

## Trig 3.4

Determine inverses of  
relations and functions  
Graphs functions and their  
inverses

whiteboards

Quiz 3.3-3.4 tomorrow

$$x \leftrightarrow y$$

domain  $x$  ↗  
range ↘

line of symmetry ( $y=x$ )

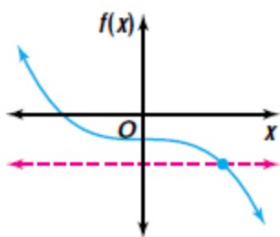
inverse function/ inverse  
relation

vertical line test (VLT)

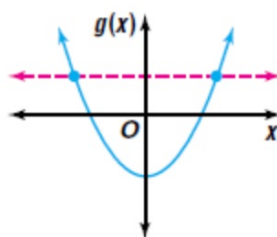
horizontal line test (HLT)

### Inverse Relations

Two relations are inverse relations if and only if one relation contains the element  $(b, a)$  whenever the other relation contains the element  $(a, b)$ .



*The inverse of  $f(x)$  is a function.*



*The inverse of  $g(x)$  is not a function.*

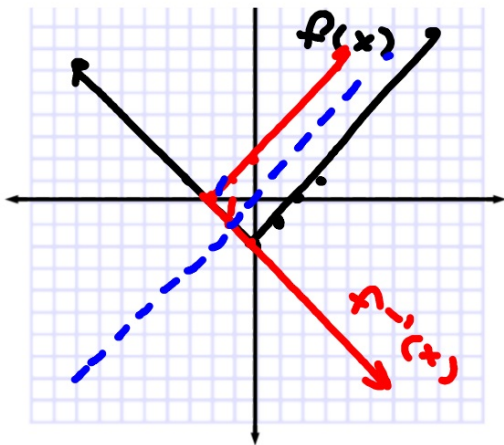
whiteboards

**Lesson 3-4** (Pages 152-158)

Graph each function and its inverse.

1.  $f(x) = |x| - 2$

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



D:  $\mathbb{R}$

R:  $y \geq -2$

D:  $x \geq -2$

R:  $\mathbb{R}$

Equation

VLT, HLT

Find  $f^{-1}(x)$ . Then state whether  $f^{-1}(x)$  is a function.

4.  $f(x) = 4x - 5$

5.  $f(x) = -2x + 2$

$$x = 4y - 5$$

$$x + 5 = 4y$$

$$\frac{1}{4}(x + 5) = f^{-1}(x)$$

$$7. f(x) = (x - 2)^2$$

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

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

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

$$8. f(x) = -\frac{x}{2}$$

$$10. f(y) = x^2 + 8x - 2$$

$$11. f(x) = x^3 + 4$$

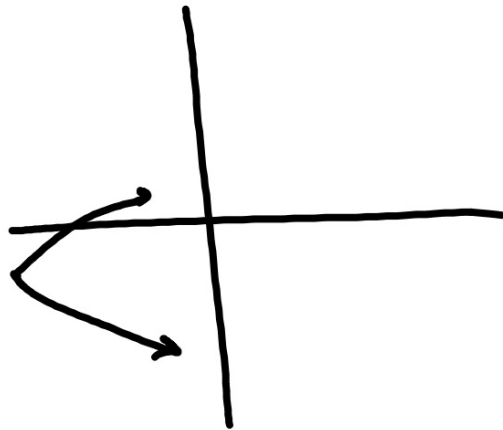
$$x = y^2 + 8y - 2$$

$$x + 2 \stackrel{+16}{=} y^2 + 8y + 16$$

$$\sqrt{x+18} = \sqrt{(y+4)^2}$$

$$\pm \sqrt{x+18} = y+4$$

$$f^{-1}(x) = \pm \sqrt{x+18} - 4$$



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

$$\frac{x}{1} = \frac{4}{(y-3)^2}$$

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

$$\sqrt{\frac{4}{x}} = \sqrt{(y-3)^2} \quad \star$$

$$y = 3 \pm \frac{2\sqrt{x}}{x}$$

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

$$\pm \frac{2\sqrt{x}}{\sqrt{x}\sqrt{x}} + 3 = f^{-1}(x)$$

$\star$