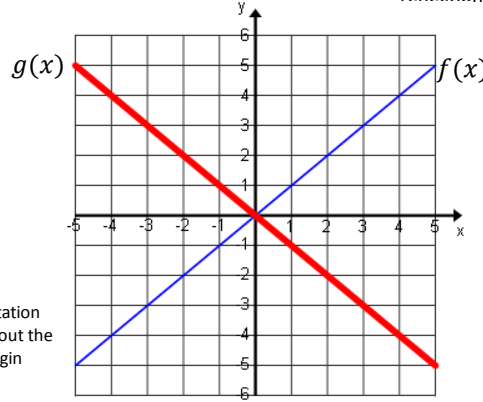rotation about the origin

---

6. $f(x) = x$ $g(x) = -f(x) =$ _____

m=____ b= _____   m=____ b= _____

g(x): Steeper   Less Steep   Same Steepness
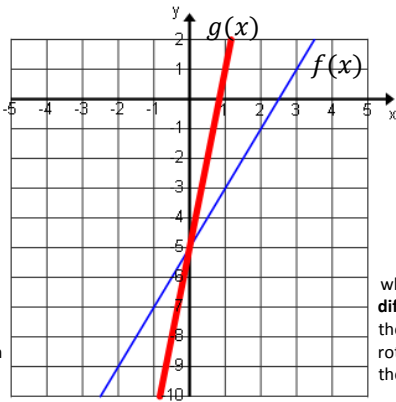
reflection

rotation about the origin

---

7. $f(x) = 2x - 5$ $g(x) = f(3x) =$ _____
                                       $=$ _____

m=____ b= _____   m=____ b= _____

g(x): Steeper   Less Steep   Same Steepness

reflection

when **b is the same** there is a rotation about the **y-axis**

when **b is different** there is a rotation about the **x-axis**

---

8. $f(x) = 2x - 5$ $g(x) = 3f(x) =$ _____
                                       $=$ _____

m=____ b= _____   m=____ b= _____

g(x): Steeper   Less Steep   Same Steepness

reflection

when **b is the same** there is a rotation about the **y-axis**
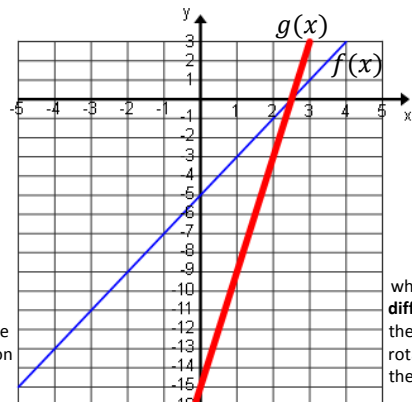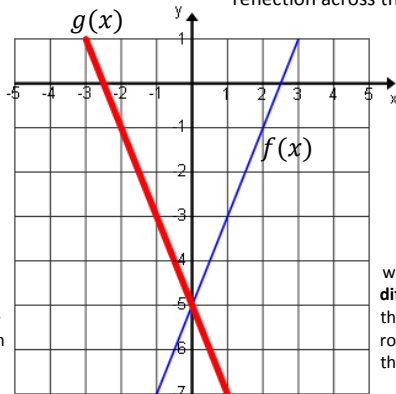
when **b is different** there is a rotation about the **x-axis**

---

9. $f(x) = 2x - 5$ $g(x) = f(-x) =$ _____
                                       $=$ _____

m=____ b= _____   m=____ b= _____

g(x): Steeper   Less Steep   Same Steepness

reflection across the y-axis

when **b is the same** there is a rotation about the **y-axis**

when **b is different** there is a rotation about the **x-axis**

---

10. $f(x) = 2x - 5$ $g(x) = -f(x) =$ _____
                                       $=$ _____

m=____ b= _____   m=____ b= _____

g(x): Steeper   Less Steep   Same Steepness

reflection across the x-axis

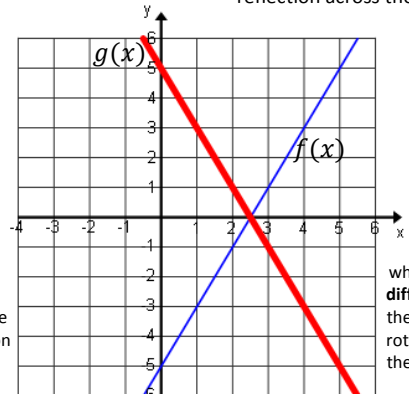when **b is the same** there is a rotation about the **y-axis**

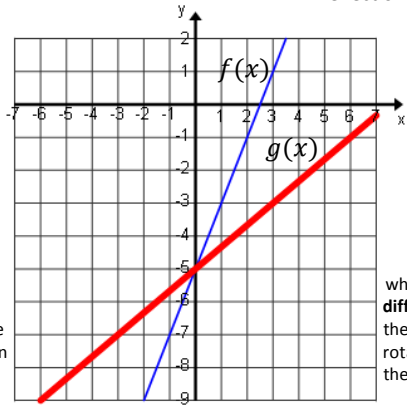when **b is different** there is a rotation about the **x-axis**

11. $f(x) = 2x - 5$ $g(x) = f\left(\frac{1}{3}x\right) = $ _____
                                    = _____

m=____ b= _____   m=____ b= _____

g(x): Steeper   Less Steep   Same Steepness
                                    reflection

when
**b is the
same** there
is a rotation
about the
y-axis

when **b is
different**
there is a
rotation about
the **x-axis**

12. $f(x) = 2x - 5$ $g(x) = \frac{1}{3}f(x) = $ _____
                                    = _____

m=____ b= _____   m=____ b= _____

g(x): Steeper   Less Steep   Same Steepness
                                    reflection

when
**b is the
same** there
is a rotation
about the
y-axis

when **b is
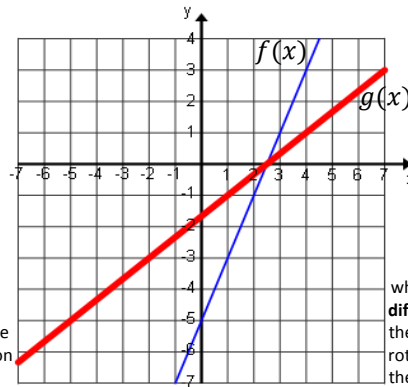different**
there is a
rotation about
the **x-axis**

## Reflection: What do you remember?

1. When do you replace the x with an expression?

2. When do you use the distributive property?

3. When is there a rotation about the x-axis?

4. When is there a rotation about the y-axis?

5. When is there a rotation about the origin?

6. When will there be a reflection?

Write the new function and determine the steepness.

1. $f(x) = x$ $m =$ ___
   $g(x) = f(2x) =$ _____ $m =$ ___

g(x): **Steeper**   **Less Steep**   **Same Steepness**

reflection

$g(x)$
$f(x)$

rotation
about the
origin

Write the new function and determine the steepness.

2. $f(x) = x$ $m =$ ___
   $g(x) = 2f(x) =$ _____ $m =$ ___

g(x): **Steeper**   **Less Steep**   **Same Steepness**

reflection

$g(x)$
$f(x)$

rotation
about the
origin
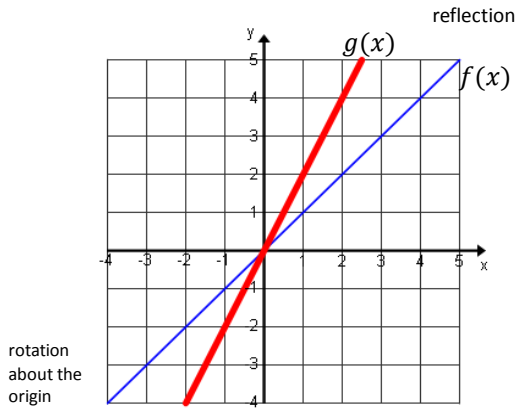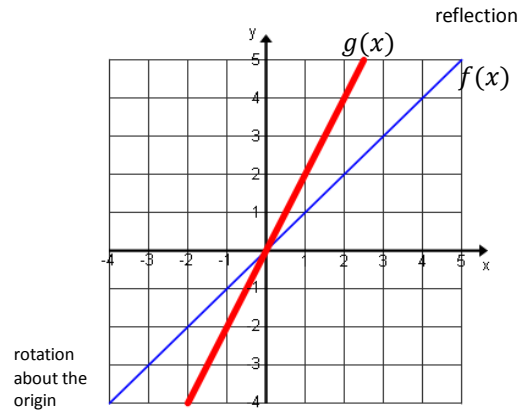
Write the new function and determine the steepness.

3. $f(x) = 2x + 3$ $m =$ ___
   $g(x) = f(2x) =$ _____
   $=$ _____ $m =$ ___

g(x): **Steeper**   **Less Steep**   **Same Steepness**

reflection

$g(x)$
$f(x)$

when
**b is the
same** there
is a rotation
about the
y-axis

when **b is
different**
there is a
rotation about
the **x-axis**
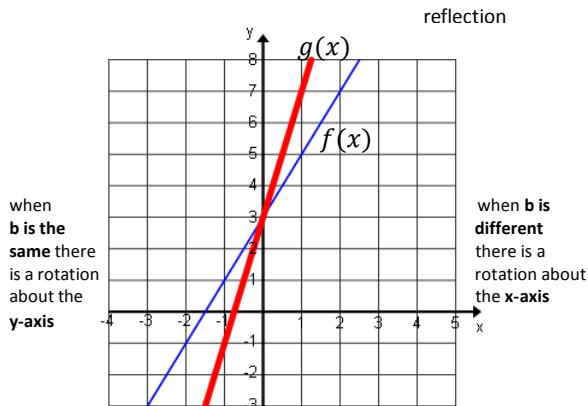
Write the new function and determine the steepness.

4. $f(x) = 2x + 3$ $m =$ ___
   $g(x) = 2f(x) =$ _____
   $=$ _____ $m =$ ___

g(x): **Steeper**   **Less Steep**   **Same Steepness**

reflection

$g(x)$
$f(x)$

when
**b is the
same** there
is a rotation
about the
y-axis

when **b is
different**
there is a
rotation about
the **x-axis**
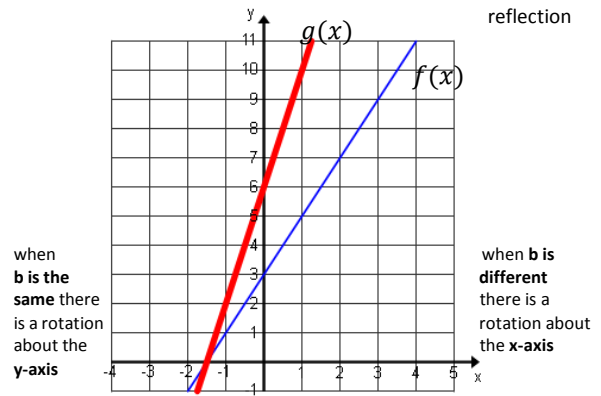
Write the new function and determine the steepness.

5. $f(x) = 2x + 3$ $m =$ ___
   $g(x) = f(\frac{1}{3}x) =$ _____
   $=$ _____ $m =$ ___

g(x): **Steeper**   **Less Steep**   **Same Steepness**

flection

$f(x)$
$g(x)$

when
**b is the
same** there
is a rotation
about the
y-axis

when **b is
different**
there is a
rotation about
the **x-axis**
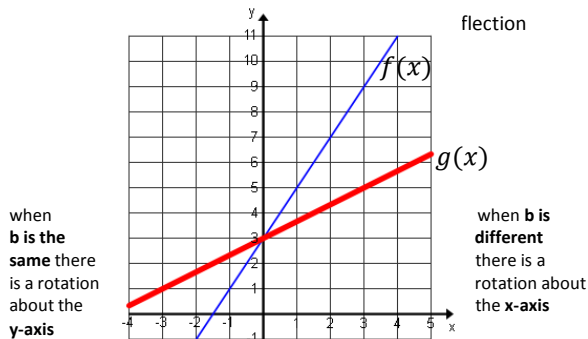
Write the new function and determine the steepness.

6. $f(x) = 2x + 3$ $m =$ ___
   $g(x) = \frac{1}{3}f(x) =$ _____
   $=$ _____ $m =$ ___
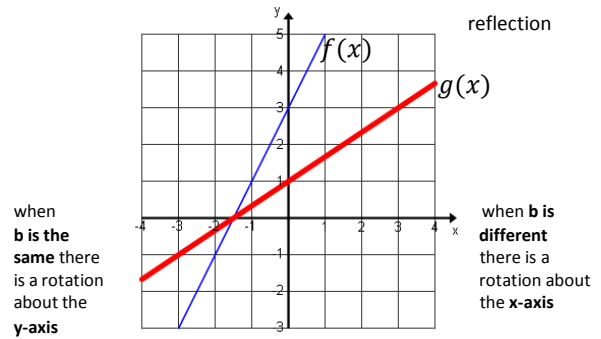
g(x): **Steeper**   **Less Steep**   **Same Steepness**

reflection

$f(x)$
$g(x)$

when
**b is the
same** there
is a rotation
about the
y-axis

when **b is
different**
there is a
rotation about
the **x-axis**
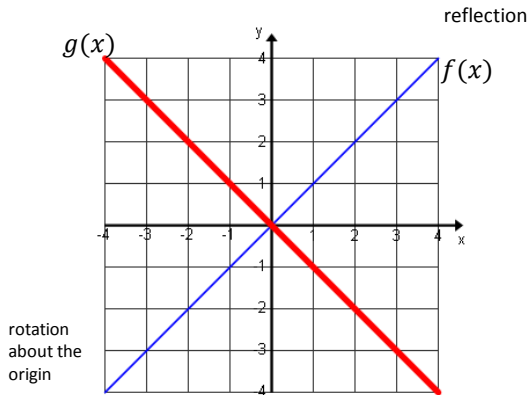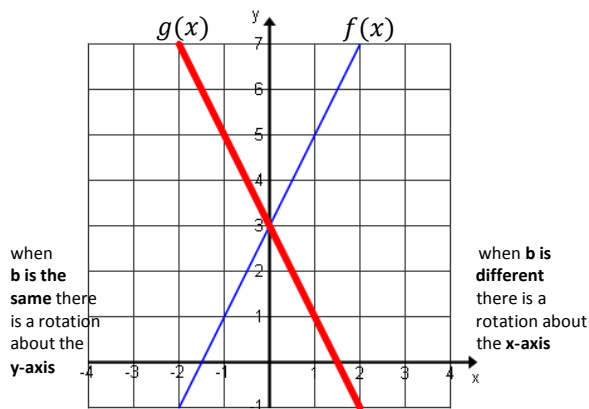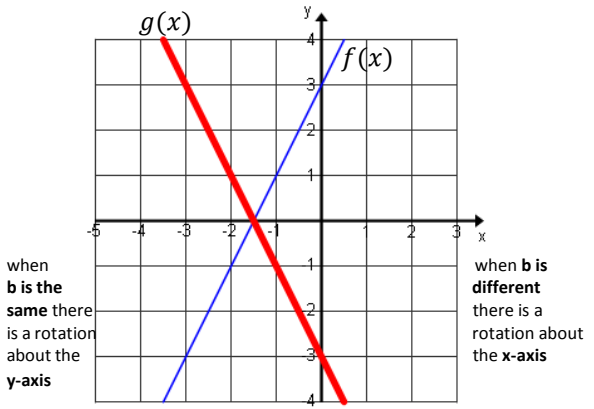
Write the new function and determine the steepness.	Write the new function and determine the steepness.
7. $f(x) = x$ $m = $ ___ $g(x) = f(-x) = $ _____ $m = $ ___ **g(x): Steeper Less Steep Same Steepness** reflection $g(x)$ $f(x)$ rotation about the origin	8. $f(x) = x$ $m = $ ___ $g(x) = -f(x) = $ _____ $m = $ ___ **g(x): Steeper Less Steep Same Steepness** reflection $g(x)$ $f(x)$ rotation about the origin
Write the new function and determine the steepness.	Write the new function and determine the steepness.
9. $f(x) = 2x + 3$ $m = $ ___ $g(x) = f(-x) = $ _____ $= $ _____ $m = $ ___ **g(x): Steeper Less Steep Same Steepness** reflection across the y-axis $g(x)$ $f(x)$ when **b is the** **same** there is a rotation about the **y-axis** when **b is** **different** there is a rotation about the **x-axis**	10. $f(x) = 2x + 3$ $m = $ ___ $g(x) = -f(x) = $ _____ $= $ _____ $m = $ ___ **g(x): Steeper Less Steep Same Steepness** reflection across the x-axis $g(x)$ $f(x)$ when **b is the** **same** there is a rotation about the **y-axis** when **b is** **different** there is a rotation about the **x-axis**
What conclusions can you make about the steepness of a line with regards to its slope?	
What conclusions can you make about the effects that **f(bx)** has on the graph of a line?	What conclusions can you make about the effects that **af(x)** has on the graph of a line?