Name _____ KEY _____ Date _____

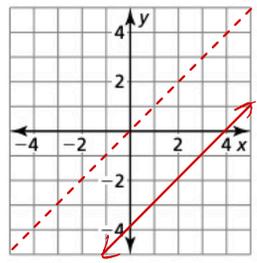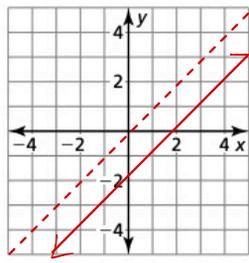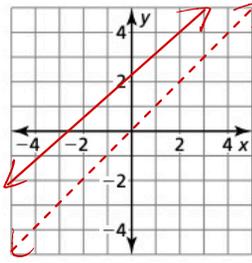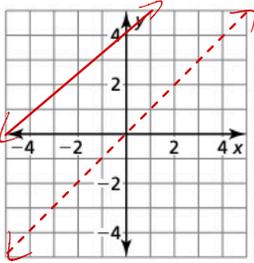## Transformations of Graphs of Linear Functions

1) Using f(x)=x as the parent function, sketch each transformed graph. After completing your sketches, verify your results using a graphing calculator.

a. $g(x) = x + 4$ **b.** $g(x) = x + 2$ **c.** $g(x) = x - 2$ **d.** $g(x) = x - 4$

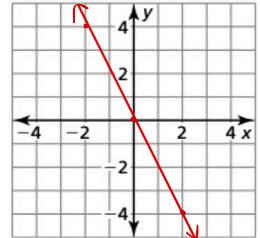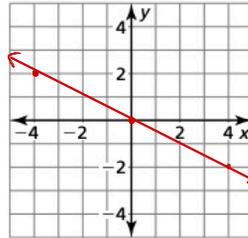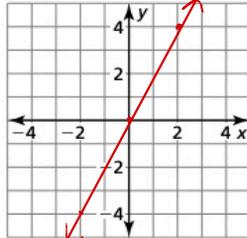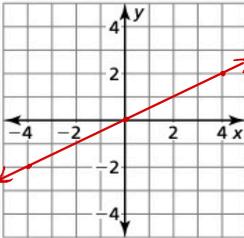

2) Using f(x)=x as the parent function, sketch the graphs of each function using your graphing calculator. What can we conclude from this?

**a.** $h(x) = \frac{1}{2}x$ **b.** $h(x) = 2x$ **c.** $h(x) = -\frac{1}{2}x$ **d.** $h(x) = -2x$

Transformations of Function

a>1, horizontal stretch
0<a<1, vertical stretch

x+h shift function left (h<0)
x-h shift function right (h>0)

$$y = -af(-b(x-h)) +/- k$$

y-coordinate

x-coordinate +k shift function up (k>0)
          -k shift function down (k<0)

function
(must pass vertical line test)

b>1, horizontal compression
0<b<1, horizontal stretch

3) Explain transformation of each equation and match it to its graph.

a. $k(x) = 2x - 4$
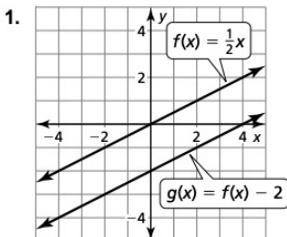
B

a. $k(x) = 2x - 4$
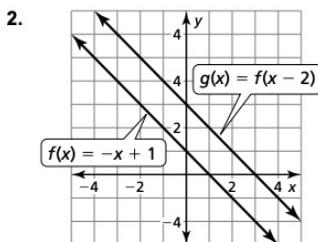
c. $k(x) = \frac{1}{2}x + 4$
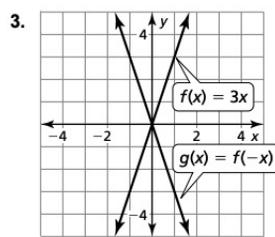
D

b. $k(x) = -2x + 2$

A

C
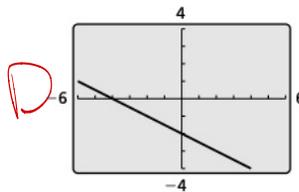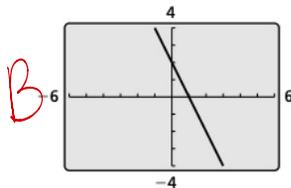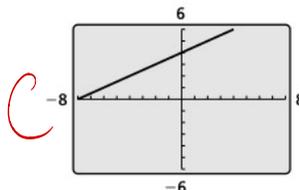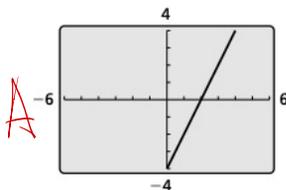
d. $k(x) = -\frac{1}{2}x - 2$

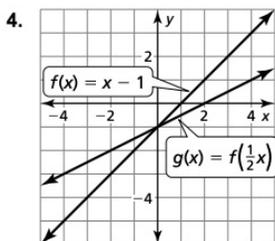4) For problems 1-6, use graph of f and g to describe the transformation from the graph of f to graph of g.
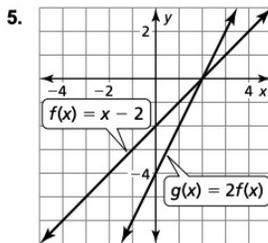
1.
$f(x) = \frac{1}{2}x$
$g(x) = f(x) - 2$

Down 2

2.
$g(x) = f(x - 2)$
$f(x) = -x + 1$

Right 2

3.
$f(x) = 3x$
$g(x) = f(-x)$

Reflection across y-axis

4.
$f(x) = x - 1$
$g(x) = f\left(\frac{1}{2}x\right)$

H Stretch by 2

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

Vertical Stretch by 2

6.
$f(x) = -x + 2$
$g(x) = \frac{1}{2}f(x)$
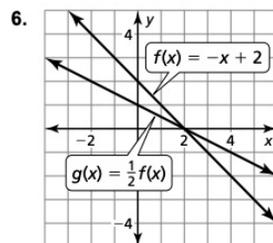
V compression by ½

7. Graph $f(x) = x$ and $g(x) = 3x - 2$.
   Describe the transformations from the
   graph of f to the graph of g.

$f(x) = x$
$g(x) = 3x - 2$