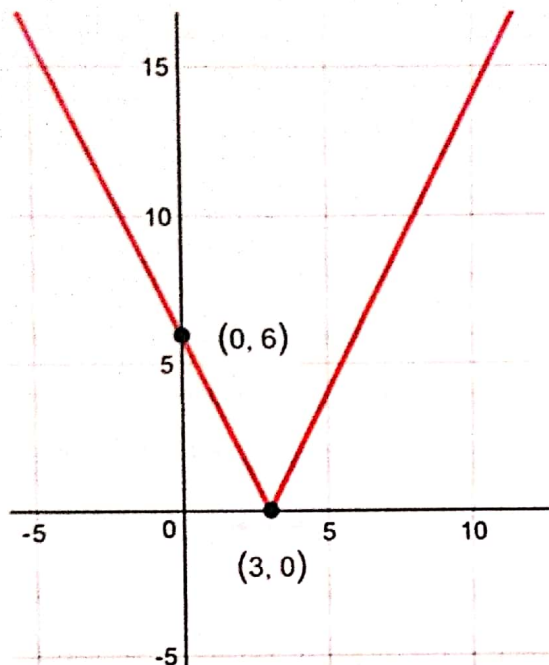


Name: Answer Key

8.1 - 8.3 Mid Unit Review

Graph the following functions and write the domain and range for each.

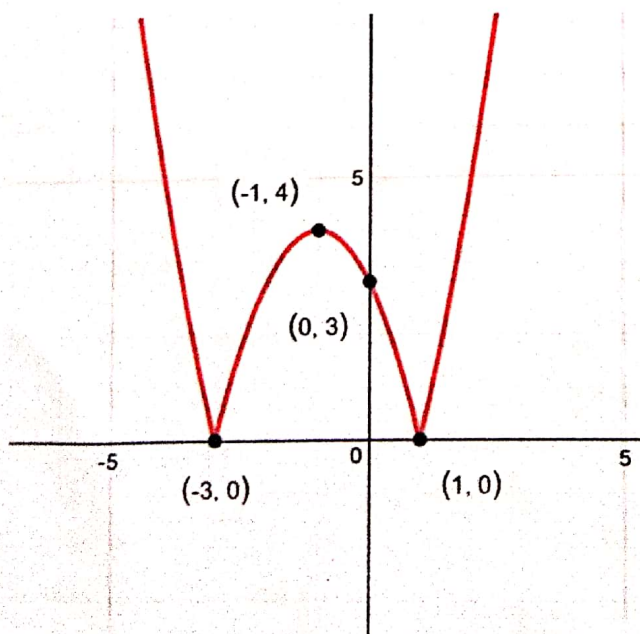
1. Graph $y = |2x - 6|$ and find the domain and range.



Domain: $x \in R$

Range: $y \geq 0, y \in R$

2. Graph $y = |x^2 + 2x - 3|$ and find the domain and range.



Domain: $x \in R$

Range: $y \geq 0, y \in R$

3. Write the equation in piecewise notation:

a. $y = |x + 2|$

$$x + 2 \geq 0$$

$$x \geq -2$$

$$-x - 2 > 0$$

$$-x > 2$$

$$x < -2$$

$$y = \begin{cases} x+2, & \text{if } x \geq -2 \\ -x-2, & \text{if } x < -2 \end{cases}$$

b. $y = |-x^2 - 4x - 3|$

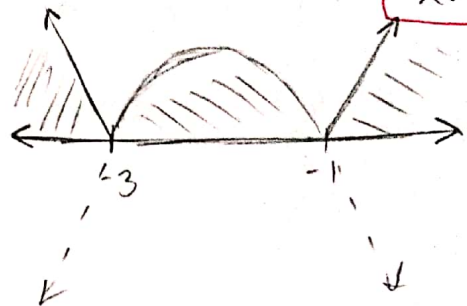
$$-x^2 - 4x - 3 = 0$$

$$x^2 + 4x + 3 = 0$$

$$(x+3)(x+1) = 0$$

$$x = -3 \quad x = -1$$

$$y = \begin{cases} -x^2 - 4x - 3, & -3 \leq x \leq -1 \\ x^2 + 4x + 3, & x < -3 \\ & \text{or} \\ & x > -1 \end{cases}$$



4. Solve algebraically. Verify your solutions!

a. $2|3x + 1| = 2x - 8$

$$|3x + 1| = x - 4$$

$$3x + 1 = x - 4$$

and

$$-3x - 1 = x - 4$$

$$2x = -5$$

$$x = -5/2$$

$$-4x = -3$$

$$x = 3/4$$

No Solution

Check:

$$x = -5/2$$

$$2|3(-5/2) + 1| = 2(-5/2) - 8$$

$$13 \neq -13 \quad \times \text{ False}$$

$$x = 3/4$$

$$2|3(3/4) + 1| = 2(3/4) - 8$$

$$13/2 \neq -13/2 \quad \times \text{ False}$$

b. $1 = |x^2 + 8x + 16|$

$$x^2 + 8x + 16 = 1$$

and $-x^2 - 8x - 16 = 1$

$$x^2 + 8x + 15 = 0$$

$$x^2 + 8x + 16 = -1$$

$$x^2 + 8x + 17 = 0$$

$$(x+3)(x+5) = 0$$

$$x_1 = -3 \quad x_2 = -5$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-8 \pm \sqrt{8^2 - 4(1)(17)}}{2(1)}$$

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

No Real Roots

Check:

$$1 = |(-3)^2 + 8(-3) + 16|$$

$$1 = 1 \quad \checkmark$$

$$1 = |(-5)^2 + 8(-5) + 16|$$

$$1 = 1 \quad \checkmark$$

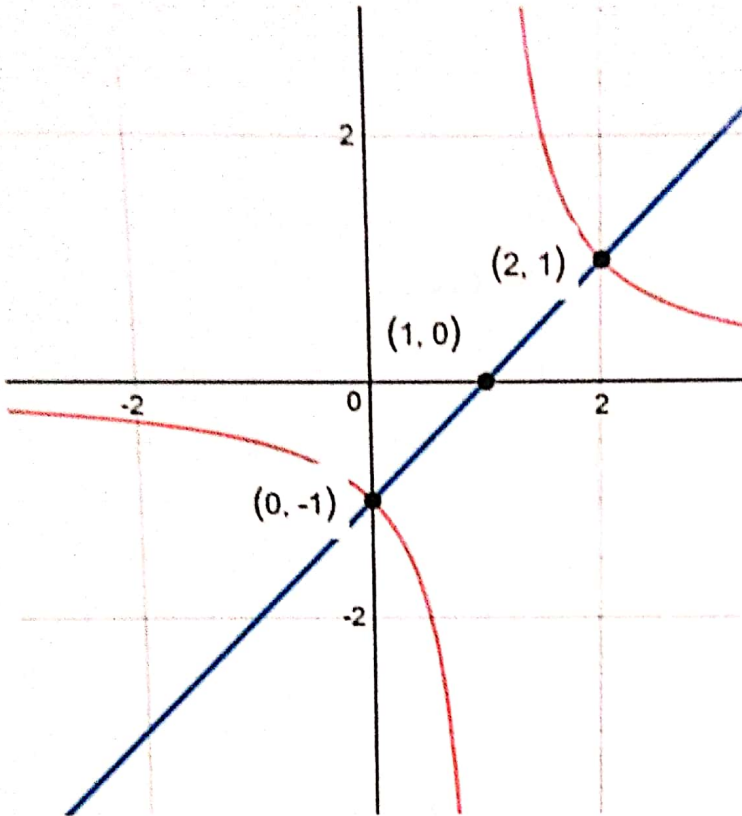
2 Solutions

$$x = -3$$

$$x = -5$$

5. Graph the following reciprocal functions. State the domain and range for each reciprocal function.

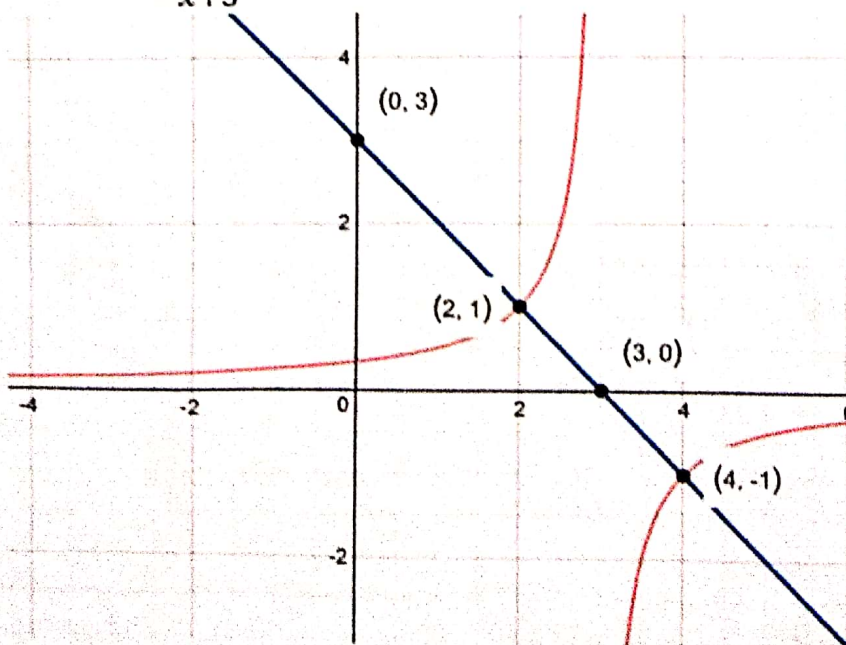
a) $y = \frac{1}{x-1}$



Domain: $x \neq 1, x \in R$

Range: $y \neq 0, y \in R$

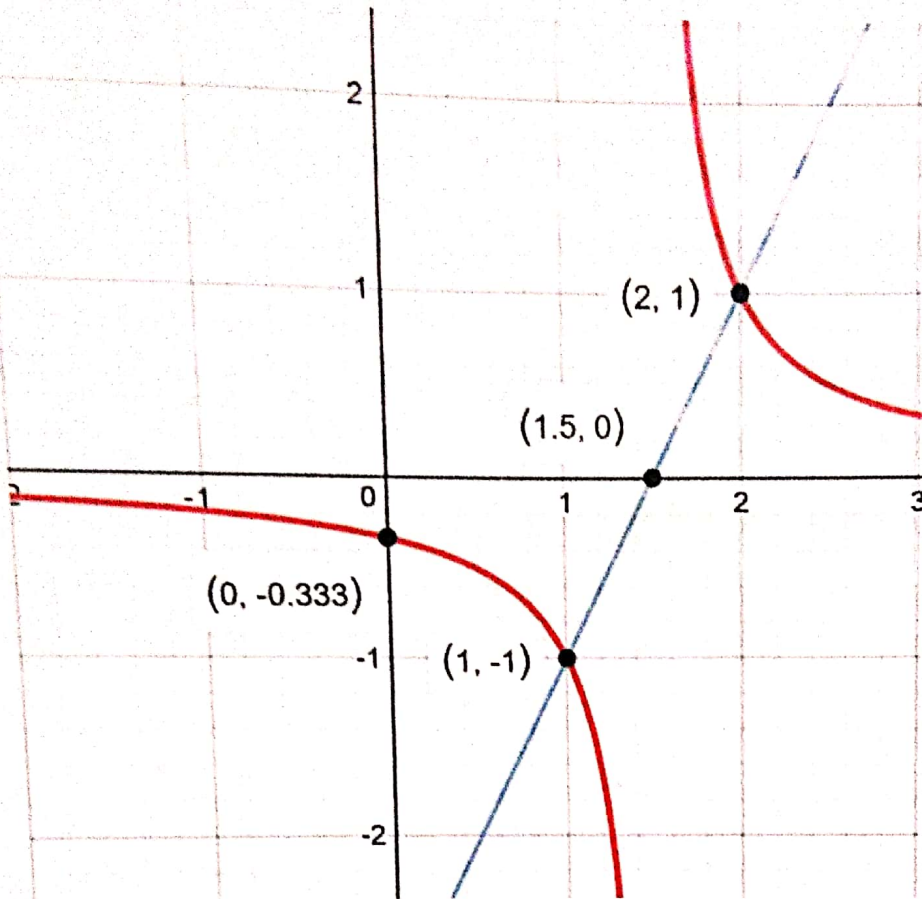
b) $y = \frac{1}{-x+3}$



Domain: $x \neq 3, x \in R$

Range: $y \neq 0, y \in R$

c) $y = \frac{1}{2x-3}$

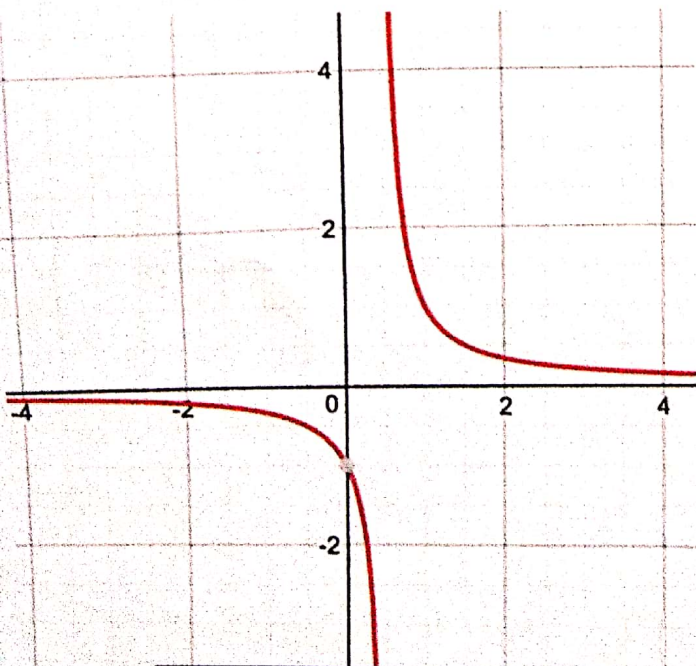


Domain: $x \neq \frac{3}{2}, x \in R$

Range: $y \neq 0, y \in R$

6. Write the equation of the reciprocal function.

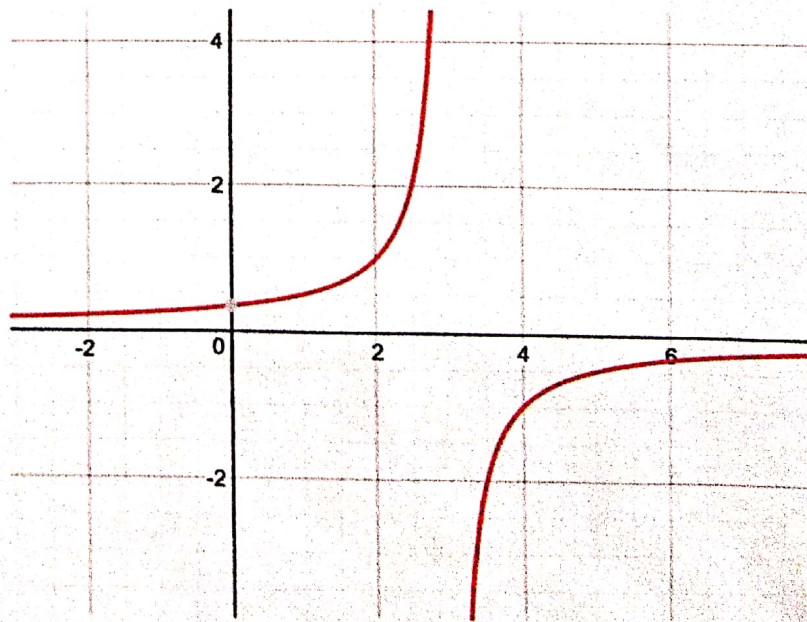
a.



Answer:

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

b.



Answer:

$$y = \frac{1}{-x + 3}$$