

# **Transformations of Functions and Graphing Video Lecture**

## **Sections 8.2 and 8.3**

### **Course Learning Objectives:**

- 1) Graph linear and quadratic equations.**
- 2) Be able to find the domain, range and transformations of a function.**

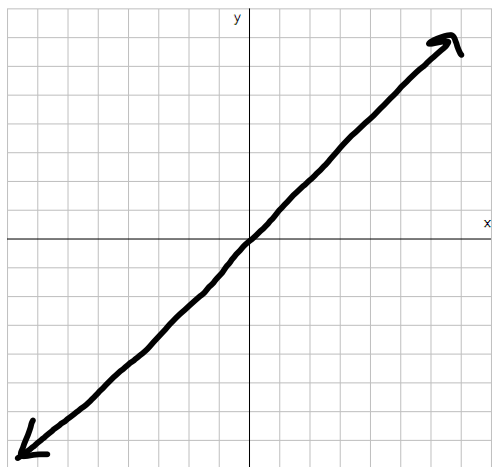
### **Weekly Learning Objectives:**

- 1) Graph linear and nonlinear functions including quadratics, square roots and absolute values.**
- 2) Apply vertical and horizontal shifts to graphs.**
- 3) Reflect graphs horizontally and vertically.**
- 4) Find the domain and range of a function from its graph.**

# Transformations of Functions and Graphing

## Graphs of Common Functions:

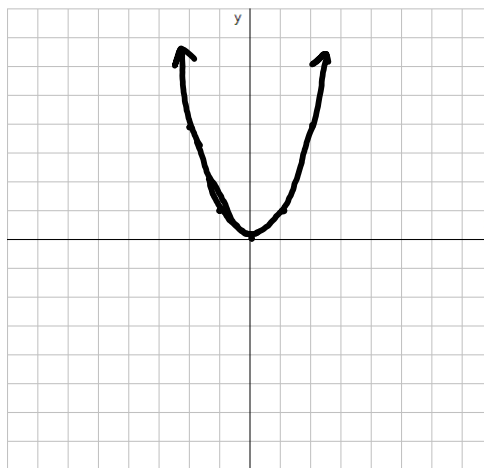
$$f(x) = x$$



Domain:

Range:

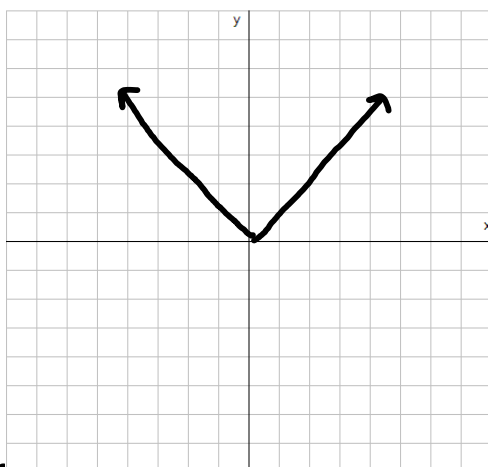
$$f(x) = x^2$$



Domain:

Range:

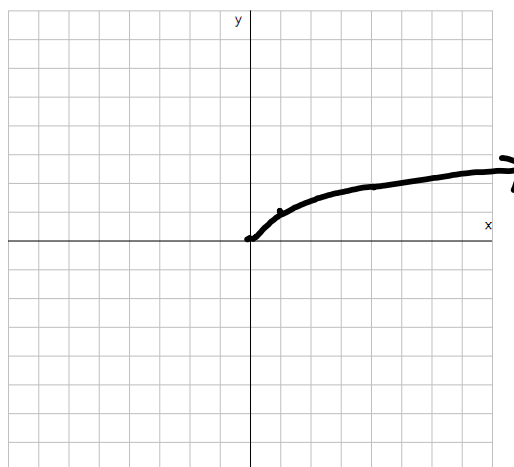
$$f(x) = |x|$$



Domain:

Range:

$$f(x) = \sqrt{x}$$



Range:

## Summary of Transformations:

Example:

$f(x) + k$       Vertical Shift Up  $k$

$$f(x) = x^2 + 1$$

$f(x) - k$       Vertical Shift Down  $k$

$$f(x) = \sqrt{x} - 2$$

$f(x + k)$       Horizontal Shift Left  $k$

$$f(x) = (x + 3)^2$$

$f(x - k)$       Horizontal Shift Right  $k$

$$f(x) = |x - 4|$$

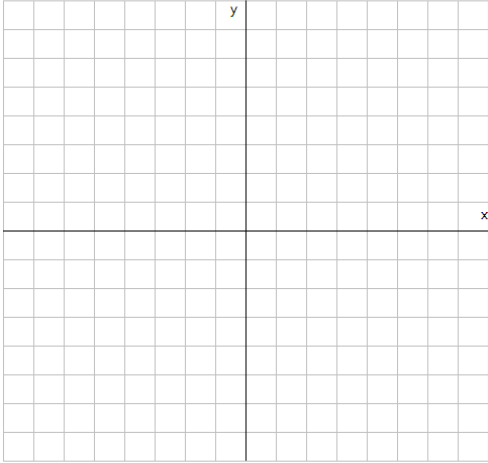
$-f(x)$       Reflection over the  $x$ -axis

$$f(x) = -|x|$$

$f(-x)$       Reflection over the  $y$ -axis

$$f(x) = \sqrt{-x}$$

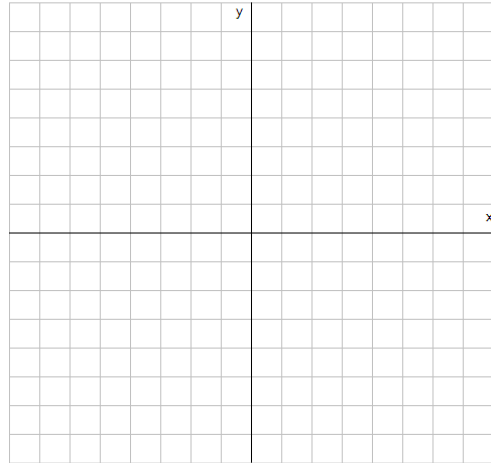
$$f(x) = x^2 - 3$$



D:

R:

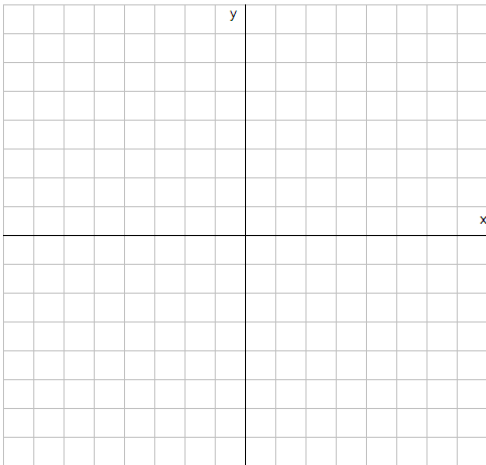
$$f(x) = |x| + 2$$



D:

R:

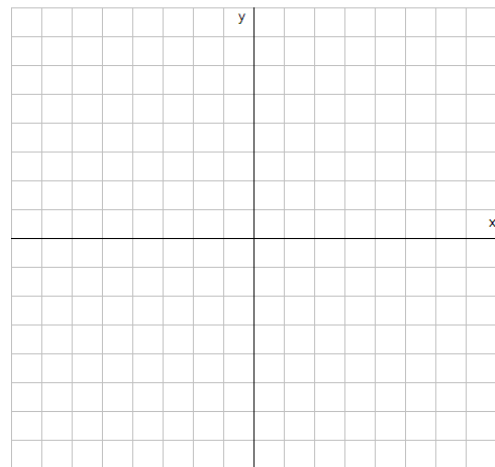
$$f(x) = |x - 1|$$



D:

R:

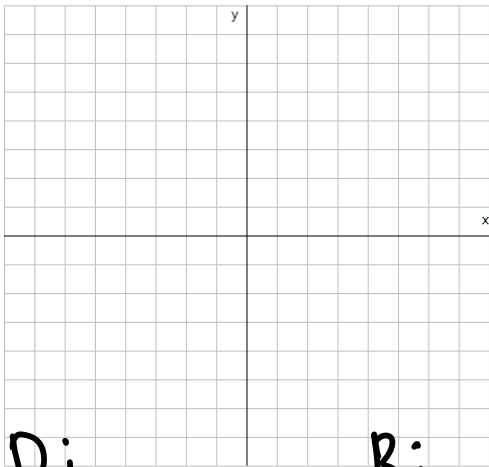
$$f(x) = \sqrt{x + 4}$$



D:

R:

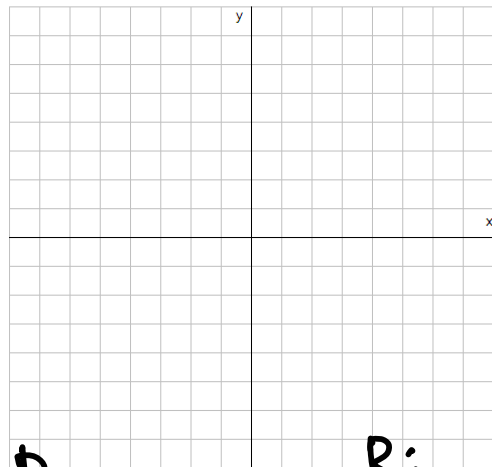
$$f(x) = (x-2)^2 + 1$$



D: R:

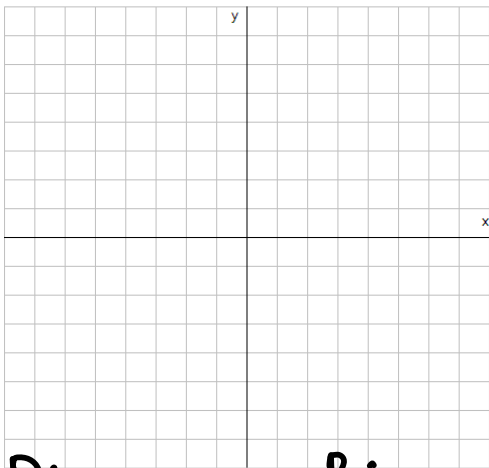
$$f(x) = -|x|$$

$$f(x) = |x+3| - 2$$



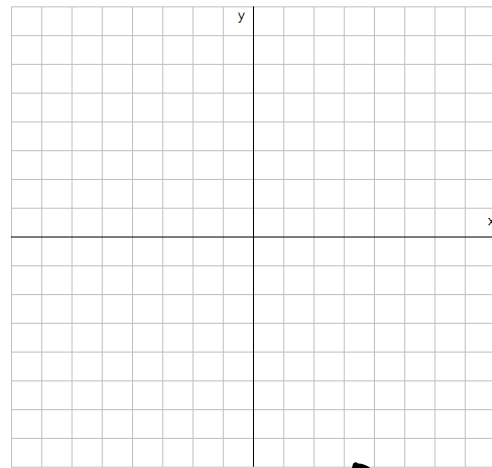
D: R:

$$f(x) = \sqrt{-x}$$



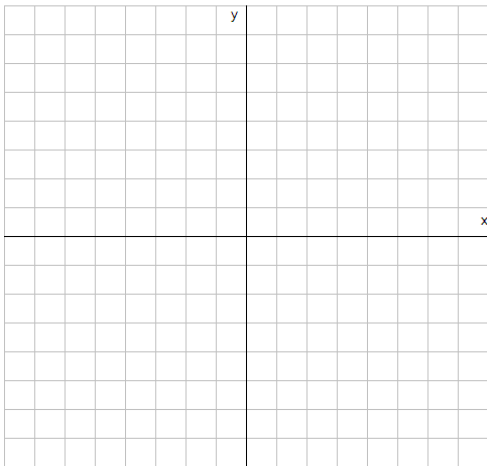
D: R:

$$f(x) = -\sqrt{x-1} + 2$$

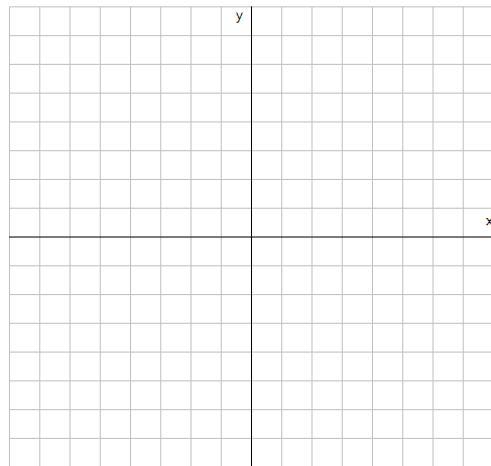


D: R:

$$f(x) = -|x+5| + 3$$



D: R:



D: R: