

$f(bx)$

- $0 < b < 1$  “inside the function”

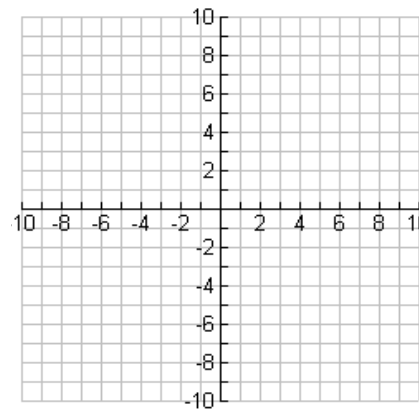
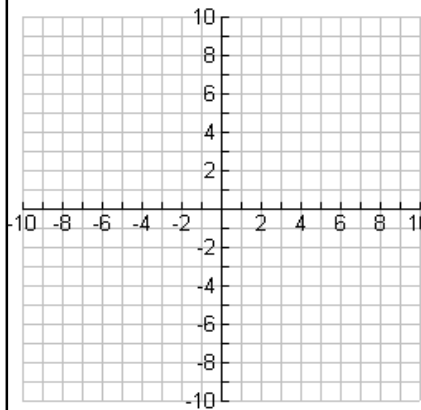
\_\_\_\_\_ it.

$f(bx)$

- $b > 1$  “outside the function”

\_\_\_\_\_ or  
\_\_\_\_\_ it.

Horizontal Shrinks & Stretches



$f(bx)$

- $0 < b < 1$  “inside the function”

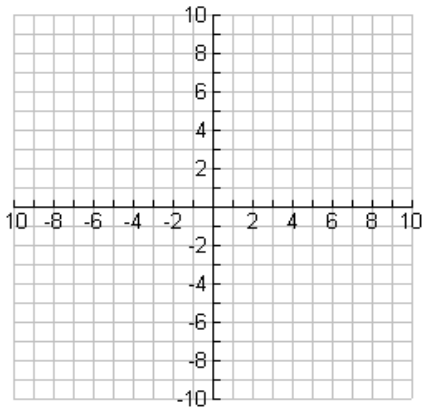
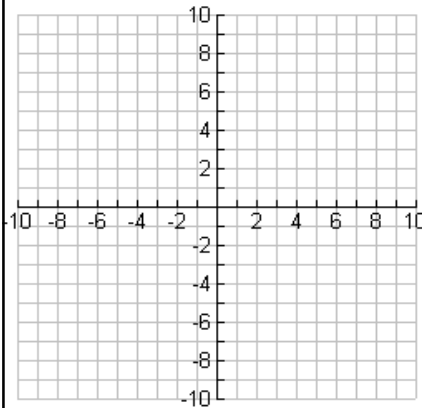
\_\_\_\_\_ it.

$f(bx)$

- $b > 1$  “inside the function”

\_\_\_\_\_ or  
\_\_\_\_\_ it.

Horizontal Shrinks & Stretches



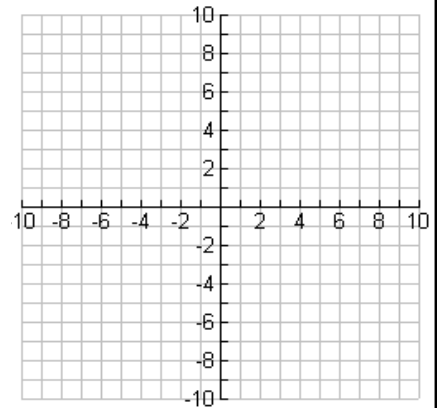
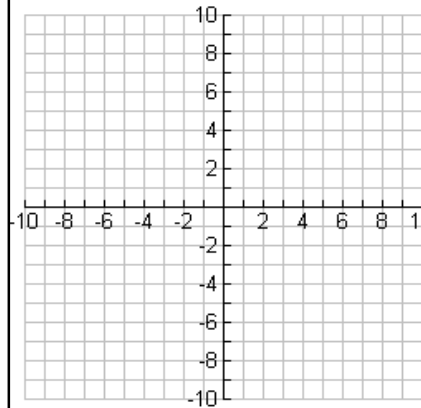
$$f(x + k)$$

- adding “inside the function” moves it \_\_\_\_\_.

$$f(x - k)$$

- subtracting “inside the function” moves it \_\_\_\_\_.

## Horizontal Shifts



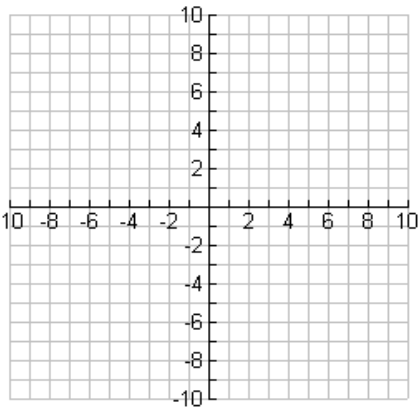
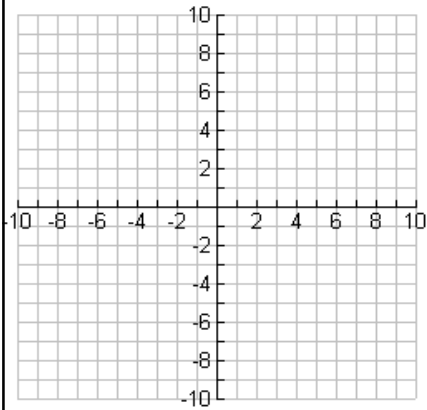
$$f(x + k)$$

- adding “inside the function” moves it \_\_\_\_\_.

$$f(x - k)$$

- subtracting “inside the function” moves it \_\_\_\_\_.

## Horizontal Shifts



$af(x)$

- $0 < a < 1$  “outside the function”

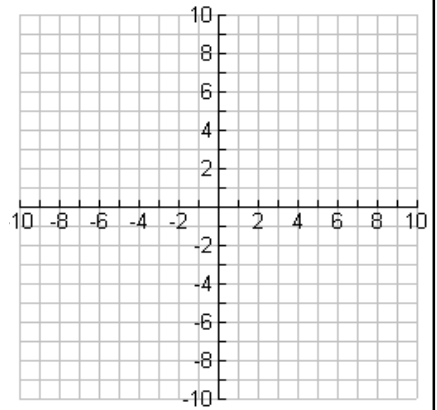
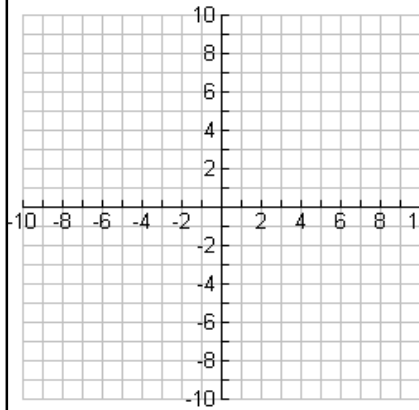
\_\_\_\_\_ or  
\_\_\_\_\_ it.

$af(x)$

- $a > 1$  “outside the function”

\_\_\_\_\_ it.

## Vertical Shrinks & Stretches



$af(x)$

- $0 < a < 1$  “outside the function”

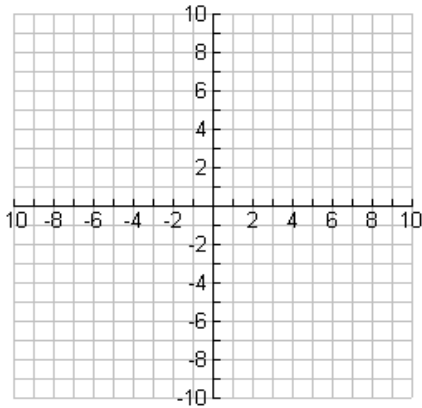
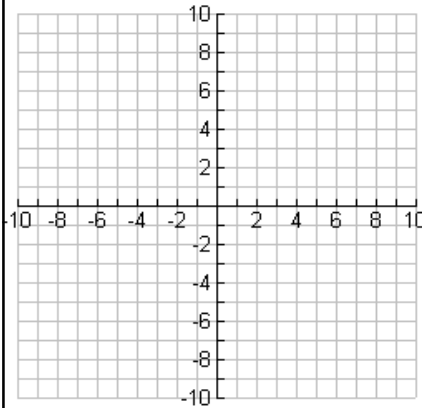
\_\_\_\_\_ or  
\_\_\_\_\_ it.

$af(x)$

- $a > 1$  “outside the function”

\_\_\_\_\_ it.

## Vertical Shrinks & Stretches



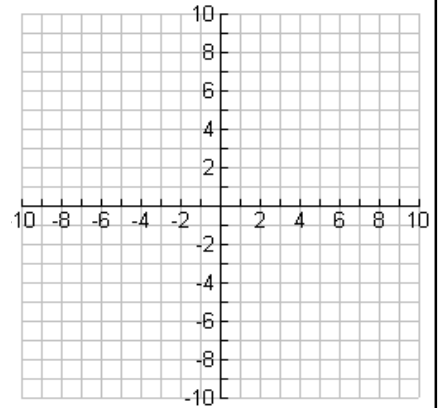
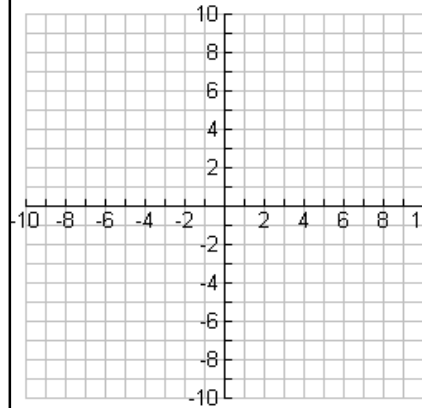
$$f(x) + k$$

- adding “outside the function” moves it \_\_\_\_\_.

$$f(x) - k$$

- subtracting “outside the function” moves it \_\_\_\_\_.

## Vertical Shifts



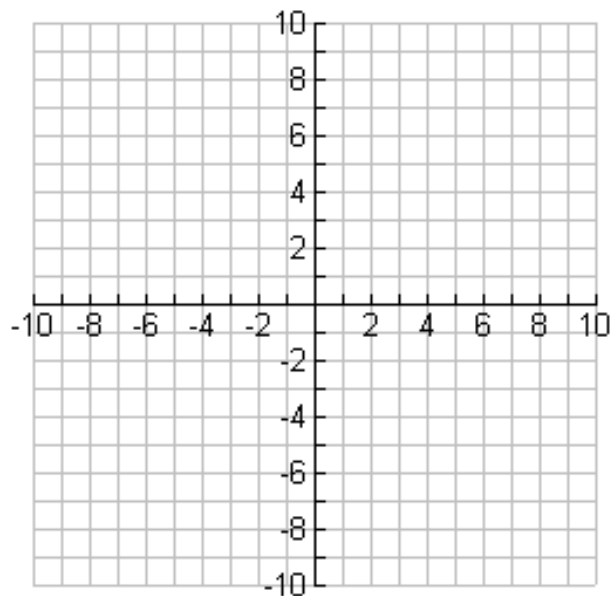
$$f(x) + k$$

- adding “outside the function” moves it \_\_\_\_\_.

$$f(x) - k$$

- subtracting “outside the function” moves it \_\_\_\_\_.

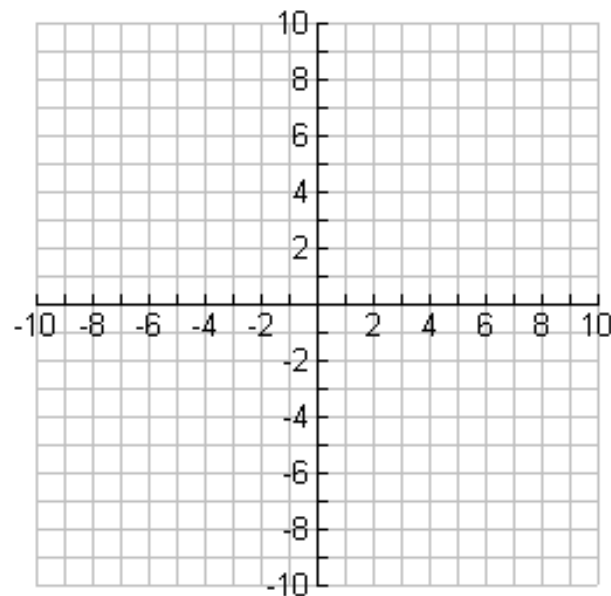
## Vertical Shifts



# Function Transformations

Name \_\_\_\_\_

Adapted by Dr. Jennifer L. Brown, Columbus State University, ©2014  
Original Source <http://precalculus.nonstopmathfun.com/page/9/>  
(MCC9-12.F.BF.3)



# Function Transformations

Name \_\_\_\_\_

Adapted by Dr. Jennifer L. Brown, Columbus State University, ©2014  
Original Source <http://precalculus.nonstopmathfun.com/page/9/>  
(MCC9-12.F.BF.3)