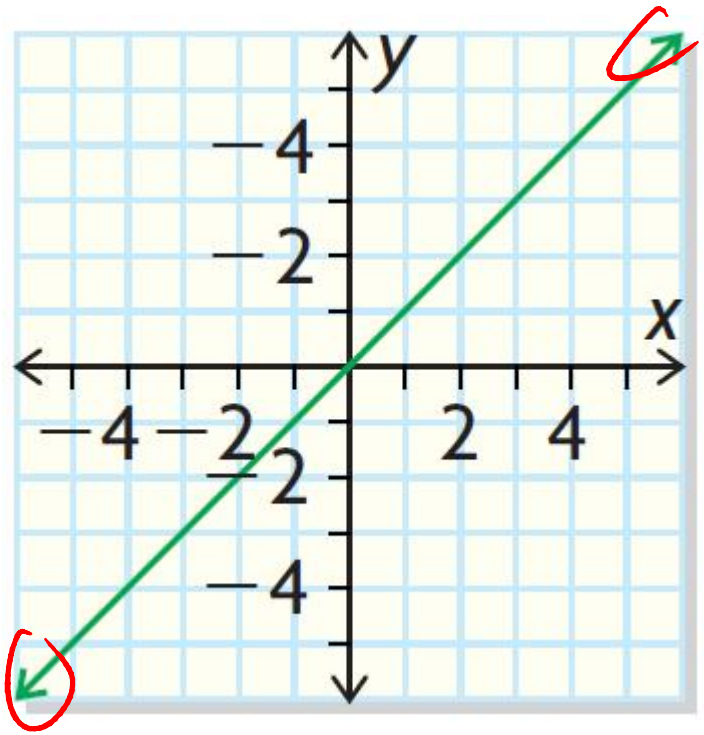
Mathematics 11U

1.4 –Domain and Range Part 2

Mr. D. Hagen

- Domain: the set of all possible x-values or inputs
  - restrictions
- Range: the set of all possible y-values or outputs
  - values that cannot be produced



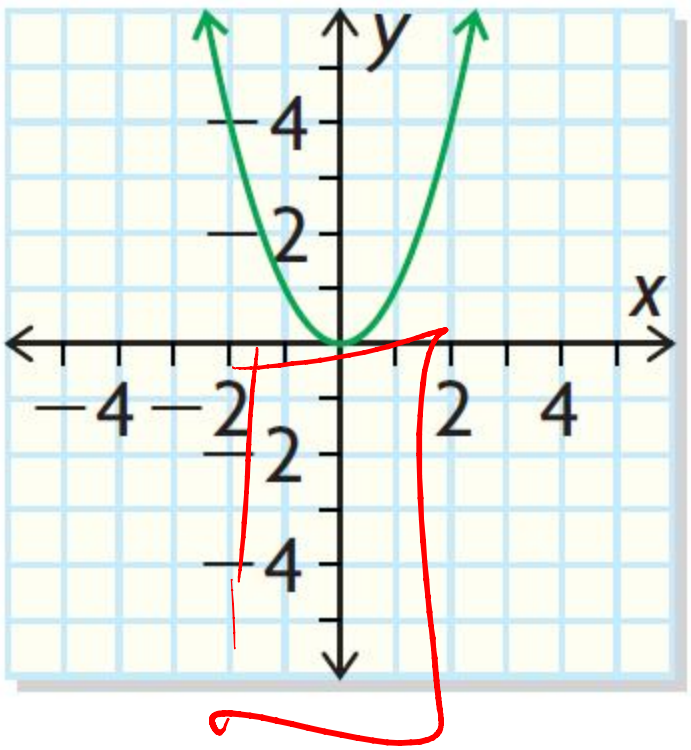
Linear fn

$f(x) = x$

Domain: $\{x \in \mathbb{R}\}$

Range: $\{f(x) \in \mathbb{R}\}$

This is true for all linear fn except horizontal and ~~vertical lines.~~



Quadratic Fn

$f(x) = x^2$

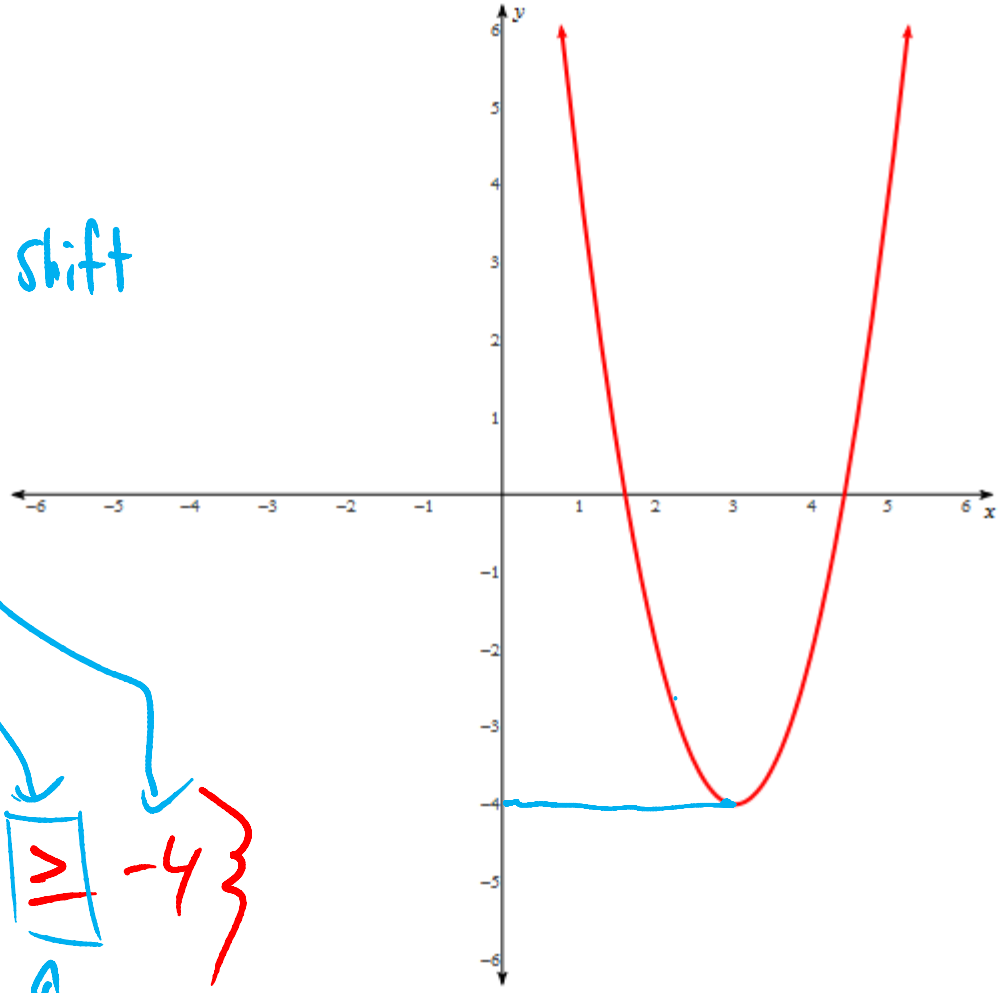
Domain: $\{x \in \mathbb{R}\}$

Range: $\{f(x) \in \mathbb{R} \mid f(x) \geq 0\}$

$$f(x) = 2(x-3)^2 - 4$$

Vertical Stretch

Vertical Shift

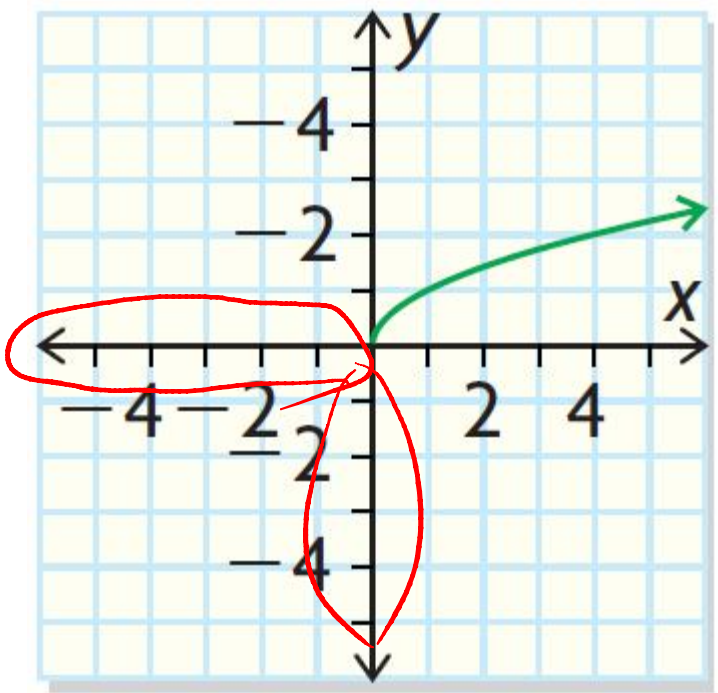


Domain: $\{x \in \mathbb{R}\}$

Range: $\{f(x) \in \mathbb{R} \mid f(x) \geq -4\}$

$+ = \geq$

$- = \leq$



Square Root Fn

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

~~$\sqrt{-2} = ??$~~

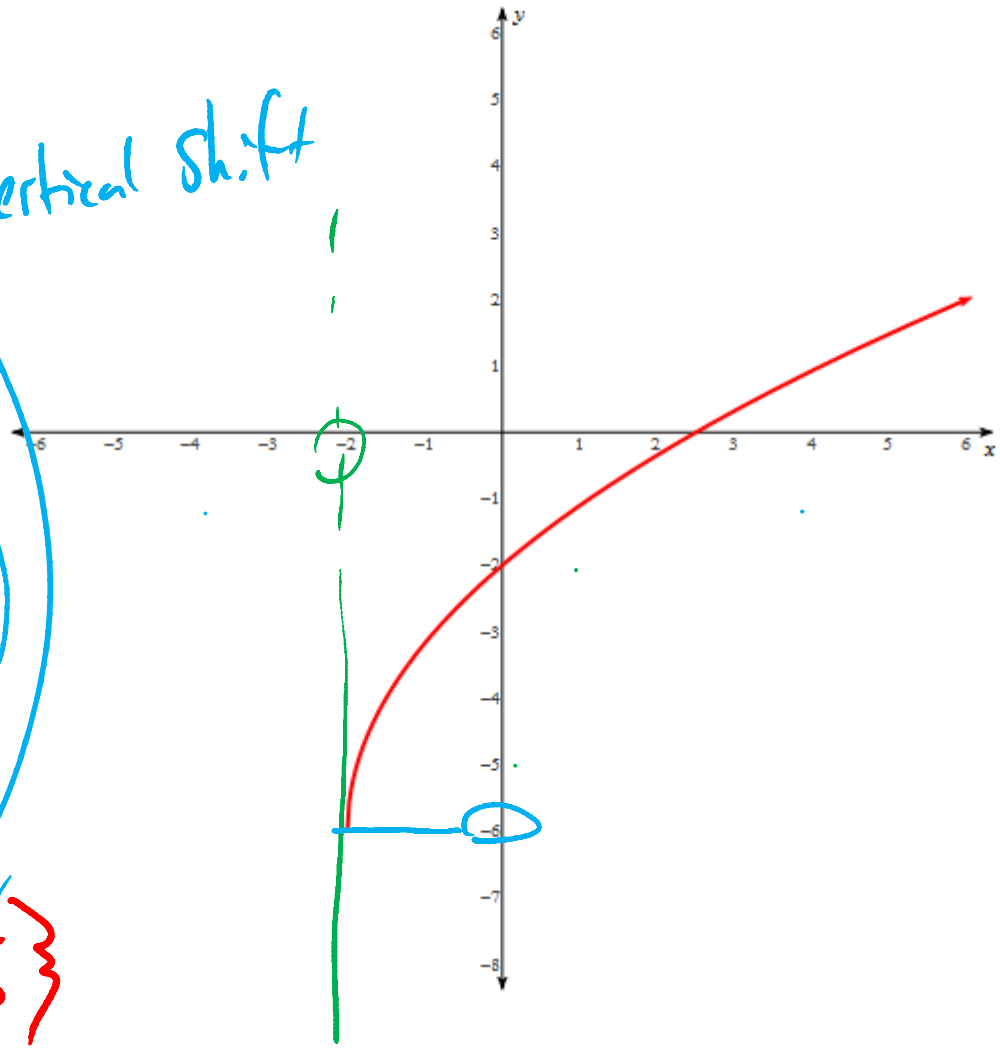
Domain: $\{x \in \mathbb{R} \mid x \geq 0\}$

Range: $\{f(x) \in \mathbb{R} \mid f(x) \geq 0\}$

$$f(x) = 2\sqrt{2x+4} - 6$$

$2(x+2)$ — Horizontal Shift

-6 — Vertical Shift

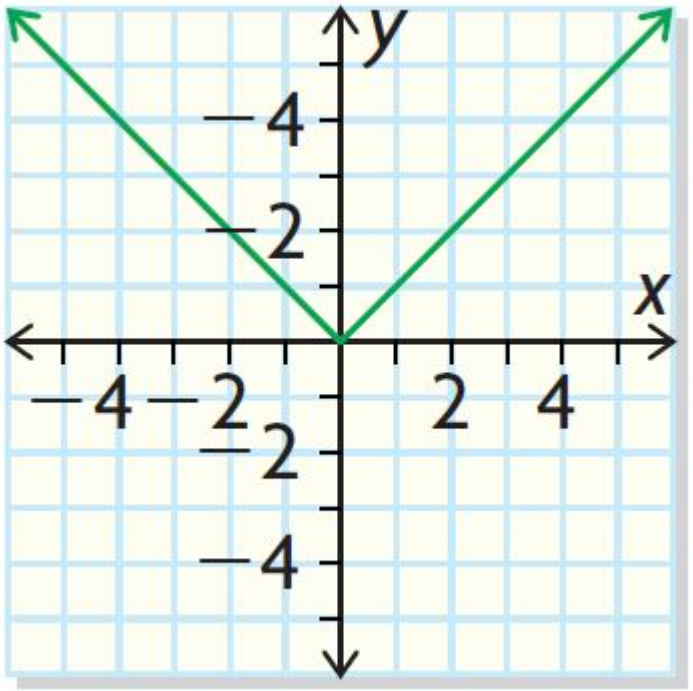


Domain: $\{x \in \mathbb{R} \mid x \geq -2\}$

Range: $\{f(x) \in \mathbb{R} \mid f(x) \geq -6\}$

$x+2=0$

$x=-2$



Absolute Value fn

$f(x) = |x|$

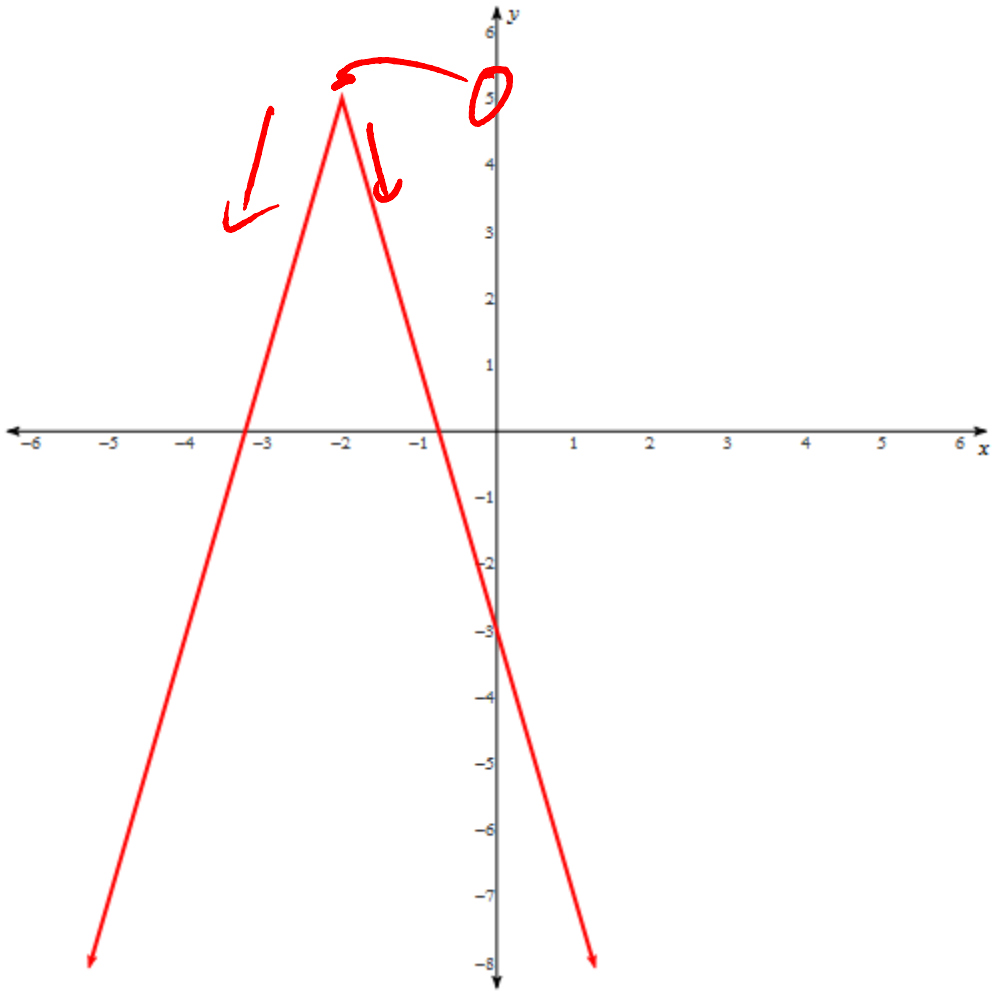
Domain: $\{x \in \mathbb{R}\}$

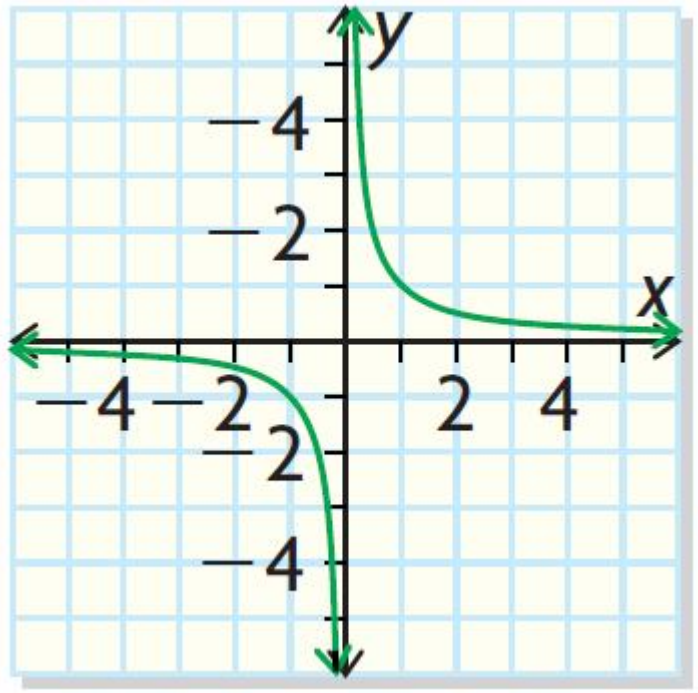
Range: $\{f(x) \in \mathbb{R} \mid f(x) \geq 0\}$

$$f(x) = -4|x+2|+5$$

Domain: $\{x \in \mathbb{R}\}$

Range: $\{f(x) \in \mathbb{R} \mid f(x) \leq 5\}$





Reciprocal Fn

$f(x) = \frac{1}{x}$

Domain: $\{x \in \mathbb{R} \mid x \neq 0\}$

Range: $\{f(x) \in \mathbb{R} \mid f(x) \neq 0\}$

$f(0) = \frac{1}{0} = ???$

undefined

$f(x) = 0, \quad x = ??$

$$f(x) = \frac{5}{3x-2} + 4$$

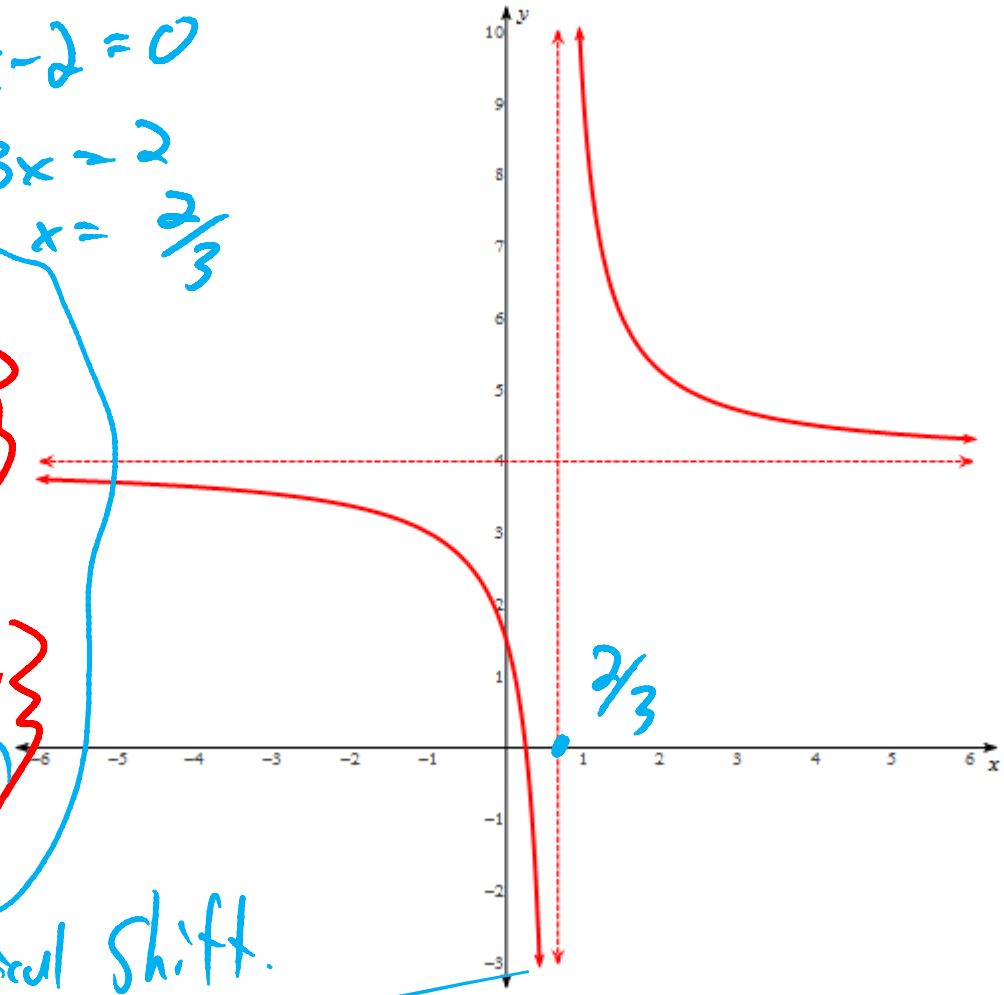
$3x - 2 = 0$

$3x = 2$

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

Domain: $\{x \in \mathbb{R} \mid x \neq \frac{2}{3}\}$

Range: $\{f(x) \in \mathbb{R} \mid f(x) \neq 4\}$



Vertical Shift.