

Inverse of a Square Root Function

Goal:

- to be able to find the inverse of a square root function and correctly state the domain

The inverse of a function reverses the dependency.
That is the independent and dependent variables are
changed.

$$x \rightleftarrows y$$

domain \Leftrightarrow range

The inverse of a function may or may not also be a function.

Determine the inverse of the following function:

$$f(x) = 2\sqrt{-x+4} - 8 \quad \text{rang: } [-8, \infty[$$

$$y = 2\sqrt{-x+4} - 8$$

$$x = 2\sqrt{-y+4} - 8$$

$$x+8 = 2\sqrt{-y+4}$$

$$\frac{x+8}{2} = \sqrt{-y+4}$$

$$\left(\frac{x+8}{2}\right)^2 = -y+4$$

$$\left(\frac{x+8}{2}\right)^2 - 4 = -y$$

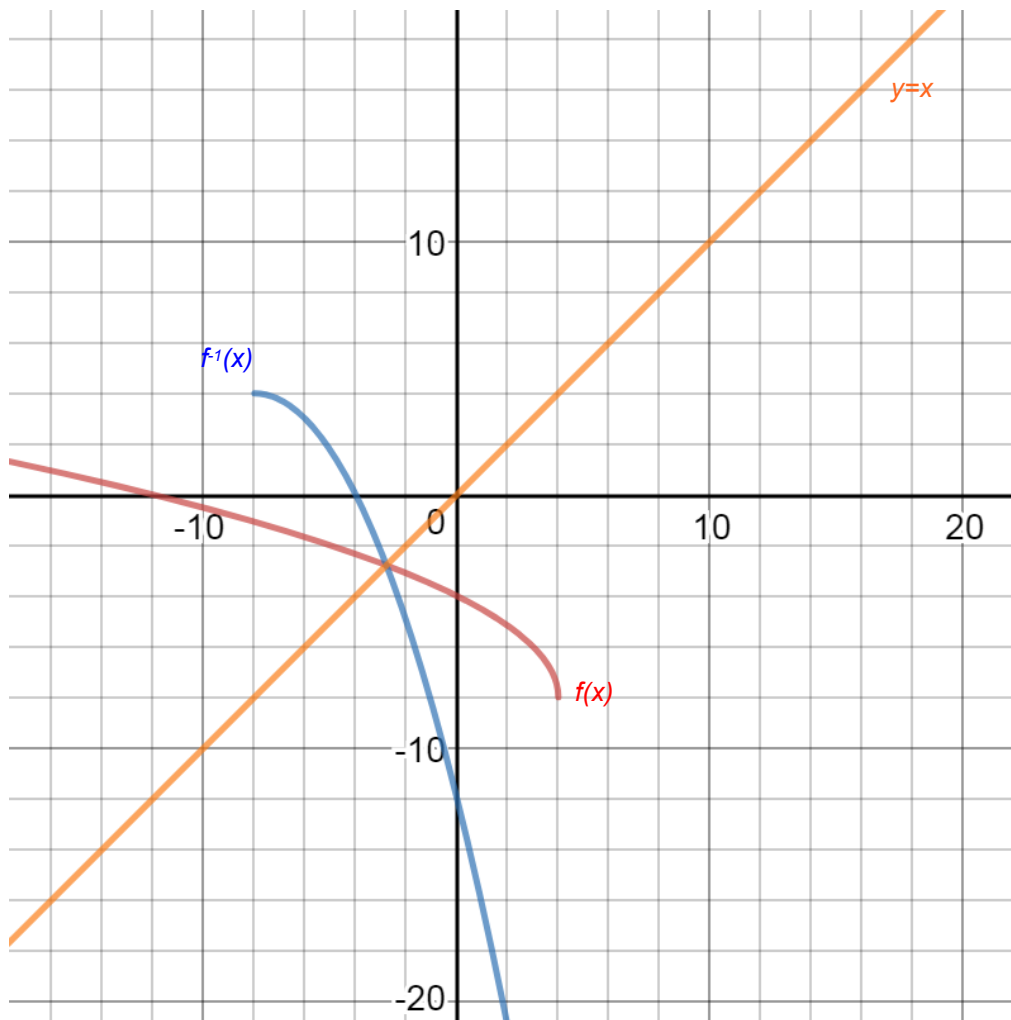
$$-\left(\frac{x+8}{2}\right)^2 + 4 = y$$

$$y = -\frac{1}{4}(x+8)^2 + 4 \quad \text{the inverse is a quadratic function}$$

$$f^{-1}(x) = -\frac{1}{4}(x+8)^2 + 4$$

$$\text{for } x \geq -8$$

$$\text{or } x: [-8, \infty[$$



To determine the inverse of a function:

- Replace x with y and y with x .
- Re-write the equation for $y=$
- When done replace y with $f^{-1}(x)$
- You must include the domain of the inverse (which is the range of the square root function)