

## Rational Functions and their Properties

**Identify the holes and vertical asymptotes of each.**

1)  $f(x) = \frac{x-2}{4x^3 - 20x^2 + 24x}$

2)  $f(x) = \frac{x^2 - 5x + 6}{2x^2 + 4x - 6}$

3)  $f(x) = \frac{x^3 + 3x^2 - 4x}{4x^2 - 36}$

4)  $f(x) = \frac{x^2 + 3x - 4}{-2x^2 + 2x + 12}$

**Identify the horizontal asymptote of each.**

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

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

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

8)  $f(x) = \frac{-2x+4}{x^2-4}$

**Identify the x-intercepts and the y-intercept of each.**

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

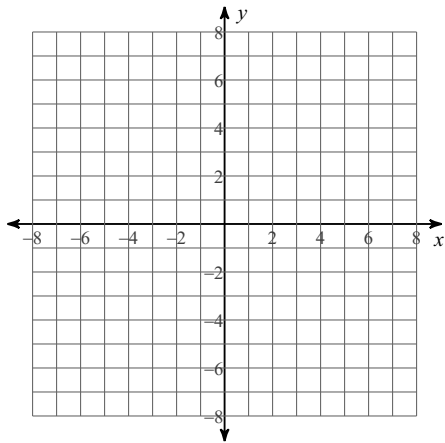
10)  $f(x) = \frac{x^3 + 2x^2 - 3x}{3x^2 - 3x - 6}$

11)  $f(x) = \frac{x^2 - 4x}{4x^2 + 8x - 12}$

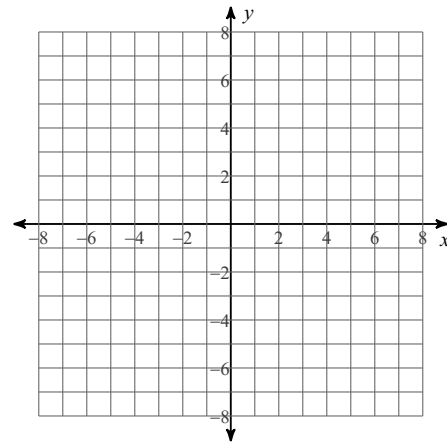
12)  $f(x) = \frac{x^2 + 2x - 8}{2x^2 - 12x + 16}$

Identify the vertical asymptotes and horizontal asymptote of each. Then sketch the graph.

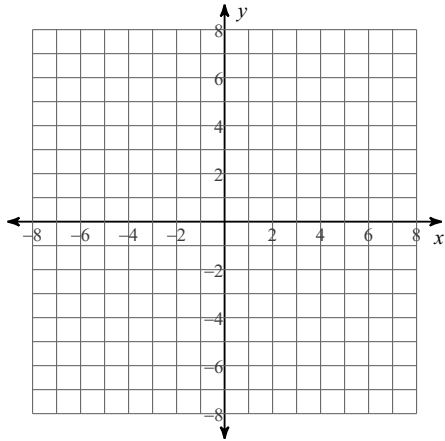
13)  $f(x) = \frac{1}{x-2} + 3$



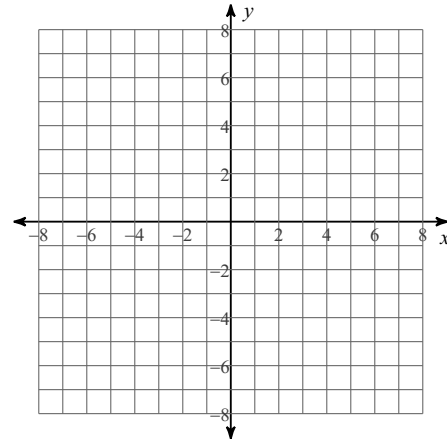
14)  $f(x) = -\frac{2}{x+2} + 2$



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



16)  $f(x) = -\frac{4}{x-2} - 1$



## Rational Functions and their Properties

Identify the holes and vertical asymptotes of each.

1)  $f(x) = \frac{x-2}{4x^3 - 20x^2 + 24x}$

Vertical Asym.:  $x = 0, x = 3$ Holes:  $x = 2$ 

2)  $f(x) = \frac{x^2 - 5x + 6}{2x^2 + 4x - 6}$

Vertical Asym.:  $x = 1, x = -3$ 

Holes: None

3)  $f(x) = \frac{x^3 + 3x^2 - 4x}{4x^2 - 36}$

Vertical Asym.:  $x = 3, x = -3$ 

Holes: None

4)  $f(x) = \frac{x^2 + 3x - 4}{-2x^2 + 2x + 12}$

Vertical Asym.:  $x = 3, x = -2$ 

Holes: None

Identify the horizontal asymptote of each.

5)  $f(x) = \frac{x-2}{4x+4}$  Horz. Asym.:  $y = \frac{1}{4}$

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

Horz. Asym.:  $y = 1$ 

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

Horz. Asym.:  $y = 0$ 

8)  $f(x) = \frac{-2x+4}{x^2-4}$

Horz. Asym.:  $y = 0$ 

Identify the x-intercepts and the y-intercept of each.

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

X-intercepts: 2

10)  $f(x) = \frac{x^3 + 2x^2 - 3x}{3x^2 - 3x - 6}$

X-intercepts: 0, 1, -3

11)  $f(x) = \frac{x^2 - 4x}{4x^2 + 8x - 12}$

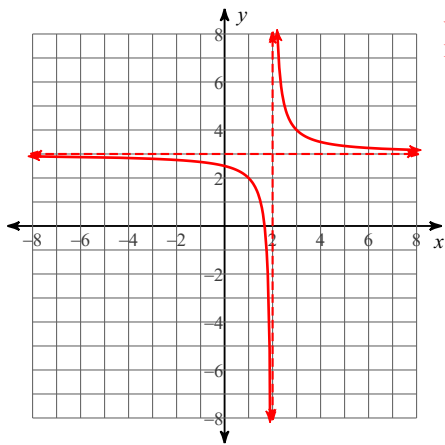
X-intercepts: 0, 4

12)  $f(x) = \frac{x^2 + 2x - 8}{2x^2 - 12x + 16}$

X-intercepts: -4

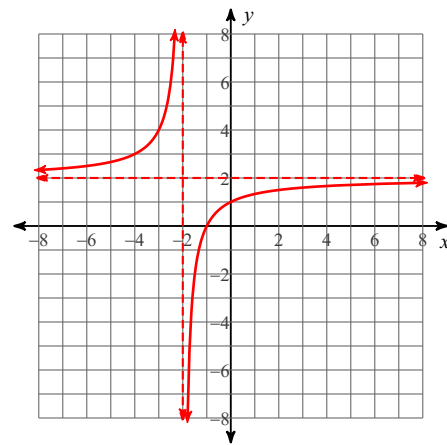
Identify the vertical asymptotes and horizontal asymptote of each. Then sketch the graph.

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



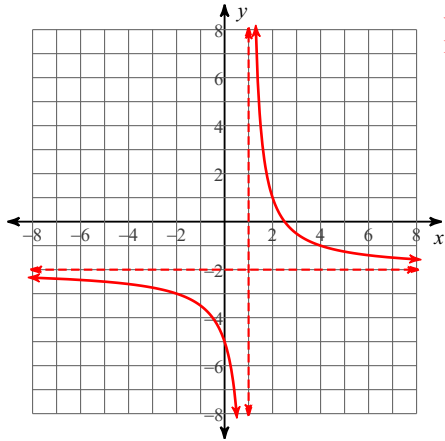
Vertical Asym.:  $x = 2$   
Horz. Asym.:  $y = 3$

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



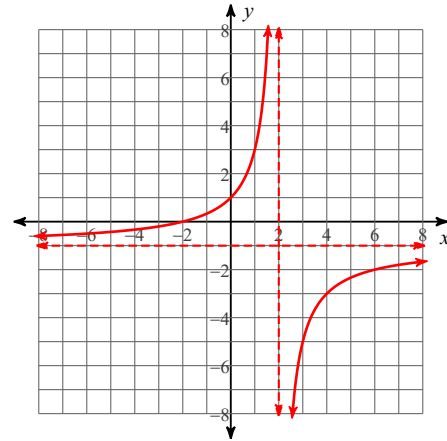
Vertical Asym.:  $x = -2$   
Horz. Asym.:  $y = 2$

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



Vertical Asym.:  $x = 1$   
Horz. Asym.:  $y = -2$

16)  $f(x) = -\frac{4}{x-2} - 1$



Vertical Asym.:  $x = 2$   
Horz. Asym.:  $y = -1$