

Warm up: $y = x^2 + 5$

1. Sketch a graph the equation
2. What is the domain?
3. What is the range?

SWBAT find the inverse of functions, the domain and range of the function and its inverse and determine if the function is one-to-one.

Agenda:

Warm up

Notes

Scaffolded problems

problem task

practice (homework)

Restricted Domain:

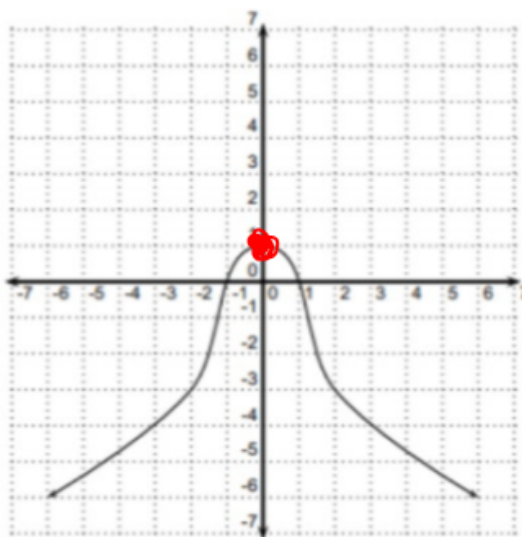
If a graph is not one-to-one, we can restrict the domain to make it one-to-one.

What part of this graph is one-to-one?

VLT
 $f(x)$ is a
 function

$$(-\infty, 0)$$

$$x \leq 0$$

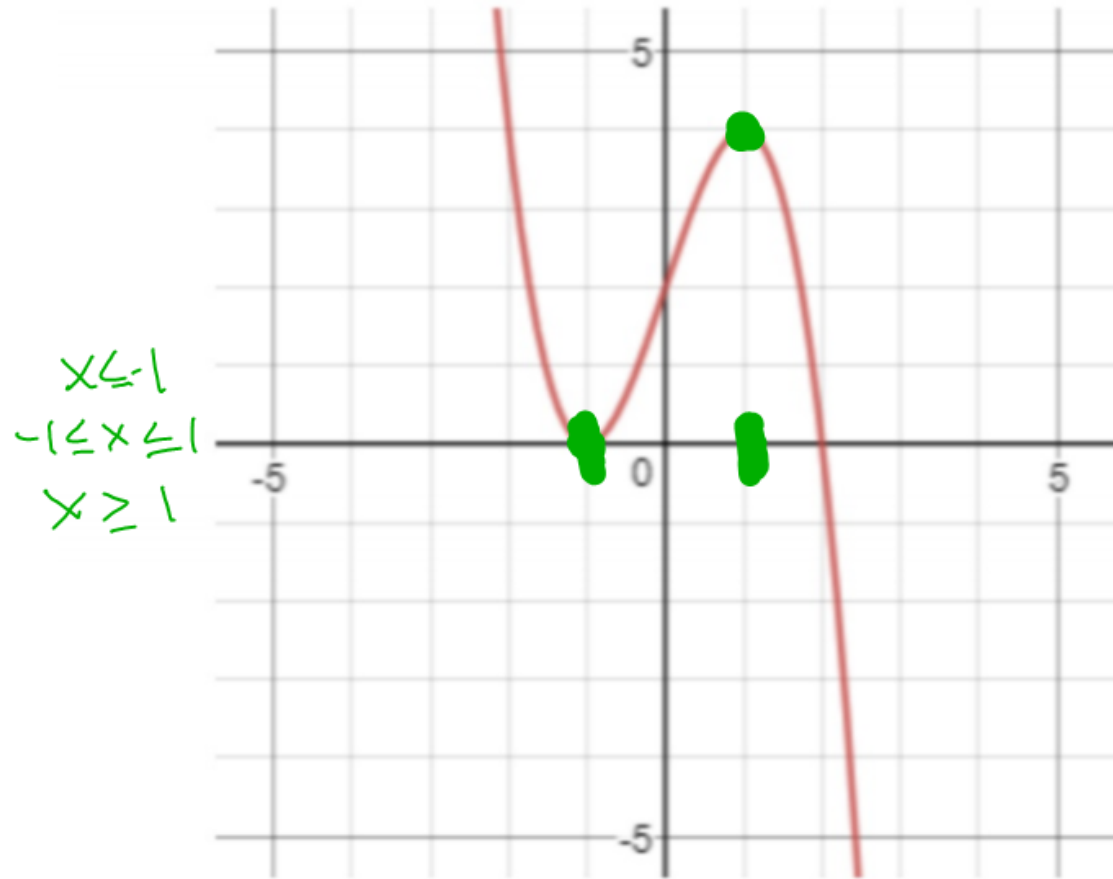


HLT
 $f^{-1}(x)$ is
 a function

$$[0, \infty)$$

$$x \geq 0$$

How can we restrict this domain?



Example 2: $y = x^2 + 5$

Find the inverse: $y^{-1} = \pm \sqrt{x-5}$

What is the domain of $f^{-1}(x)$?

$(5, \infty)$

What is the range of $f^{-1}(x)$?

$(-\infty, \infty)$

Is the inverse a function?

What domain could we use to make it a function?

$x \leq 0$

$x \geq 0$

Lin is tracking the progress of her plant's growth. Today the plant is 5 cm high. The plant grows 1.5 cm per day.

Write a linear model that represents the height of the plant after d days.

$$f(d) = 1.5d + 5$$

$$f^{-1}(d) = \frac{d-5}{1.5}$$

$$f^{-1}(d) = ?$$

What is the inverse?

What do each variable

Ms. Jantz has a part time job where she earns \$400 plus 300 for every car she sells. The function model that shows the total income is $f(x) = 300x + 400$.

What does each variable in $f(x)$ represent?

$$f(x) = \text{total income}$$

$$x = \# \text{ of cars}$$

What does each variable in $f^{-1}(x)$ represent?

$$f^{-1}(x) = \# \text{ of cars}$$

$$x = \text{total income}$$

If g is the inverse of f and $f(3) = 2$, what is the $f(3) + g(2)$?

$$f(g(2)) = 2$$

$$2 + 3 = \boxed{5}$$

$$f(g(-354)) = -354$$

$$g(f(-63.2)) = -63.2$$

If g is the inverse of f and $f(4) = 7$, what is the $2f(4) - 3g(7)$

Function

Verify the functions are inverses

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

$$f(g(x))$$

$$g(f(x))$$

$$g(x) = \frac{x + 3}{2}$$

Verify the functions are inverses

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

$$g(x) = \sqrt[3]{x-3} - 2$$

Verify the functions are inverses.

$$f(x) = 3x + 8$$

$$g(x) = \frac{x + 8}{3}$$

Worksheets for