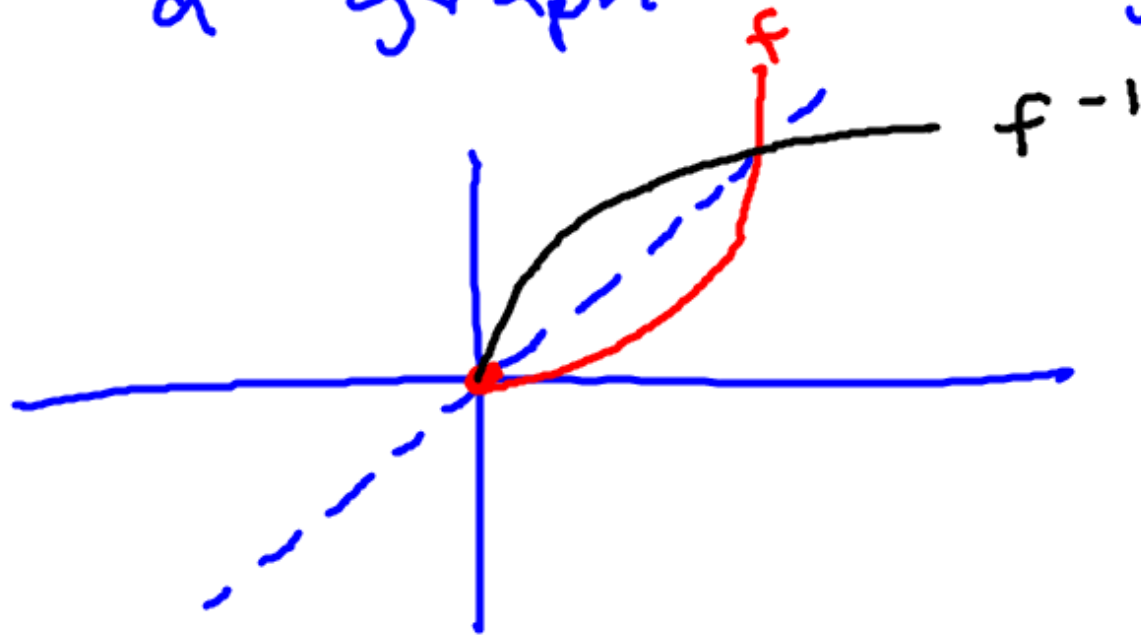
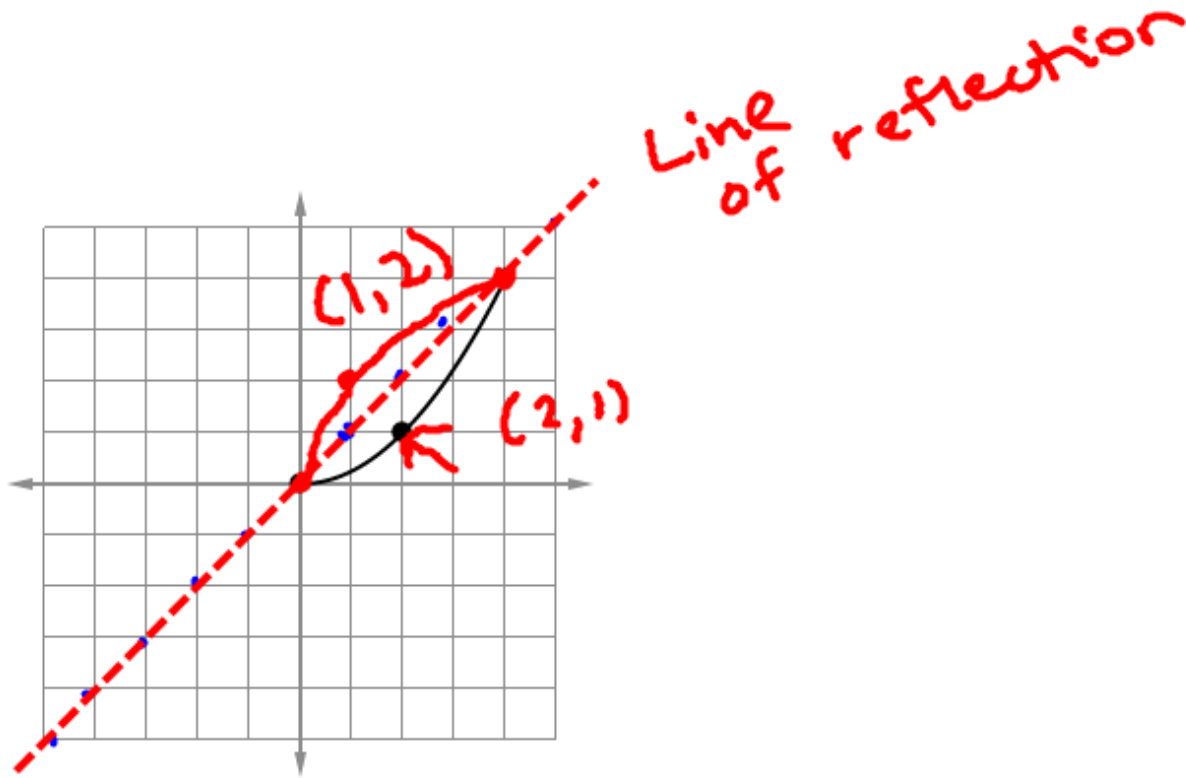


Lesson 8.2: Inverses

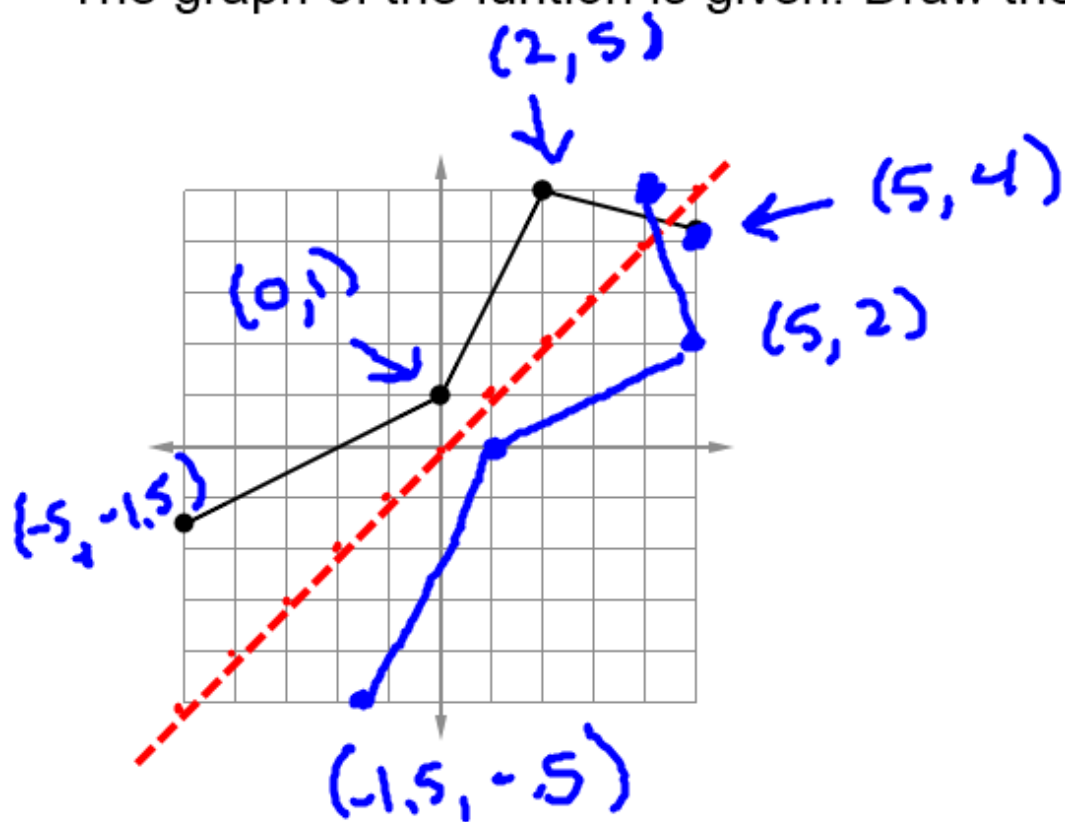
Graphically: Reflection of
a graph over $y = x$



The graph of the function is given. Draw the graph of the inverse.



The graph of the function is given. Draw the graph of the inverse.



Find the inverse of the function. State the domain of the function and the inverse.

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

Solve the equation for x .

$$y = 2x + 1$$

$$\frac{y-1}{2} = \frac{2x}{2}$$

$$x = \frac{y-1}{2}$$

Switch x & y

$$y = \frac{x-1}{2}$$

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

	Domain
f	\mathbb{R}
f^{-1}	\mathbb{R}

Domain

1. Fractions: Denominator $\neq 0$
(the x has to be in the den.)
2. Square Roots: Inside ≥ 0
3. Neither: Domain: \mathbb{R}

Find the inverse of the function. State the domain of the function and the inverse.

$$f(x) = \sqrt[3]{2x} - 4$$

$$y = \sqrt[3]{2x} - 4$$

$$(y+4)^3 = (\sqrt[3]{2x})^3$$

$$\frac{(y+4)^3}{2} = \frac{2x}{2}$$

$$x = \frac{(y+4)^3}{2}$$

$$y = \frac{(x+4)^3}{2}$$

	Domain
f	\mathbb{R}
f^{-1}	\mathbb{R}

Find the inverse of the function. State the domain of the function and the inverse.

$$f(x) = x^2 - 5,$$

$$\begin{array}{r} \downarrow \\ y = x^2 - 5 \\ +5 \quad \quad +5 \end{array}$$

$$\ominus \sqrt{y+5} = \sqrt{x^2}$$

$$x = -\sqrt{y+5}$$

$$y = -\sqrt{x+5}$$

$$x+5 \geq 0$$

$$x \geq -5$$

$$x \leq 0$$

less than means

	Domain
f	$x \leq 0$
f^{-1}	$x \geq -5$

Find the inverse of the function. State the domain of the function and the inverse.

$$f(x) = (x + 2)^2, \quad x \geq -2$$

\oplus
 $\sqrt{y} = \sqrt{(x+2)^2}$

$$\sqrt{y} = x + 2$$

$-2 \qquad -2$

$$x = \sqrt{y} - 2$$

$$y = \sqrt{x} - 2$$

	Domain
f	$x \geq -2$
f^{-1}	$x \geq 0$

Find the inverse of the function. State the domain of the function and the inverse.

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



$$4-x \geq 0$$

$$\frac{-x}{-1} \geq \frac{-4}{-1}$$

$$x \leq 4$$

	Domain
f	$x \leq 4$
f^{-1}	$x \geq 0$

horizontal shift

$$(y)^2 = (\sqrt{4-x})^2$$

$$y^2 = 4 - x$$

$$\frac{y^2}{-1} - \frac{4}{-1} = \frac{-x}{-1}$$

$$x = -y^2 + 4$$

Inverse:

$$y = -x^2 + 4$$



We only want half
Look at horizontal shift.

Find the inverse of the function. State the domain of the function and the inverse.

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

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

-2 -2

$$(y - 2)^2 = (-\sqrt{x})^2$$

$$(y - 2)^2 = x$$

$$y = \sqrt{x - 2}$$

	Domain
f	$x \geq 0$
f^{-1}	$x \leq 2$

Opposite

Find the inverse of the function. State the domain of the function and the inverse.

$$f(x) = \frac{2}{x-3}$$

	Domain
f	$x \neq 3$
f^{-1}	$x \neq 0$

$$(x-3)y = \frac{2}{x-3} \cdot (x-3)$$

$$\frac{(x-3)}{y} y = \frac{2}{y}$$

$$x-3 = \frac{2}{y}$$

$$x = \frac{2}{y} + 3$$

$$y = \frac{2}{x} + 3$$