1.4b Domain and Range Part 2.

- Find the domain and range by looking only at the equation.
- Become comfortable with using set notation.

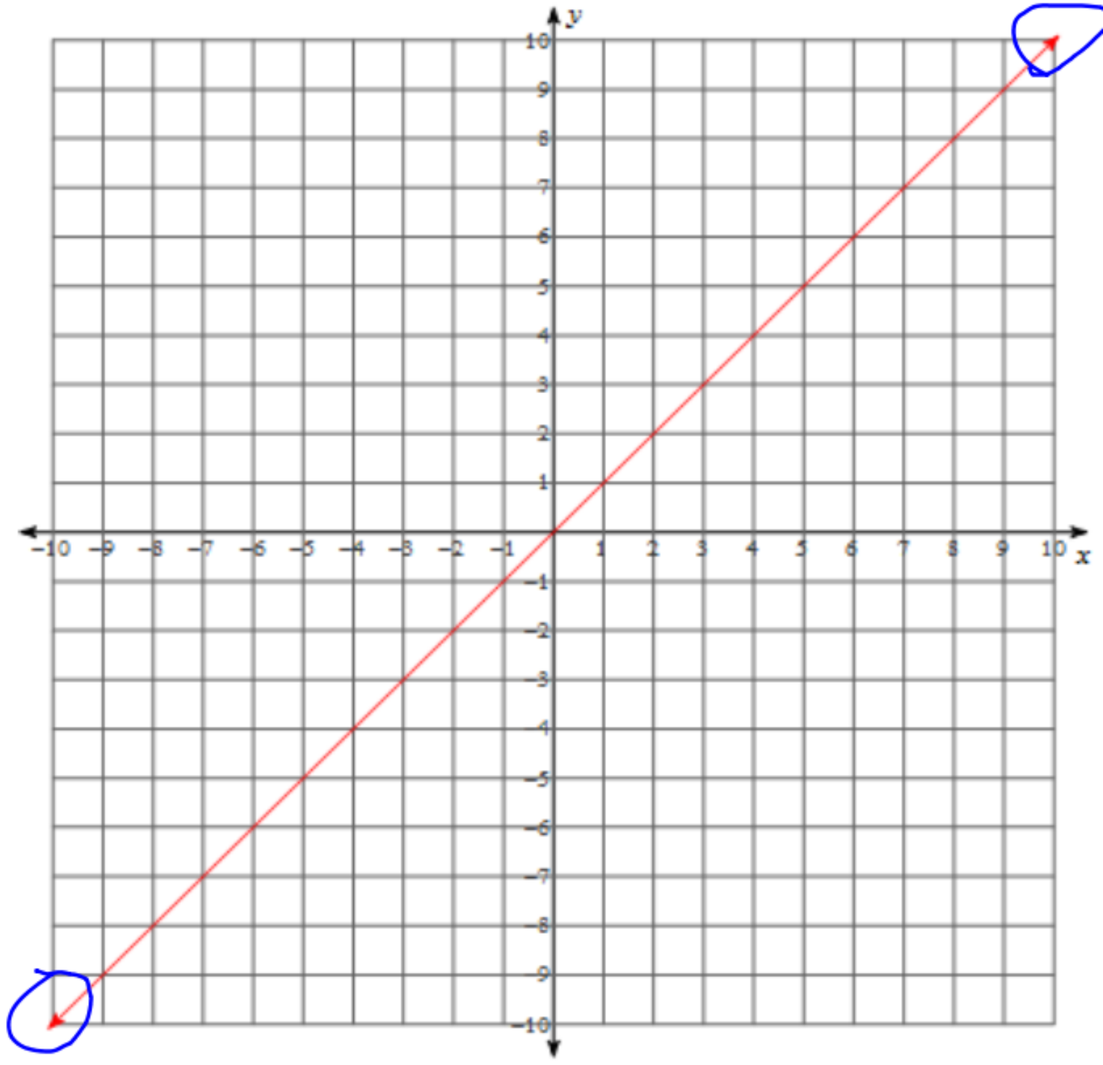
① Linear Functions

$f(x) = x$

$D: \{x \in \mathbb{R}\}$ ← everything!

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

True for <u>all</u> Linear fn's

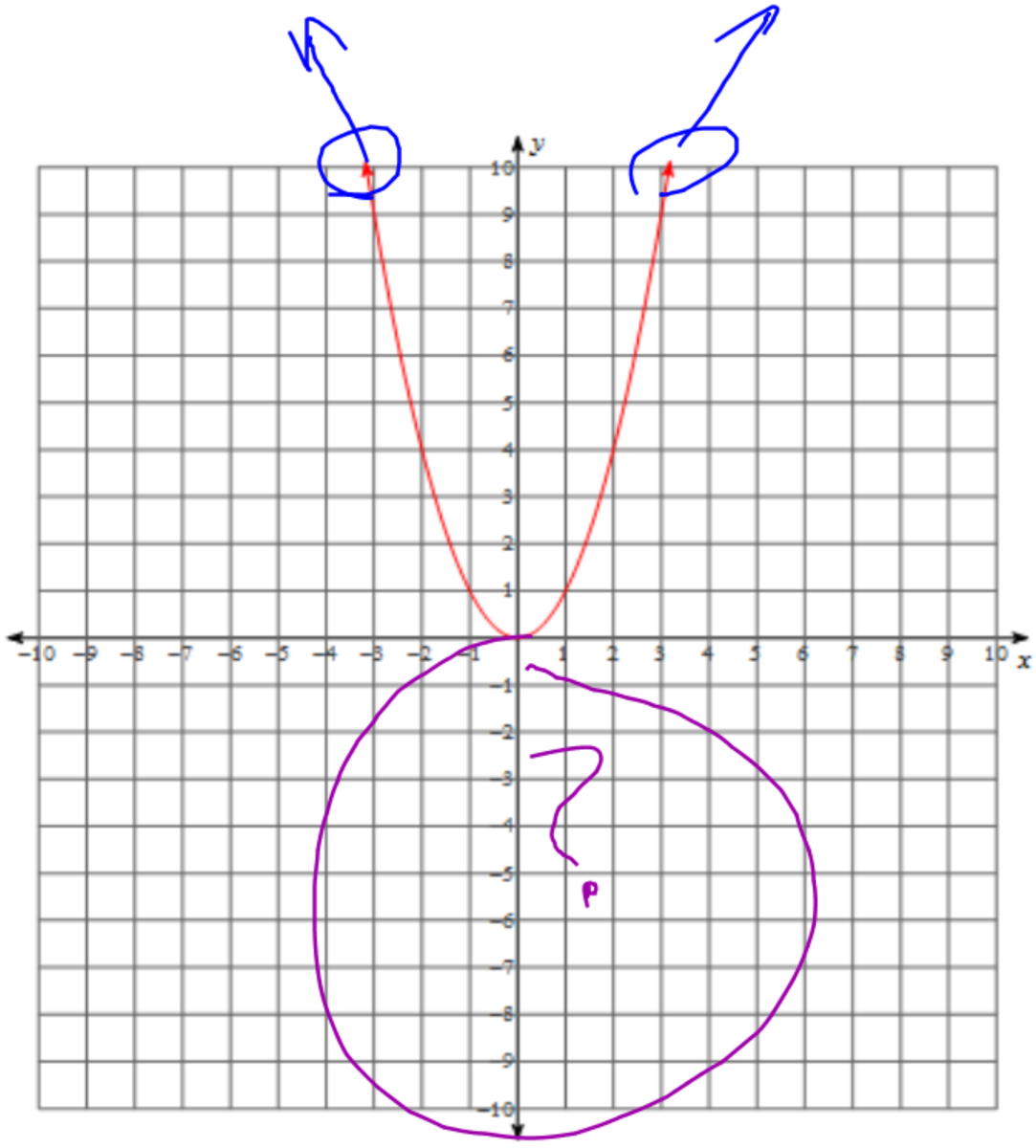


② Quadratic Fn

$$g(x) = x^2$$

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

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



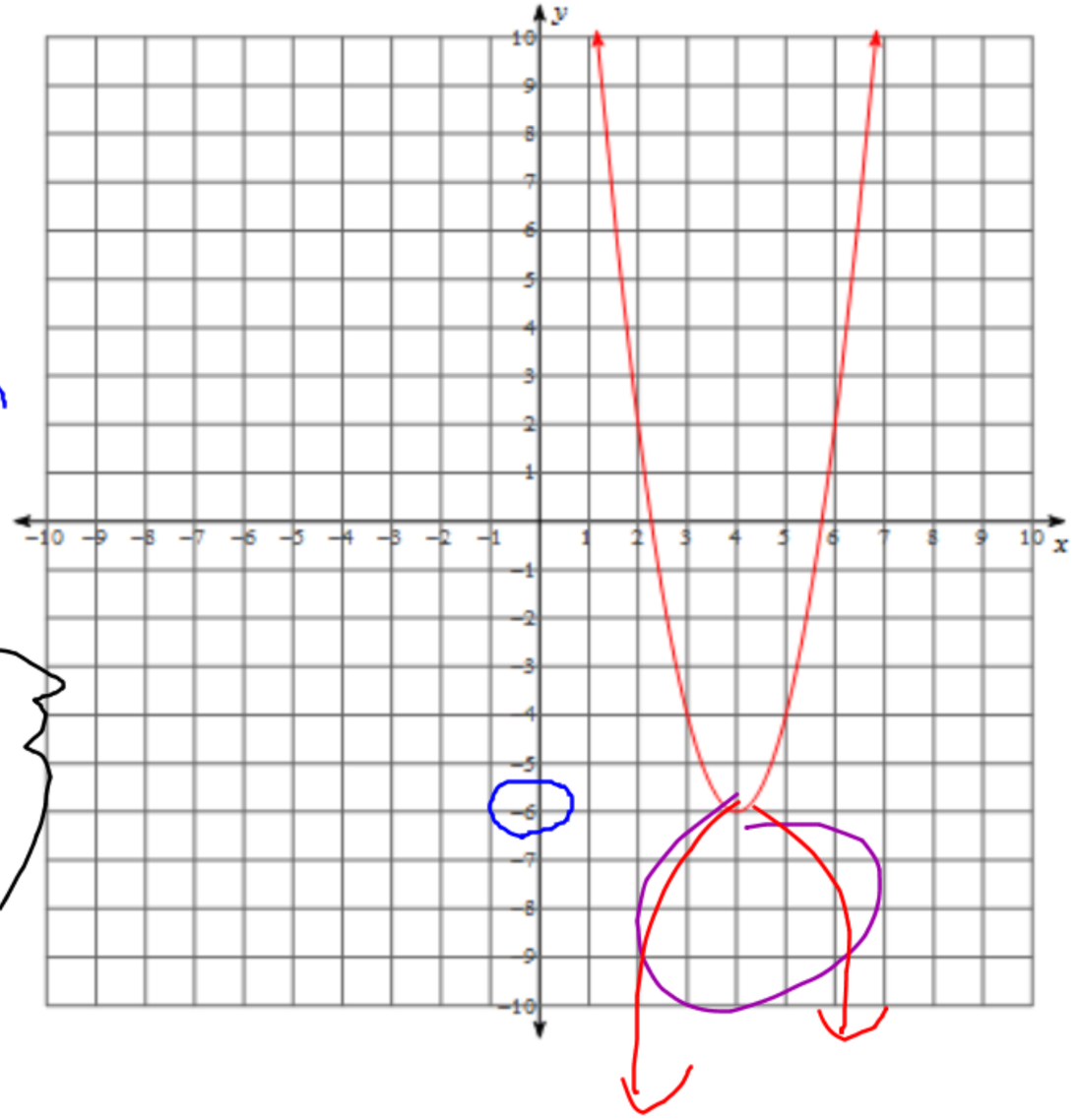
Quadratic Fn example:

$$g(x) = -2(x-4)^2 - 6$$

V.Sh

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

$$R: \{g(x) \in \mathbb{R} \mid g(x) \leq -6\}$$

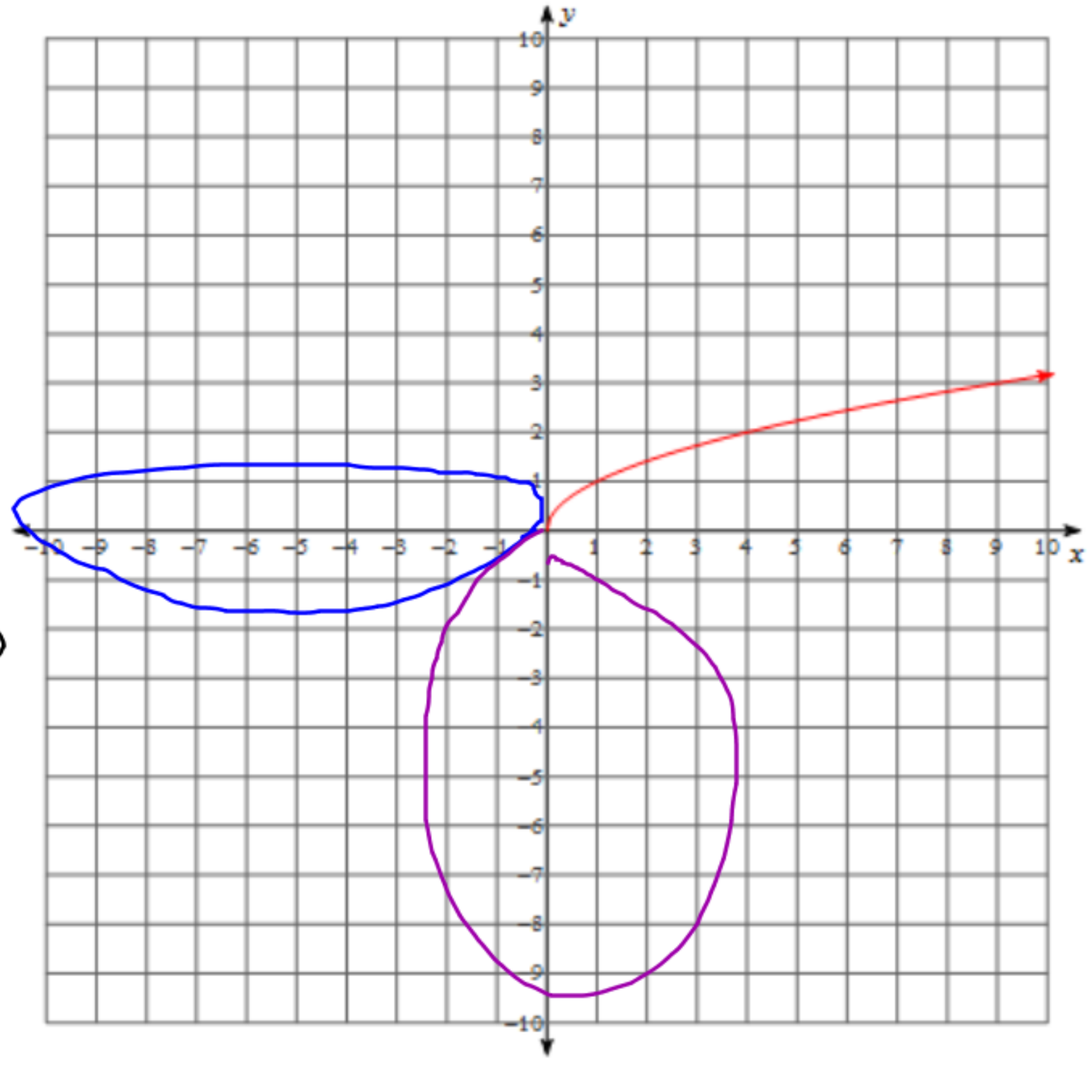


③ Square Root Fn

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

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

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



Square Root Example:

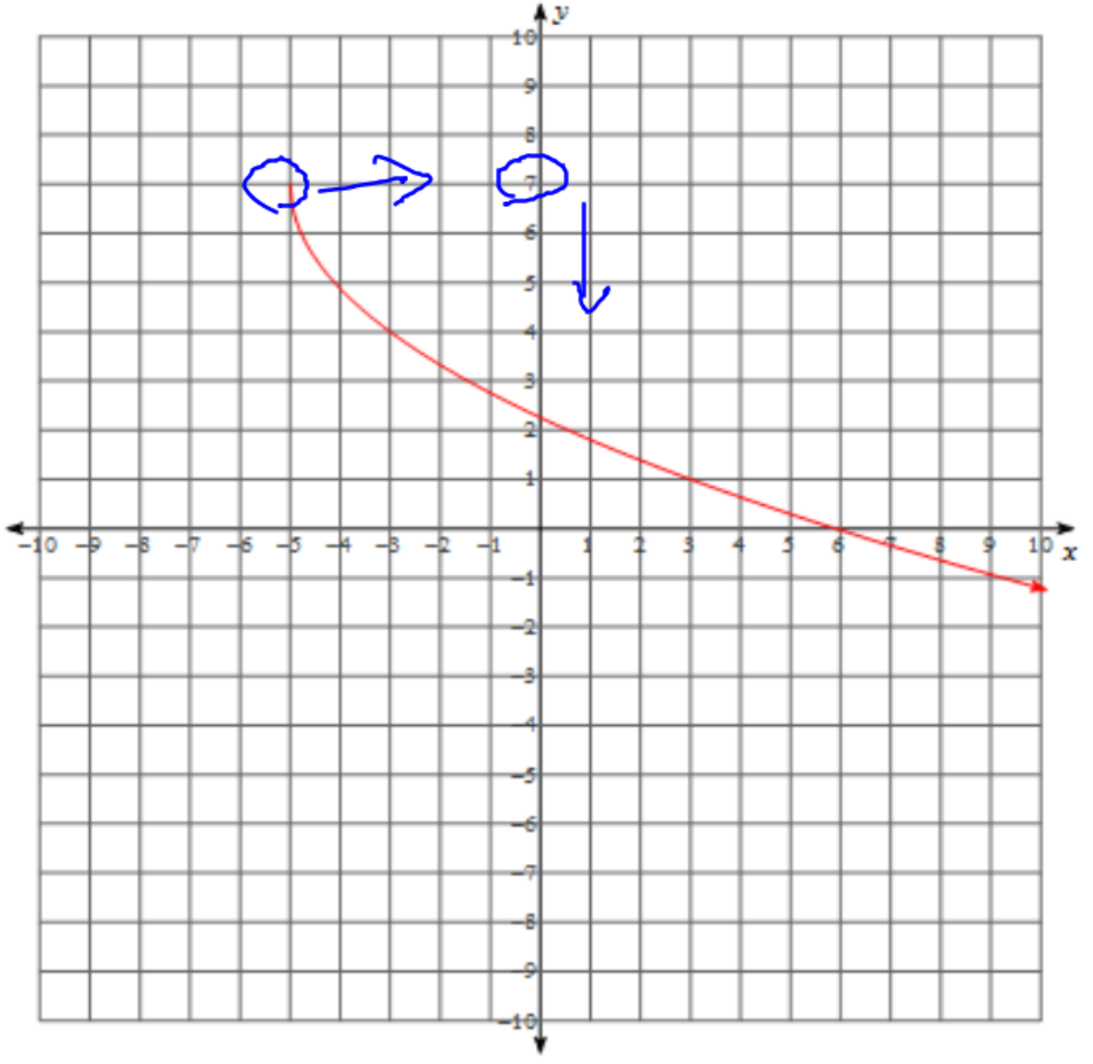
$$h(x) = -3\sqrt{-\frac{1}{2}(x+5)} + 7$$

H. Sh

V. Sh

$$D: \{x \in \mathbb{R} \mid x \geq -5\}$$

$$R: \{h(x) \in \mathbb{R} \mid h(x) \leq 7\}$$

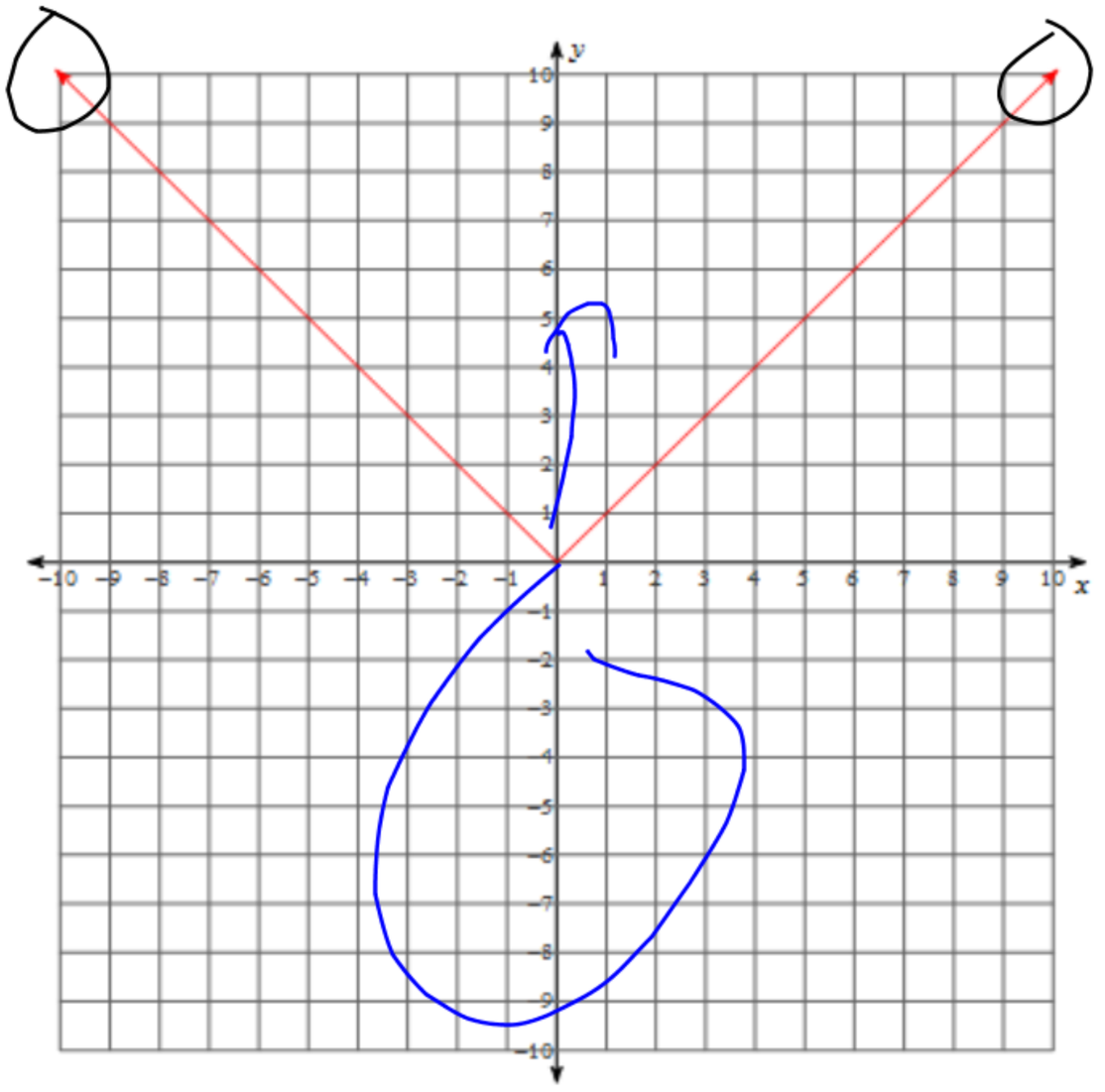


(4) Absolute Value Fn

$k(x) = |x|$

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

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

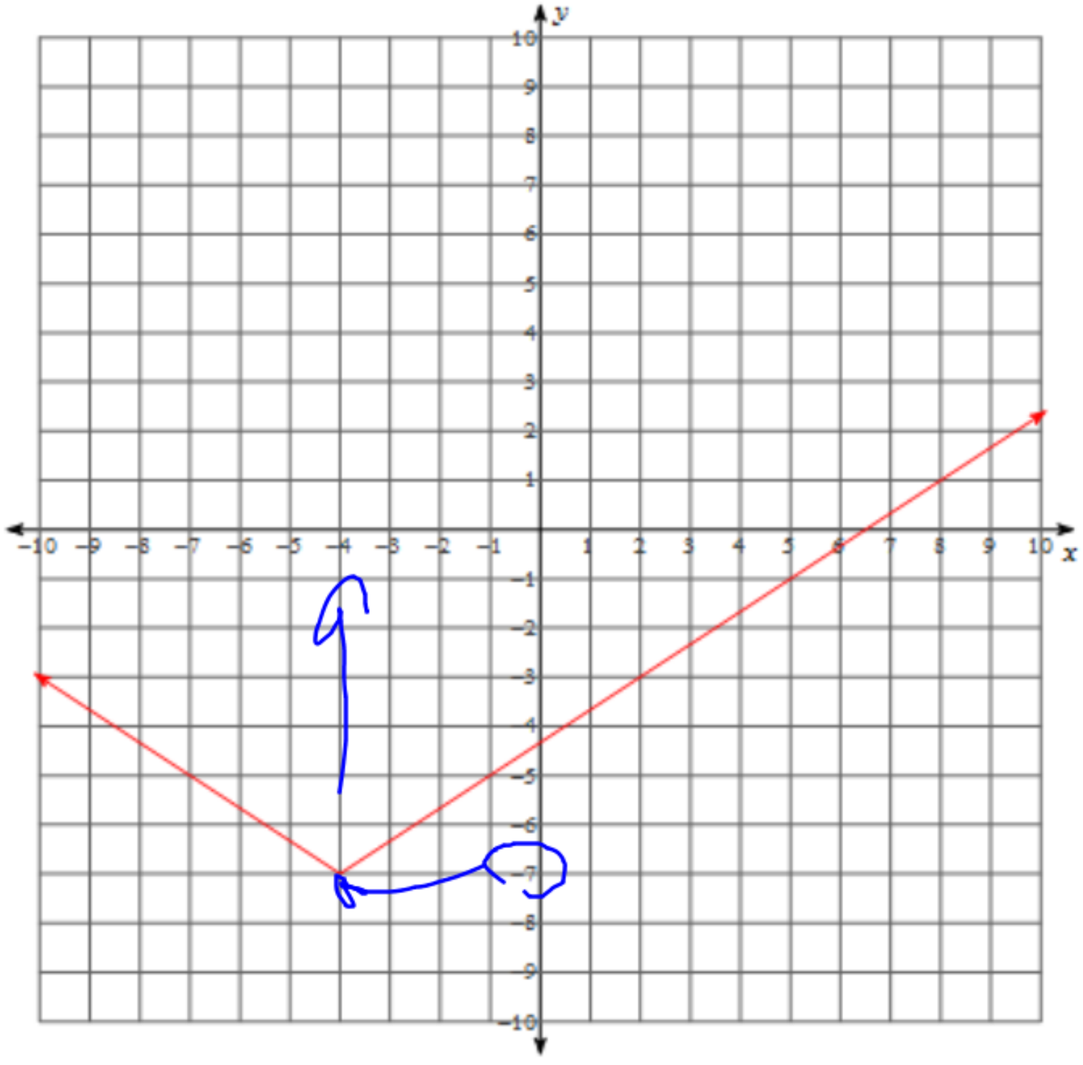


Absolute Value Example

$$k(x) = \frac{1}{3}\left|2(x+4)\right| - 7$$

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

$$R: \{k(x) \in \mathbb{R} \mid k(x) \geq -7\}$$



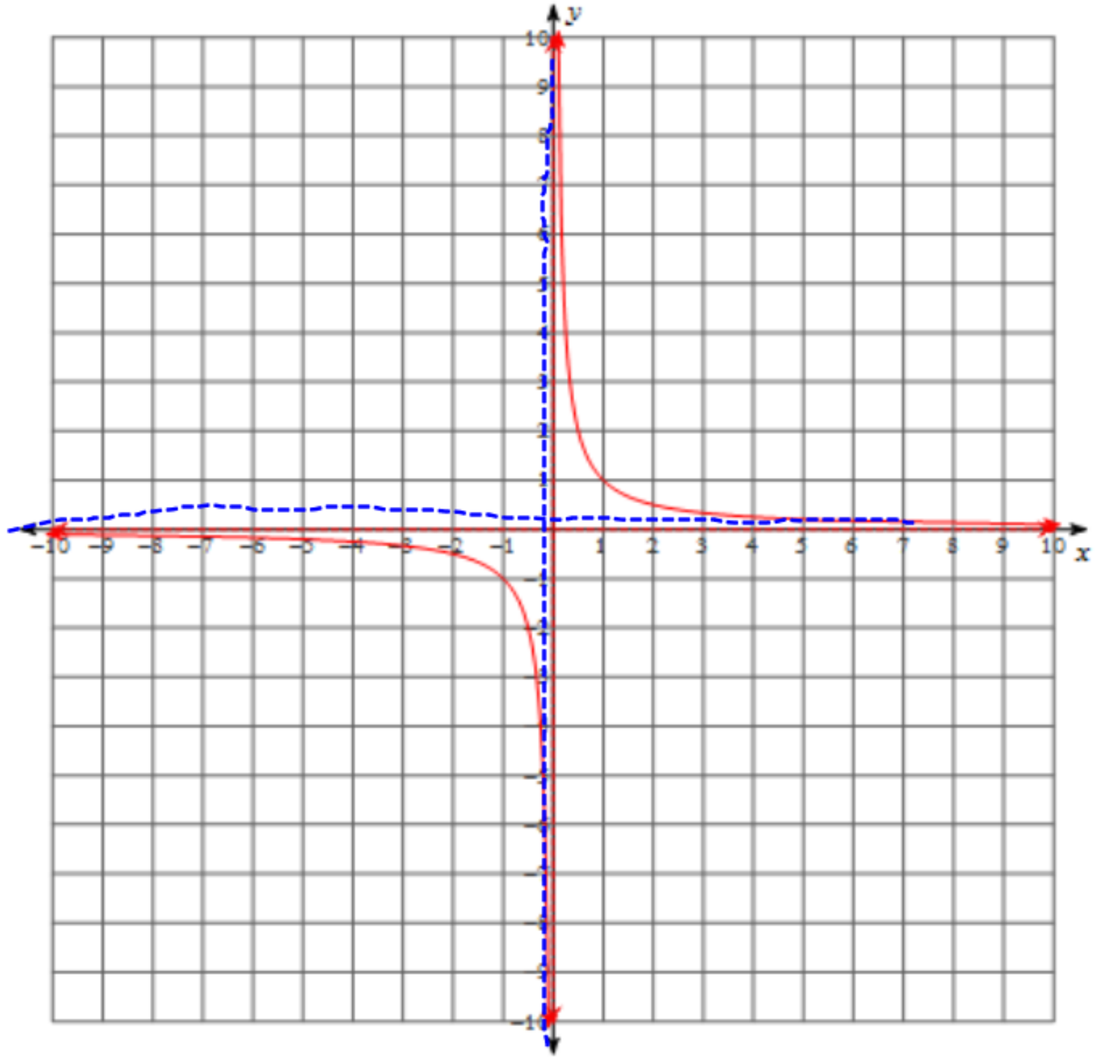
(5) Reciprocal Fn

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

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

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

$\frac{1}{x} \neq 0$



Reciprocal Fn Example

$$R(x) = \frac{-2}{3(x+6)} + 4$$

$3(x+6) = 0$

H.Sh

$$D: \{ x \in \mathbb{R} \mid x \neq -6 \}$$

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