

7.4b Quadratic Reciprocal Functions

Warm-up:

Given $f(x) = 4x - 2$, graph $\frac{1}{f(x)}$

1) Graph $y = 4x - 2$

2) Asymptotes

$$\begin{aligned} 0 &= 4x - 2 \\ 2 &= 4x \\ \frac{1}{2} &= x \end{aligned} \quad \text{vert}$$

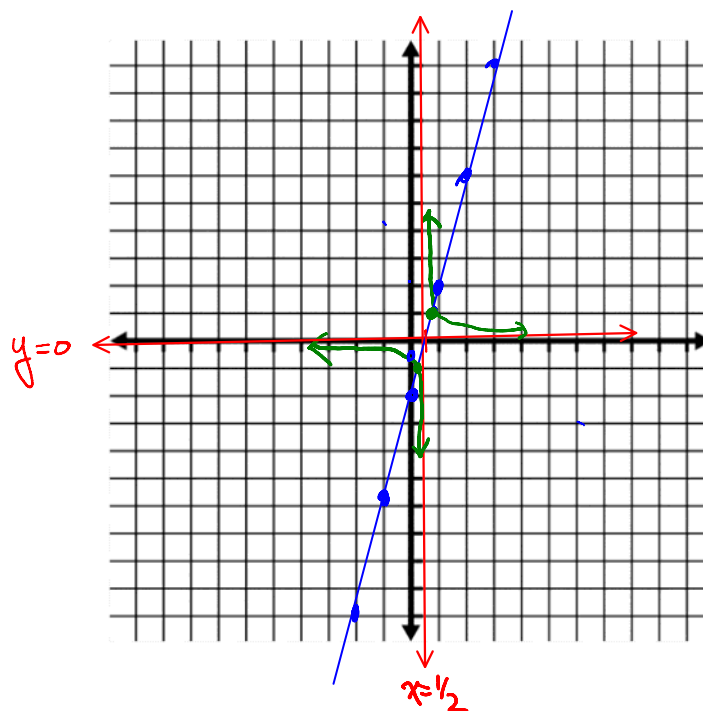
3) Invariant pts

x-int: none

y-int: $-\frac{1}{2}$

Range: $y \in \mathbb{R}, y \neq 0$

Domain: $x \in \mathbb{R}, x \neq \frac{1}{2}$



7.4b Quadratic Reciprocal Functions

Example 1:

Graph $y = \frac{1}{x^2 - 4}$ $\leftarrow x \neq \pm 2$

1) Graph $y = x^2 - 4$

2) Asymptotes
x-ints $x \neq \pm 2$

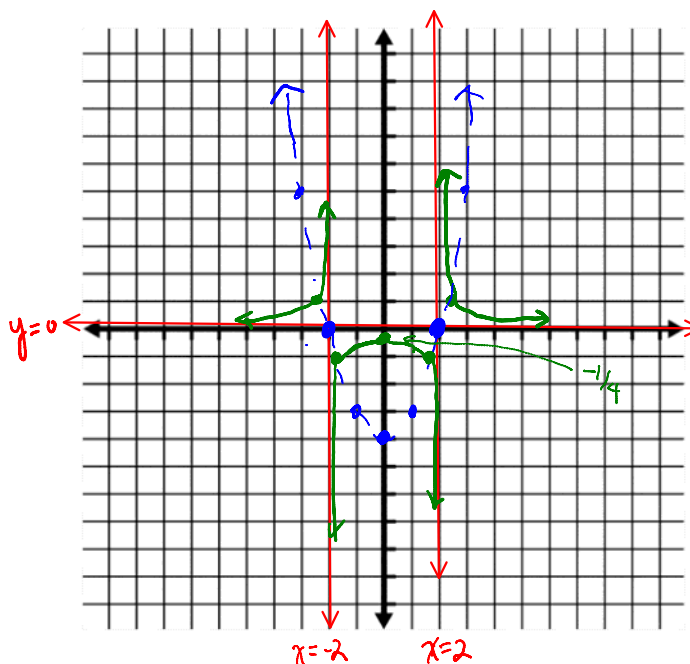
3) Invariant pts

x-int: none

y-int: $-\frac{1}{4}$

Range: $y \leq -\frac{1}{4}$ or $y > 0$

Domain: $x \in \mathbb{R}, x \neq \pm 2$

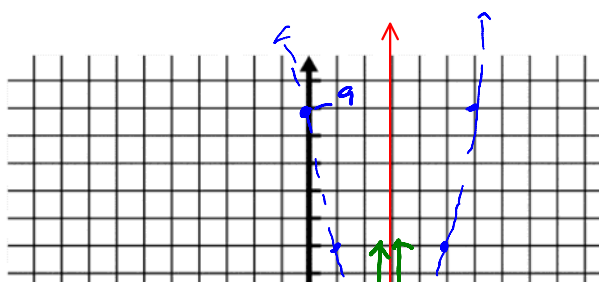


Example 2:

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

1) Graph $y = (x-3)^2$
v(3,0)

2) Asymptotes
 $y=0$



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

1) Graph $y = (x-3)^2$
 $v(3,0)$

2) Asymptotes
 $y=0$
 $x=3$

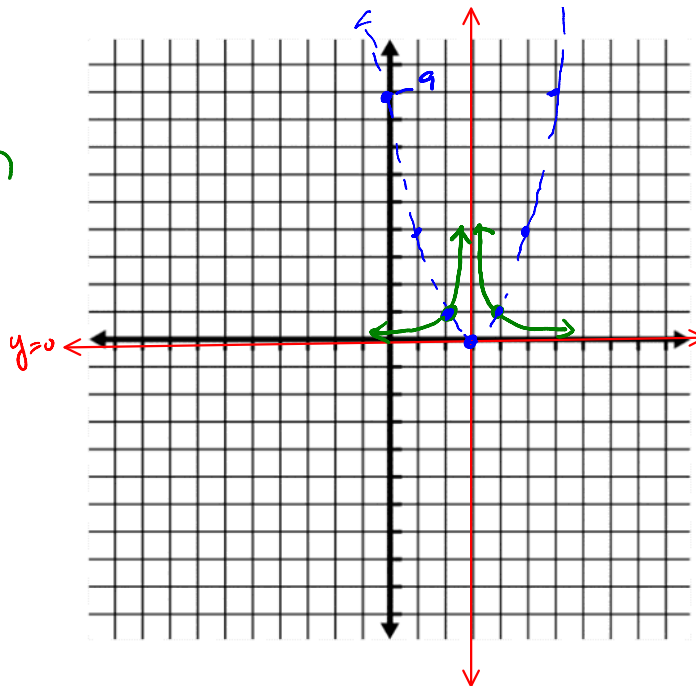
3) Inv. pts

x-int: none

y-int: $\frac{1}{9}$

Range: $y > 0$

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



Example 3:

Graph $y = \frac{1}{x^2 + 1}$

1) Graph $y = x^2 + 1$
 $v(0,1)$

2) Asym. $y=0$

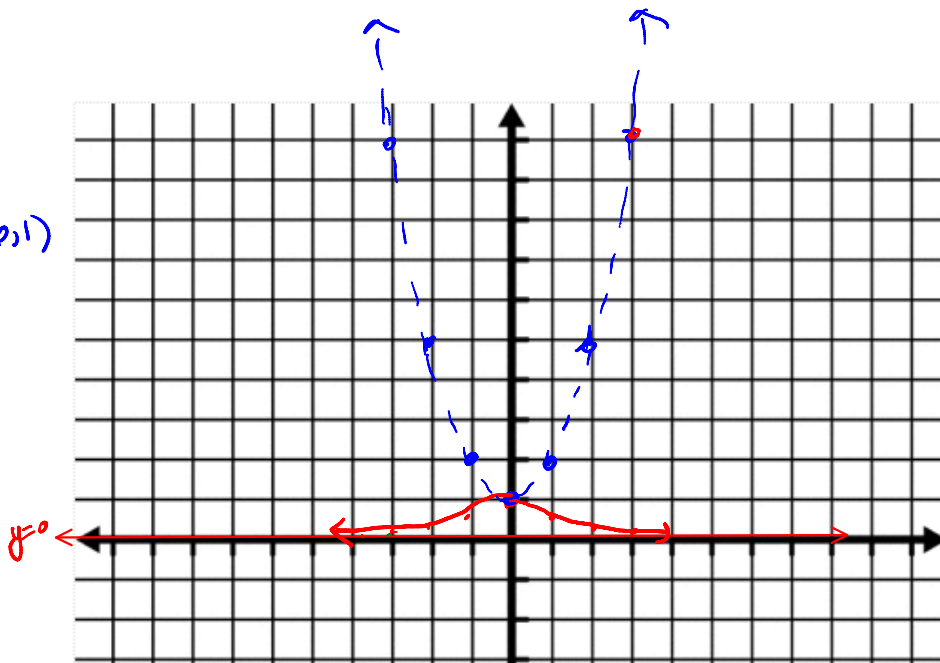
3) Inv. pts.

x-int: none

y-int: 1

Range: $0 < y \leq 1$

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



$y = x^2 + 2$

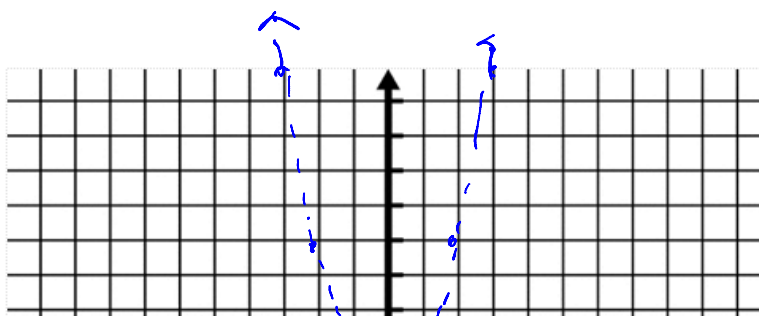
Example 4:

Graph $y = \frac{1}{x^2 + 2}$

1) Graph $y = x^2 + 2$

2) Asym. $y=0$

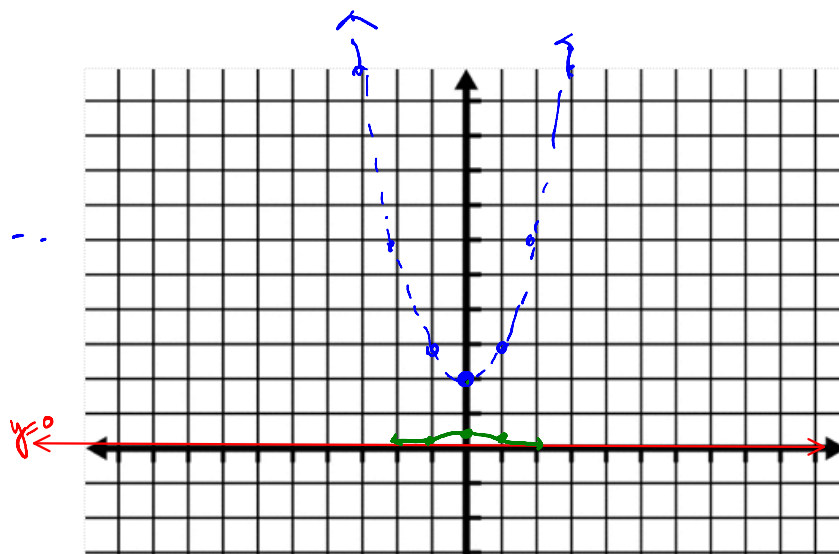
3) Inv. pts? None --



Graph $y = \frac{1}{x^2 + 2}$

- 1) Graph $y = x^2 + 2$
- 2) Asym. $y = 0$
- 3) Inv. pts? None -

x-int: none
 y-int: $\frac{1}{2}$
 Range: $0 < y \leq \frac{1}{2}$
 Domain: $x \in \mathbb{R}$

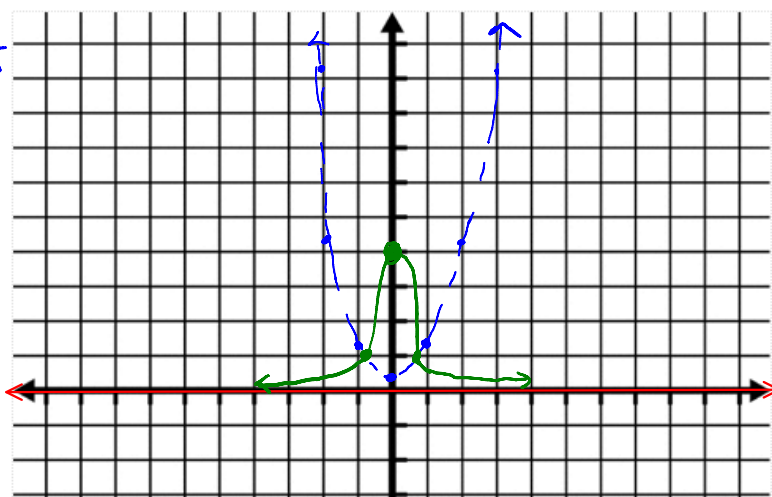


Example 5:

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

- 1) Graph $y = x^2 + 0.25$
- 2) Asym. $y = 0$
- 3) Inv.

x-int: none
 y-int: 4
 Range: $0 < y \leq 4$
 Domain: $x \in \mathbb{R}$



Assignment: p403 #1cd, 2cd, 3cd, 5cd, 6bc, 8, 9bc, 10*