5.6 - Inverse of a Function

Warmup - Find the inverse and the inverse's domain and range

1. $f(x) = \dfrac{2}{3+x}$ $\quad f^{-1}(x) = \dfrac{2-3x}{x};\ x \neq 0;\ y \neq -3$

2. $f(x) = \dfrac{3x}{x+2}$ $\quad f^{-1}(x) = \dfrac{-2x}{x-3};\ x \neq 3;\ y \neq -2$

3. $f(x) = \dfrac{2x}{3x-1}$ $\quad f^{-1}(x) = \dfrac{x}{3x-2};\ x \neq \dfrac{2}{3};\ y \neq \dfrac{1}{3}$

4. $f(x) = \dfrac{3x+4}{2x-3}$ $\quad f^{-1}(x) = \dfrac{3x+4}{2x-3};\ x \neq \dfrac{3}{2};\ y \neq \dfrac{3}{2}$

5. $f(x) = \dfrac{2x+3}{x+2}$ $\quad f^{-1}(x) = \dfrac{-2x+3}{x-2};\ x \neq 2;\ y \neq -2$

7.1 - Inverse Variation

Direct and Inverse Variation

$y = mx + b$

$y = 2x - 5$

$y = kx$

"y varies directly as x"

y = 12 when x = 15

$12 = k(15)$

$k = \frac{12}{15} = \frac{4}{5}$

Find x when y = 20

$20 = \frac{4}{5}x$

$\frac{5}{4} \cdot 20 = \frac{4}{5}x \cdot \frac{5}{4}$

$25 = x$

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$25 = x$

---

1) y varies directly as x
and y = 12 when x = 8
Find x, when y = 16

$k = \frac{3}{2}$ $x = \frac{32}{3}$

2) y varies directly as x
and y = 10 when x = 14
Find y, when x = 21

$k = \frac{5}{7}$ $y = 15$

7.1 - Inverse Variation

Direct and Inverse Variation

$$y = \frac{k}{x}$$

"y varies inversely as x"

y = 3 when x = 4

$$3 = \frac{k}{4}$$

$$k = 12$$

Find x when y = 36

$$36 = \frac{12}{x}$$

$$x = \frac{12}{36} = \frac{1}{3}$$

7.1 - Inverse Variation

Direct and Inverse Variation

$$y = \frac{k}{x}$$

"y varies inversely as x"

y = 3 when x = 4

$$3 = \frac{k}{4}$$

$$k = 12$$

Find x when y = 36

$$36 = \frac{12}{x}$$

$$x = \frac{12}{36} = \frac{1}{3}$$

---

1) y varies inversely as x and y = 2 when x = 8
Find x, when y = 8

$k = 16$ $x = 2$

2) y varies inversely as x and y = $\frac{2}{3}$ when x = 2
Find y, when x = 6

$k = \frac{4}{3}$ $y = \frac{2}{9}$

7.1 - Inverse Variation

Direct and Inverse Variation

$$y = \frac{k}{x}$$

"y varies inversely as x"

y = 3 when x = 4

$$3 = \frac{k}{4}$$

$$k = 12$$

Find x when y = 36

$$36 = \frac{12}{x}$$

$$x = \frac{12}{36} = \frac{1}{3}$$

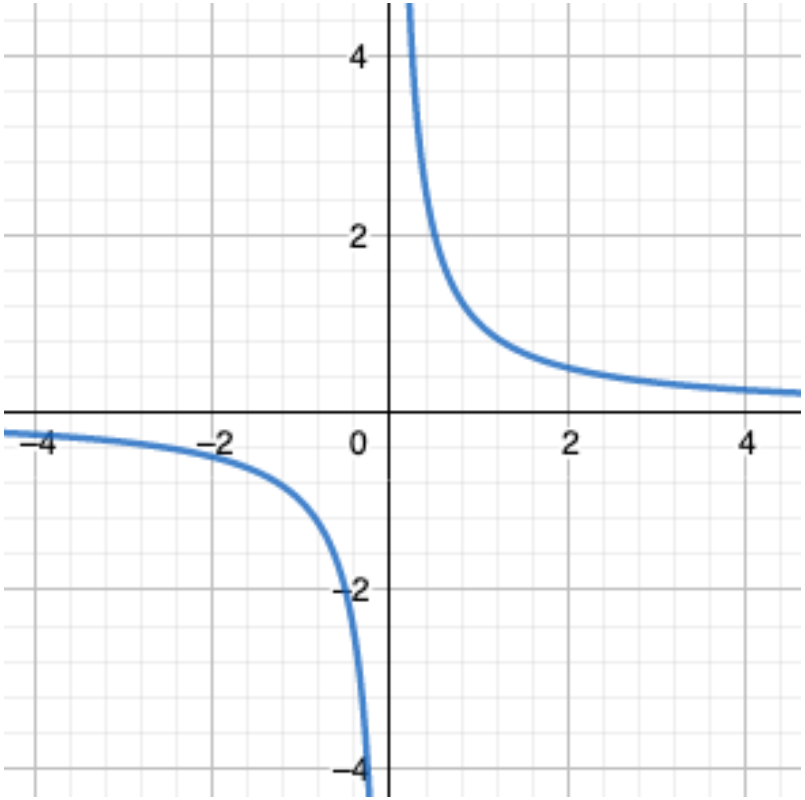
---

3) x varies jointly as a and b and inversely as c. x = 20 when a = 5, b = 2, and c = 3. Find a when x = 30, b = 4, c = 5.

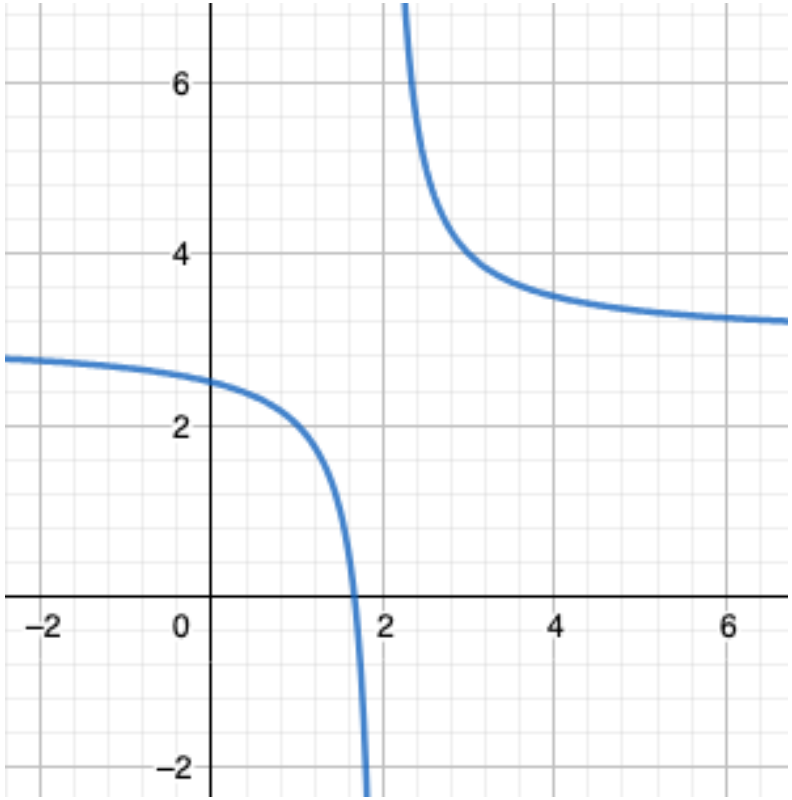
$$a = \frac{25}{4}$$

7.2 - Graphing Rational Functions

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



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



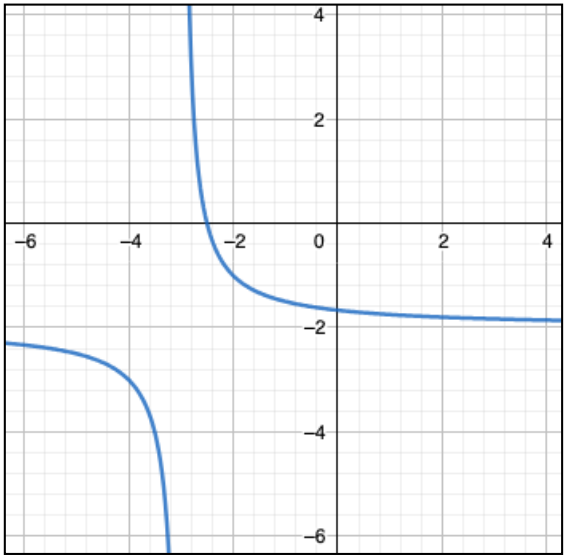
7.2 - Graphing Rational Functions

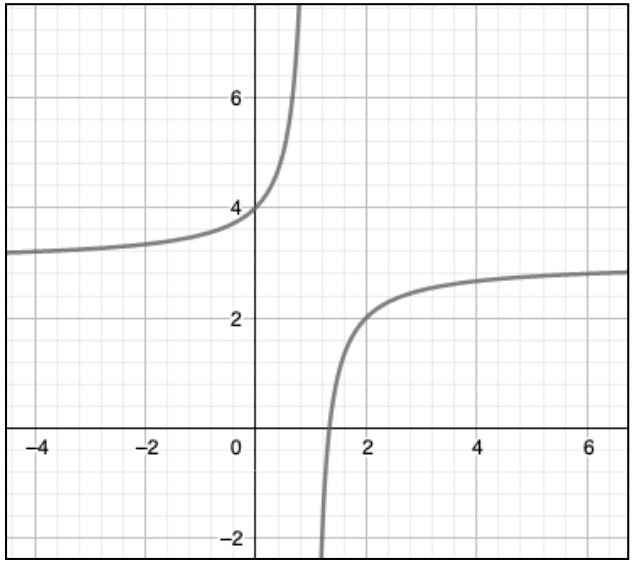
Graph the functions

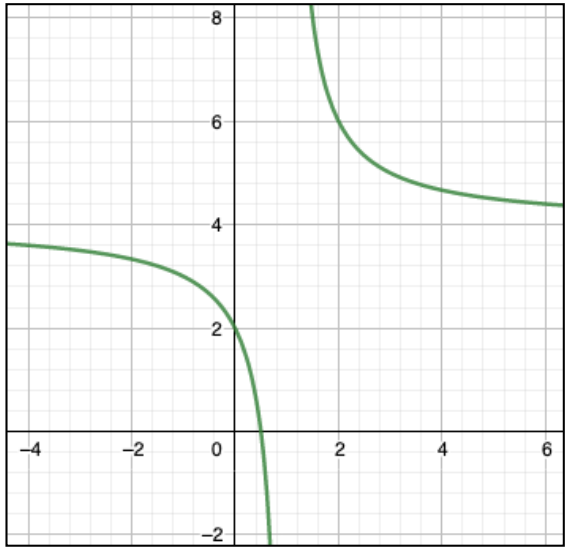
1. $f(x) = \dfrac{1}{x+3} - 2$

2. $f(x) = \dfrac{1}{-x+1} + 3$

3. $f(x) = \dfrac{x+1}{x-1} + 3$



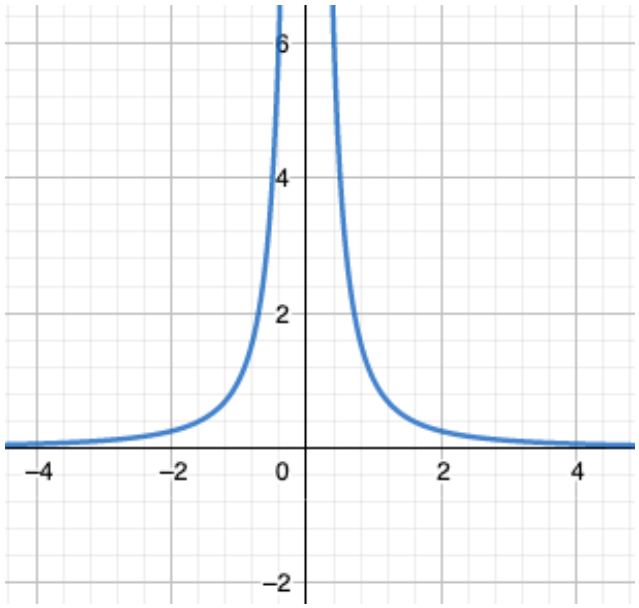




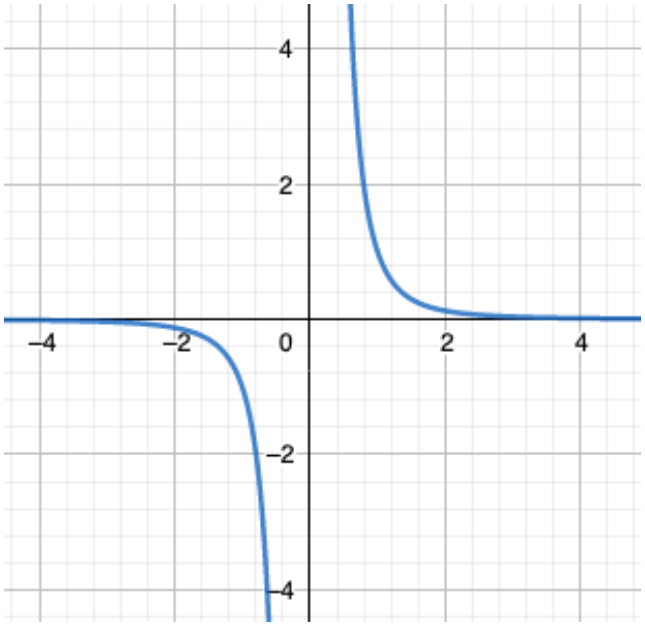
7.2 - Graphing Rational Functions

Graph the functions

$$f(x) = \frac{1}{x^2}$$



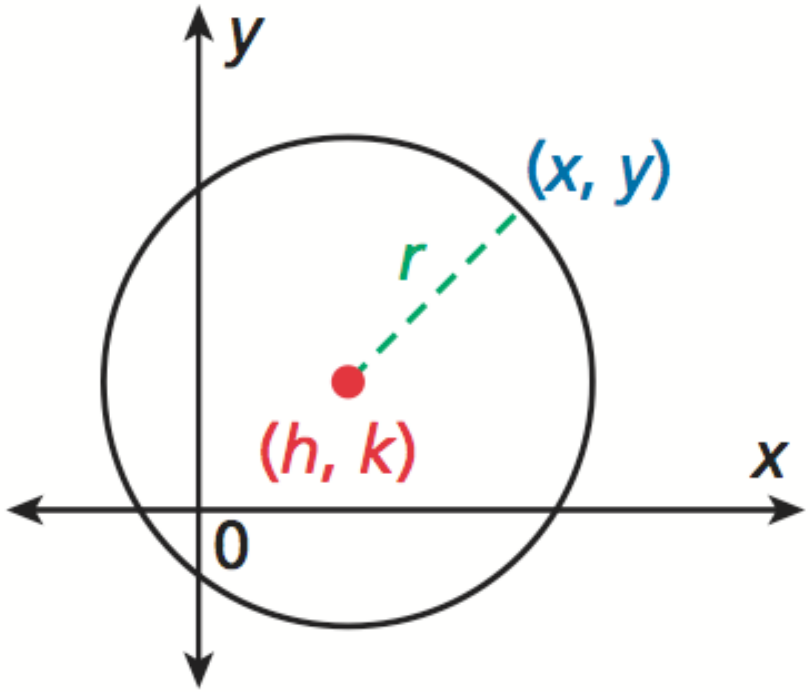
$$f(x) = \frac{1}{x^3}$$



Circles in the Coordinate Plane

Circles in the Coordinate Plane

Standard Equation for a Circle



Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

↓

Substitution from diagram

$$r = \sqrt{(x - h)^2 + (y - k)^2}$$

↓

Square each side

$$r^2 = (x - h)^2 + (y - k)^2$$

Standard Equation for a Circle

$$r^2 = (x - h)^2 + (y - k)^2$$

Circles in the Coordinate Plane

Find the equation of the circle

1. $r = 3,\ C(3, -4)$ $(x-3)^2 + (y+4)^2 = 9$

2. $r = 2\sqrt{3},\ C(-2, 3)$ $(x+2)^2 + (y-3)^2 = 12$

3. $r = 5\sqrt{2},\ C(0, -5)$ $x^2 + (y+5)^2 = 50$

Circles in the Coordinate Plane

Find the radius and center

$x^2 + y^2 - 12x - 16y + 84 = 0$

$x^2 - 12x + y^2 - 16y = -84$

$(x^2 - 12x + 36) + (y^2 - 16y + 64) = -84 + 100$

$(x - 6)^2 + (y - 8)^2 = 16$ $\quad r = 4,\ C(6,\ 8)$

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1. $x^2 + y^2 - 18x - 18y + 53 = 0$ $\quad r = \sqrt{109},\ C(9,\ 9)$

2. $x^2 + y^2 - 4x = 9$ $\quad r = \sqrt{13},\ C(2,\ 0)$

Circles in the Coordinate Plane

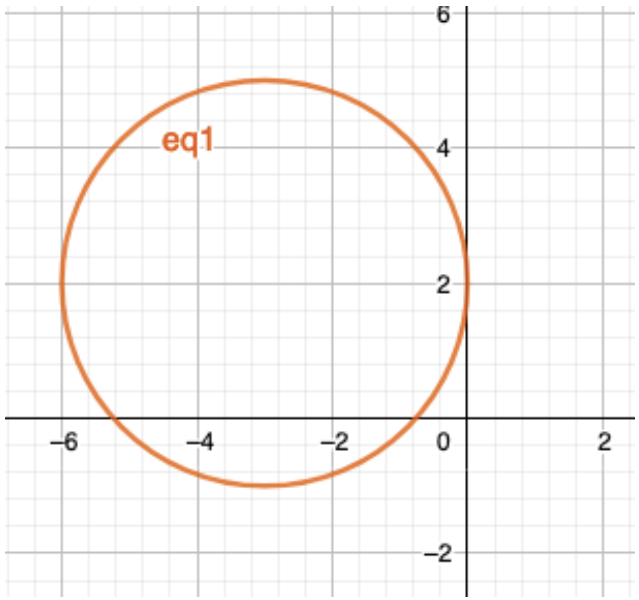
Find the equation of the circle with center C(2, 4) and the point (6, -3) on the circle.

$$(x-2)^2+(y-4)^2=65$$

Circles in the Coordinate Plane

Graph the circle.

$9 = (x + 3)^2 + (y - 2)^2$



1. $(x - 1)^2 + (y + 2)^2 = 49$

2. $25 = (x - 2)^2 + y^2$

3. $6 = (x + 1)^2 + (y - 1)^2 - 30$