TRANSFORMATIONS OF LINEAR FUNCTIONS

The transformation form of a function $g(x) = af(x - c) + d$ also applies to linear functions, not just quadratic functions.

As they do for quadratic functions, c and d shift linear functions left/right and up/down. The factor a still causes a “stretch” or “compression,” which causes lines to get “steeper” or “less steep.”

For each example, describe the transformation of the graph of f(x) = x that produces the graph of g(x) and write the new equation.

1) g(x) = f(x) + 3

g(x) = ____________________

Effects on f(x):

2) g(x) = -f(x + 4)

g(x) = ____________________

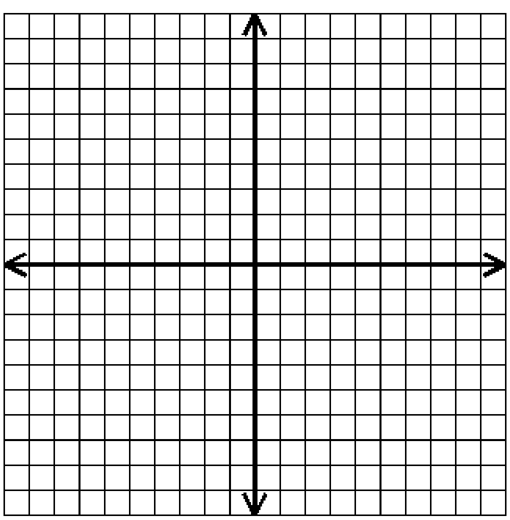
Effects on f(x):

3) g(x) = 2f(x) – 5

g(x) = ____________________

m = _____

b = _____



How does g(x) compare to f(x)?

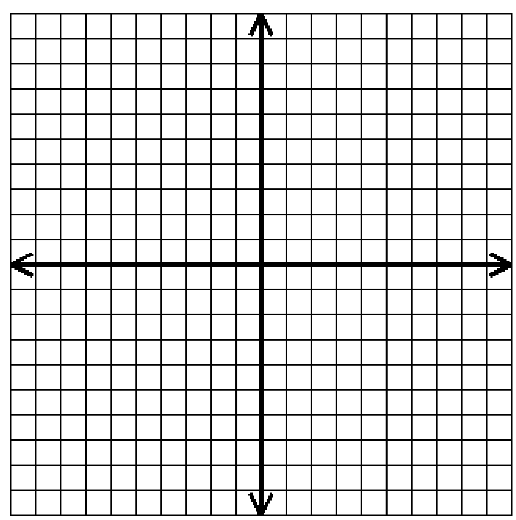
A. g(x) is steeper
B. g(x) is less steep
C. The steepness is the same.

4) g(x) = $\frac{1}{2}$f(x – 2)

g(x) = ____________________

m = _____

b = _____



How does g(x) compare to f(x)?

A. g(x) has a larger y-intercept
B. g(x) has a smaller y-intercept
C. The y-intercepts are the same.

If f(x) = x and g(x) is the transformed function, fill in the table below.

Transformation	**g(x)**
5) Shift f(x) up 3 units	
6) Reflect f(x) across the x-axis	
7) Compress (less steep) by a factor of $\frac{1}{2}$, and shift right 2 units.	
8)	**g(x) = (x + 5)**
9) Reflect across the x-axis, and translate 6 units down	
10) Vertical stretch (steeper) by a factor of 3, and translate right 4.5 units	
11)	**g(x) = $\frac{1}{2}$ (x + 7) + 4**

For Examples 12 – 16, f(x) can be linear *or* quadratic. Match the given equation with the transformation described. Each question may have more than one answer.

_______________ 12) g(x) = $\frac{1}{2}$f(x – 2)

_______________ 13) g(x) = 3f(x + 7) – 1

_______________ 14) g(x) = -f(x)

_______________ 15) g(x) = f(x – 1) + 5

_______________ 16) g(x) = $\frac{1}{6}$f(x) – 3

A. Vertical Stretch (steeper)

B. Vertical Compression (less steep)

C. Reflection

D. Shift left

E. Shift right

F. Shift up

G. Shift down