

## LINEAR TRANSFORMATION

$$f(x) = a(x - h) + k$$

**a:** Slope

$a > 1$   
steep

$0 < a < 1$   
less steep

$-a$   
Neg. Slope

**h:** Left/Right  
+h    -h

**k:** Up/Down  
+k    -k

**EXAMPLE**

*Describe the following linear transformation*

$$f(x) = 2x - 7$$

Steep  
Pos.  
Down  
7

## QUADRATIC TRANSFORMATION

$-a$ : Reflect  $f(x) = a(bx - h)^2 + k$

**OUTSIDE:** Truth

**INSIDE:** Lie

$a$ : Stretch/Compress  
narrow/widen

$b$ : Stretch/Compress

$a > 1$        $0 < a < 1$   
                    ↓  
                    fraction

$0 < b < 1$  ;  $b > 1$

$k$ : Up/Down  
 $+k$        $-k$

$h$ : Left/Right  
 $+h$        $-h$

**EXAMPLE**

*Describe the following quadratic transformation*

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

Reflect  
vertical  
Compress  
horiz.  
Compress  
Right + 2  
UP 4

## EXAMPLE

Linear function  $f(x) = x$  is graphed on a coordinate plane. The graph of a new line is formed by changing the slope of the original line to  $\frac{2}{3}$  and the  $y$ -intercept to 4. Which statement about the relationship between these two graphs is true?

- A The graph of the new line is steeper than the graph of the original line, and the  $y$ -intercept has been translated down.
- B The graph of the new line is less steep than the graph of the original line, and the  $y$ -intercept has been translated up.
- C The graph of the new line is steeper than the graph of the original line, and the  $y$ -intercept has been translated up.
- D The graph of the new line is less steep than the graph of the original line, and the  $y$ -intercept has been translated down.