Math-2A
Lesson 6-4

Piece-wise Defined Function

Set-Builder Notation: a way of writing an equation that also defines the input values to use.

$$f(x) = \{\_\_\_\_\_, \text{ for } x = (\_\_\_\_\_, \_\_\_\_\_)\}$$

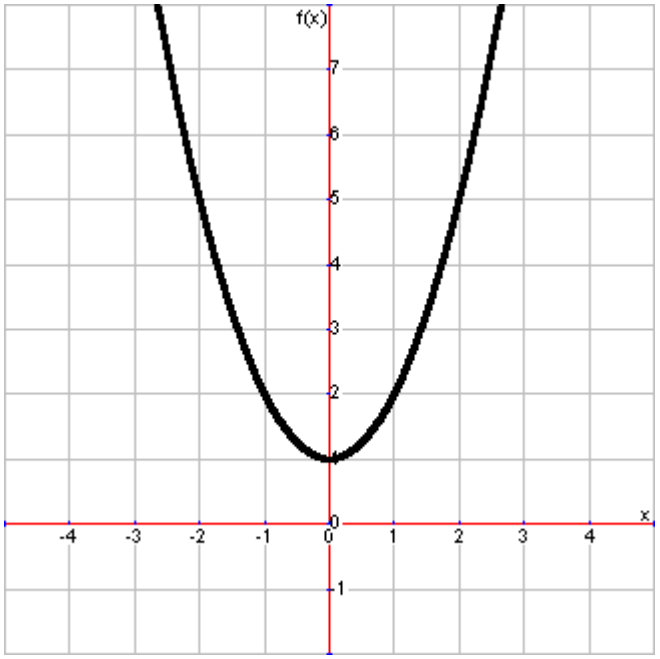
outputs — rule — Inputs

"French Brackets" → set

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

$$\text{Domain of } f(x): \{x = ???\}$$

$$\text{Domain}: \{x = (-\infty, \infty)\}$$

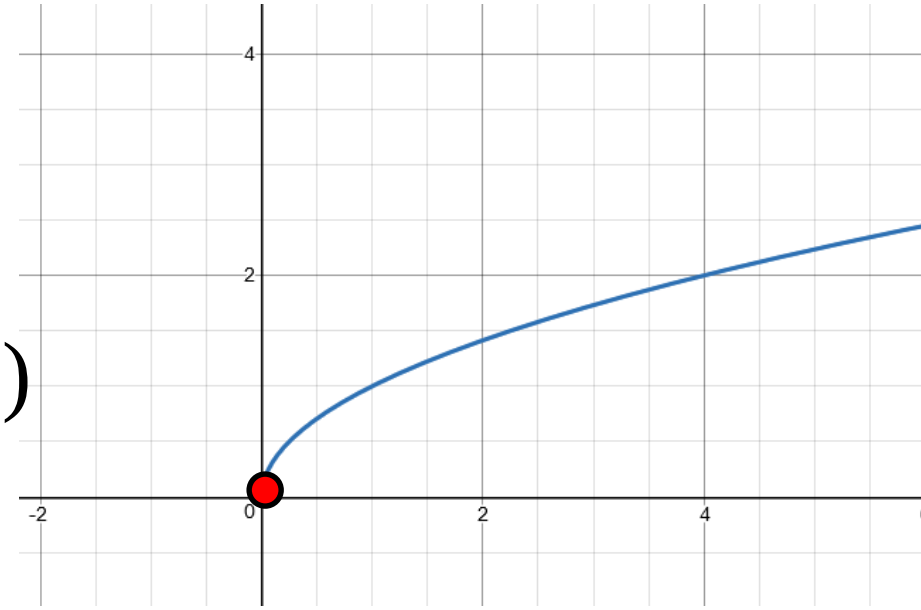


$$f(x) = \{x^2 + 1, \text{ for } x = (-\infty, \infty)\}$$

outputs — rule — Inputs

Domain of all square functions is "all real numbers"

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



Endpoint of k(x) = ? (0, 0)

Domain of k(x) = ? $x = [0, \infty)$

Graph k(x)

Write k(x) in "set-builder" notation.

$$k(x) = \{\sqrt{x}, \text{x} = [0, \infty)\}$$

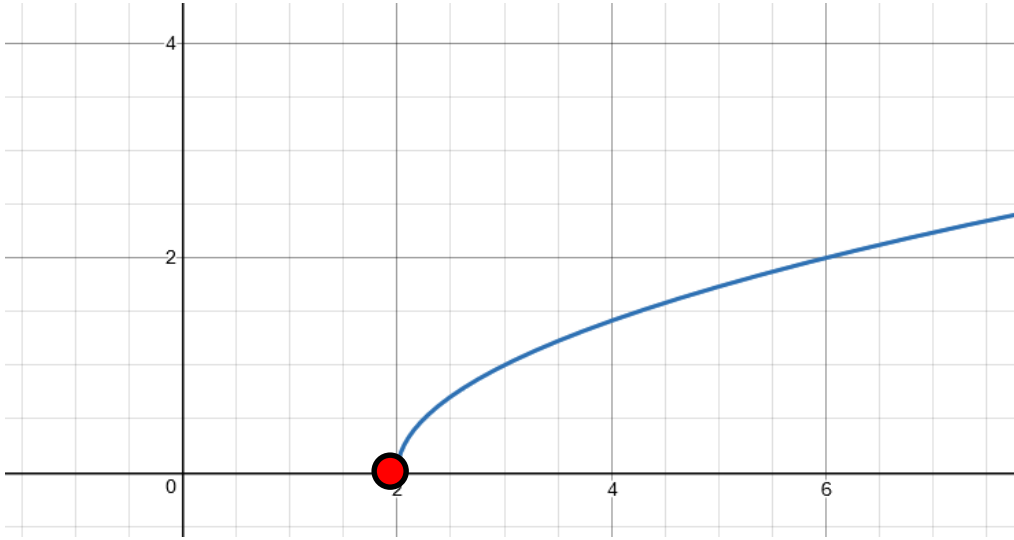
Domain of all square root functions are NOT "all real numbers" (redundant BUT more useful to write it in "set-builder" notation).

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

Endpoint of j(x) = ? (2, 0)

Domain of j(x) = ? $x = [2, \infty)$

Graph j(x)



Write j(x) in “set-builder” notation.

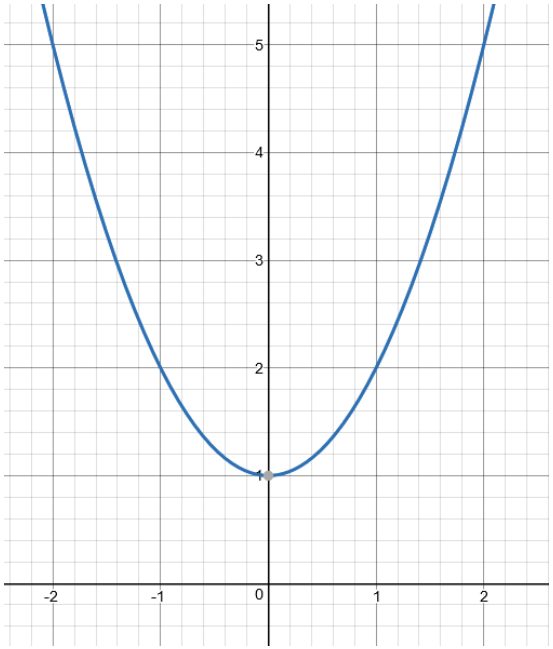
$$j(x) = \{\sqrt{x-2}, \text{x} = [2, \infty)\}$$

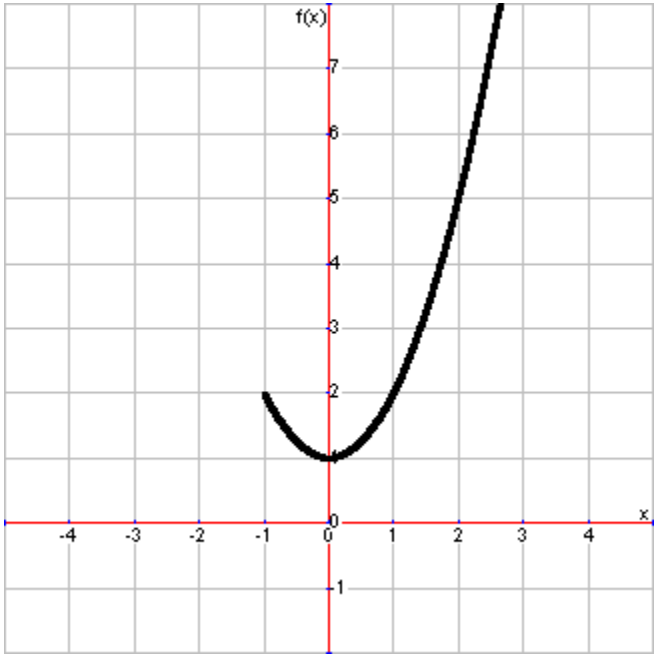
What is the domain of the graph?

$$x = [-1, \infty)$$

What is the equation of the graph?

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

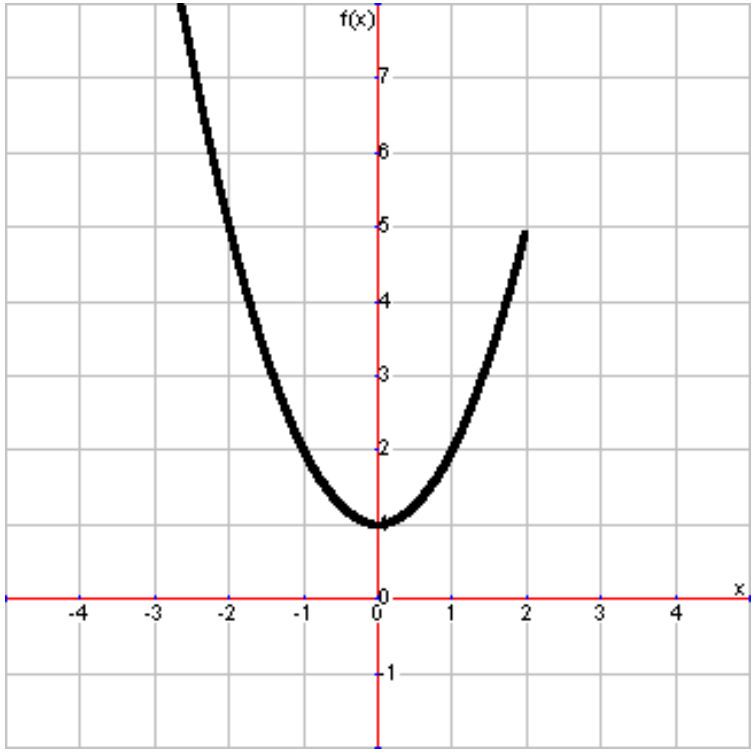




Write the equation of the graph above in set-builder notation.

$$k(x) = \{x^2 + 1, \text{x} = [\text{-}1, \infty)\}$$

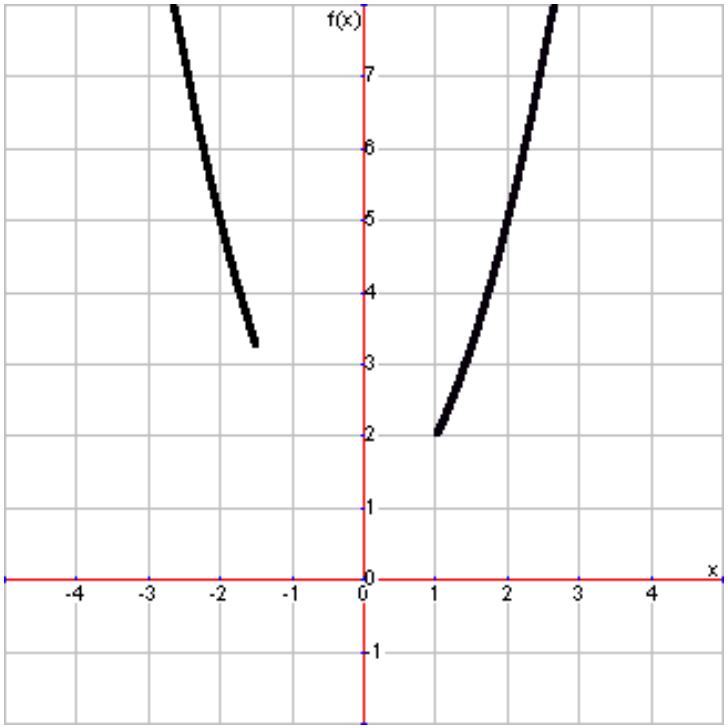
p(x)



Define p(x) using “set-builder” notation.

$$p(x) = \{x^2 + 1, \text{ for } x = (-\infty, 2]\}$$

m(x)

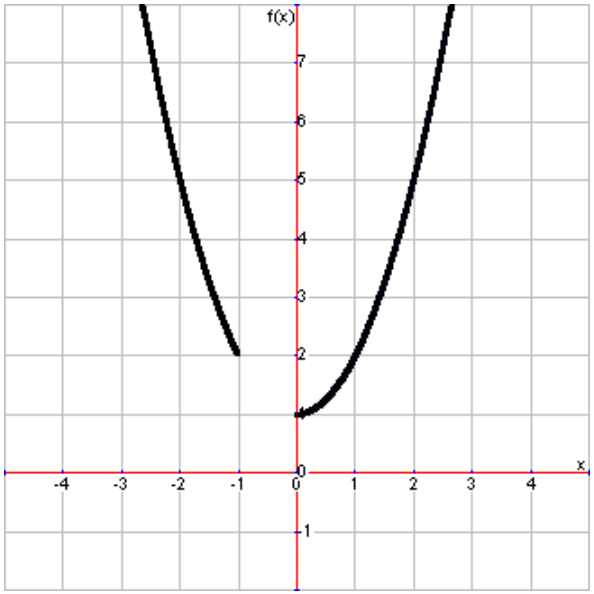


Define m(x) using “set-builder” notation.

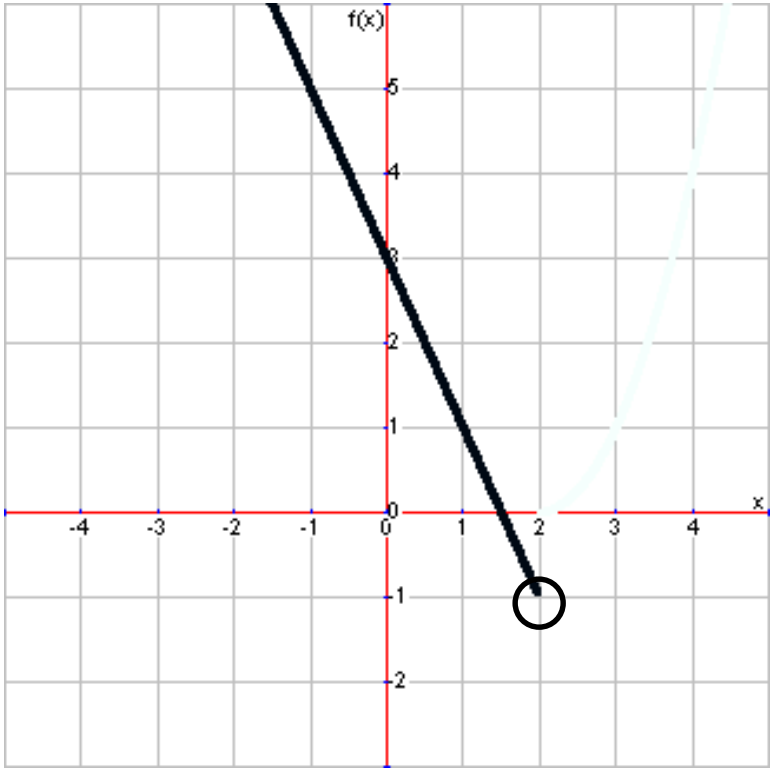
$$m(x) = \left\{ x^2 + 1, \text{ for } x = (-\infty, -1.5] \cup [1, \infty) \right\}$$

Graph j(x)

$$j(x) = \{x^2 + 1,\ \mathrm{x} = (-\infty, -1] \cup [0, \infty)\}$$

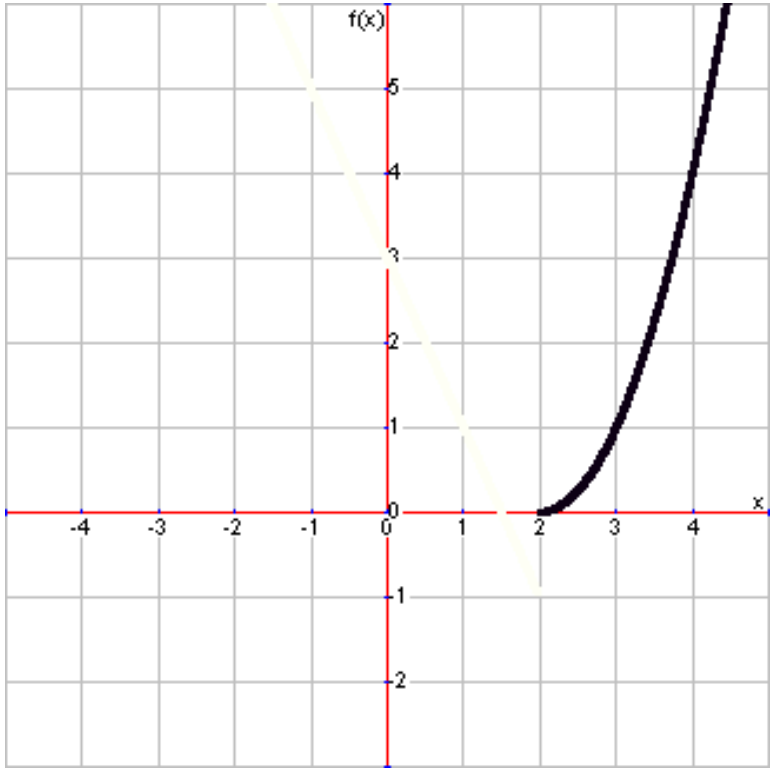


$f(x) = \{-2x + 3,\ x = (-\infty, 2)\}$



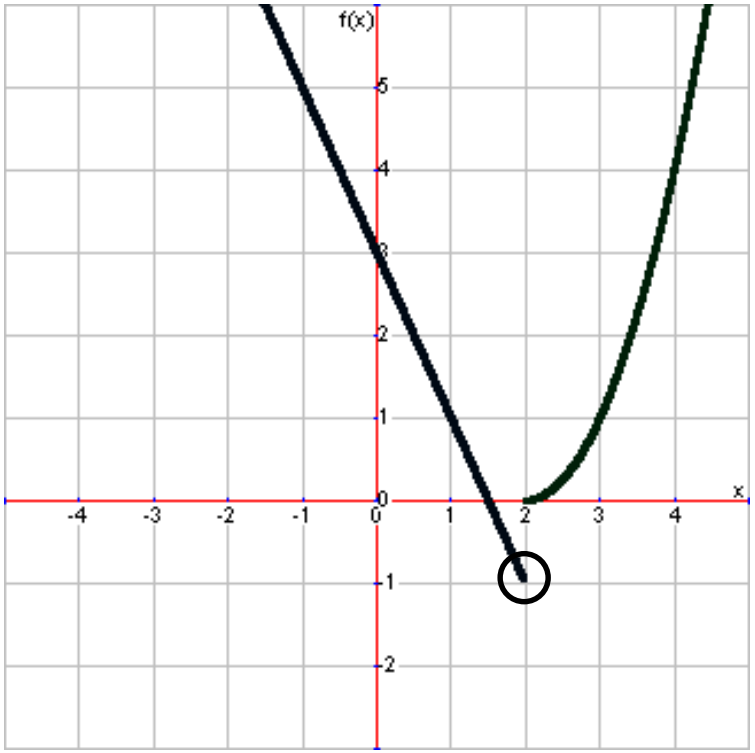
What is the equation of the graph?

$g(x) = \{(x-2)^2,\ x = [2, \infty)\}$



What is the equation of the graph?

How would you define the following graph?

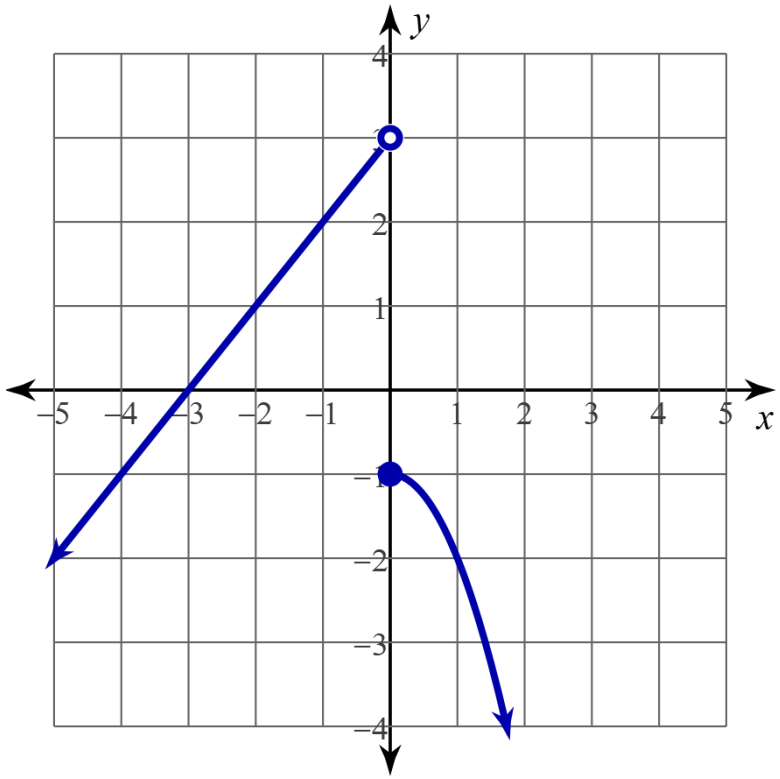


$$h(x) = \begin{cases} -2x+3, x = (-\infty, 2) \\ (x-2)^2, x = [2, \infty) \end{cases}$$

We call this a “piece-wise” defined

Graph them both:

$$h(x) = \begin{cases} x + 3 \ , \ x = (0, \infty) \\ -x^2 - 1 \ \ , \ x = (-\infty, 0] \end{cases}$$



Graph this piecewise-defined function:

$$h(x)=\begin{Bmatrix} x^2\ ,\ x=(-\infty,0) \\ |x|\ \ ,\ x=[0,\infty) \end{Bmatrix}$$

$$g(x)=\begin{Bmatrix} 1+\sqrt{x}\ ,\ \ x=(-\infty,0) \\ x-3\ \ \ ,\ \ x=[0,\infty) \end{Bmatrix}$$

$$k(x)=\begin{Bmatrix} x^3\ ,\ x=(-\infty,0) \\ x+1\ \ ,\ x=[0,\infty) \end{Bmatrix}$$