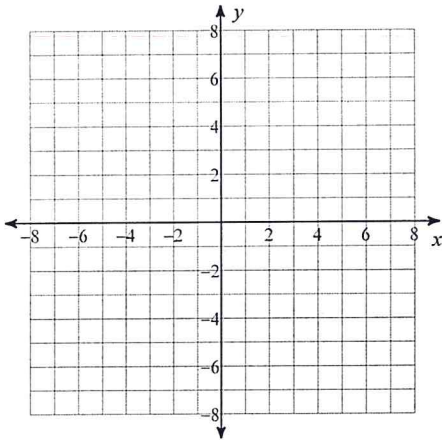


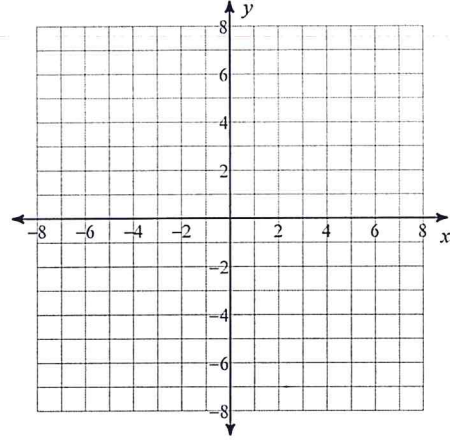
## Graphing Rational Functions

Identify the points of discontinuity, holes, vertical asymptotes, x-intercepts, and horizontal asymptote of each. Then sketch the graph.

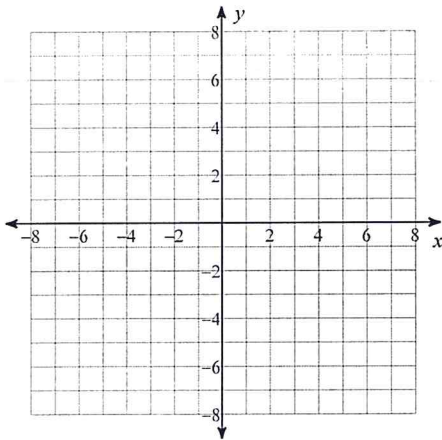
$$1) f(x) = \frac{x^2 - x - 12}{-4x + 12}$$



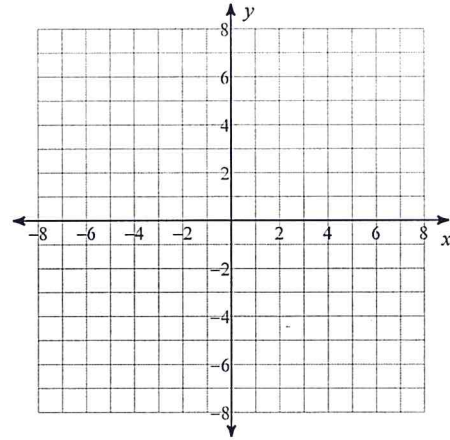
$$2) f(x) = \frac{x^3 - 16x}{-2x^2 - 4x}$$



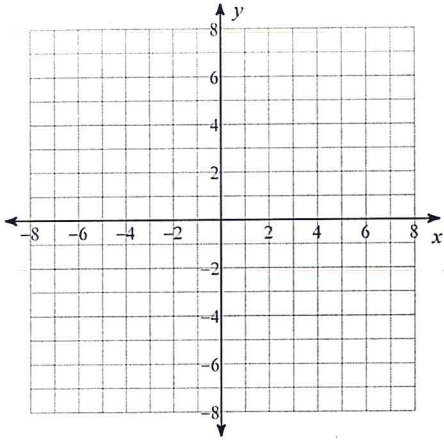
$$3) f(x) = \frac{x^3 + 5x^2 + 4x}{4x^2 - 36}$$



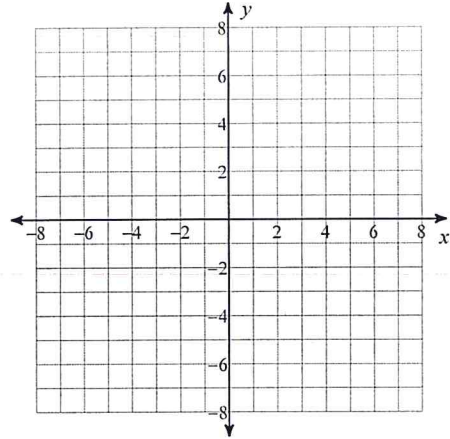
$$4) f(x) = \frac{3x^2 - 21x + 36}{x^2 - 4x + 3}$$



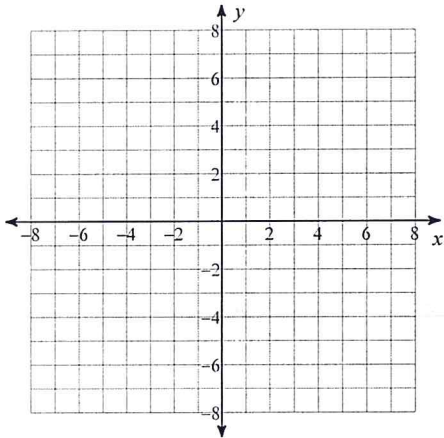
$$5) f(x) = \frac{x^3 - 16x}{-2x^2 + 2x + 12}$$



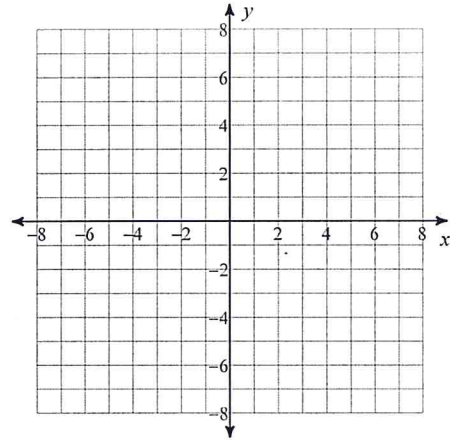
$$6) f(x) = \frac{3}{x^2 - 3x}$$



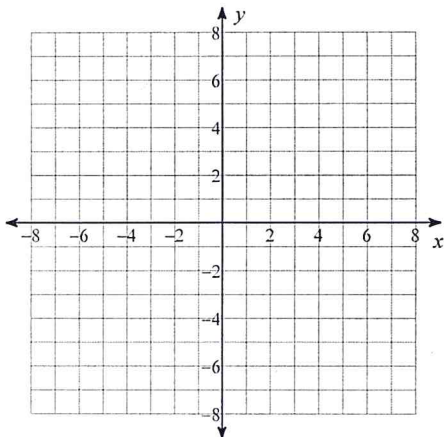
$$7) f(x) = \frac{x^2 - x - 6}{4x - 4}$$



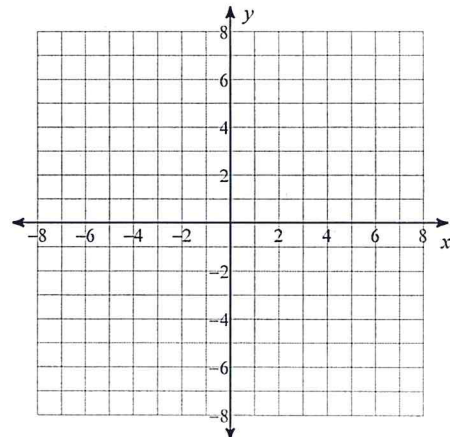
$$8) f(x) = \frac{-x - 2}{x^2 + x - 6}$$



$$9) f(x) = \frac{x^3 - 2x^2 - 3x}{4x^2 + 8x - 12}$$



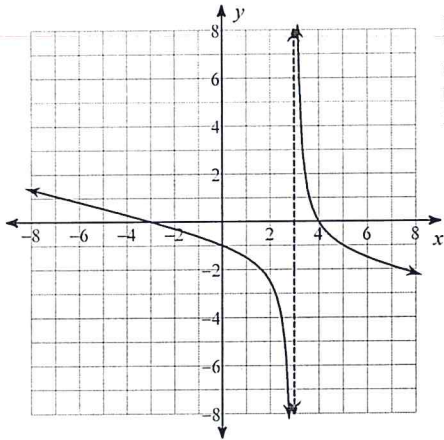
$$10) f(x) = \frac{x^2 + 3x}{4x + 4}$$



# Graphing Rational Functions

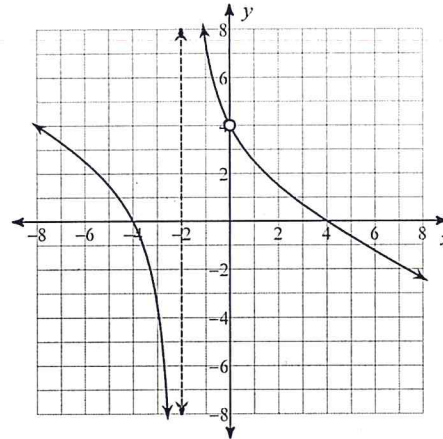
Identify the points of discontinuity, holes, vertical asymptotes, x-intercepts, and horizontal asymptote of each. Then sketch the graph.

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



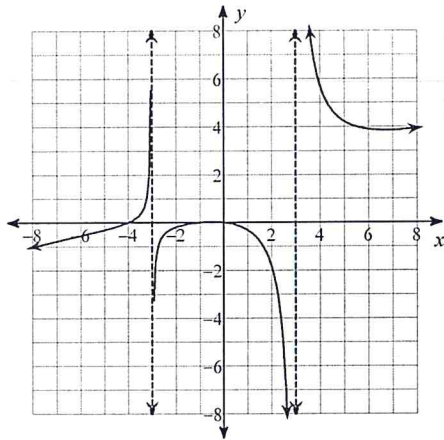
Discontinuities: 3  
 Vertical Asym.:  $x = 3$   
 Holes: None  
 Horz. Asym.: None  
 X-intercepts: 4, -3

2)  $f(x) = \frac{x^3 - 16x}{-2x^2 - 4x}$



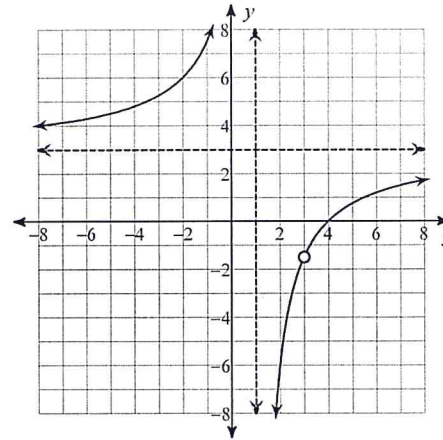
Discontinuities: -2, 0  
 Vertical Asym.:  $x = -2$   
 Holes:  $x = 0$   
 Horz. Asym.: None  
 X-intercepts: 4, -4

3)  $f(x) = \frac{x^3 + 5x^2 + 4x}{4x^2 - 36}$



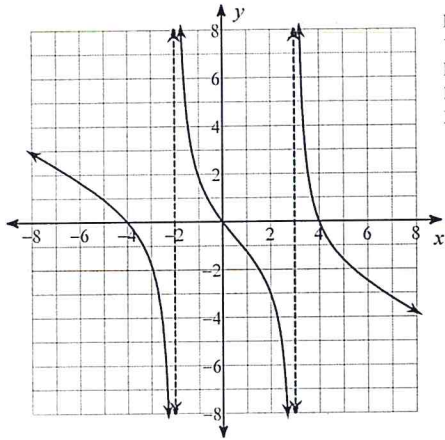
Discontinuities: 3, -3  
 Vertical Asym.:  $x = 3, x = -3$   
 Holes: None  
 Horz. Asym.: None  
 X-intercepts: 0, -4, -1

4)  $f(x) = \frac{3x^2 - 21x + 36}{x^2 - 4x + 3}$



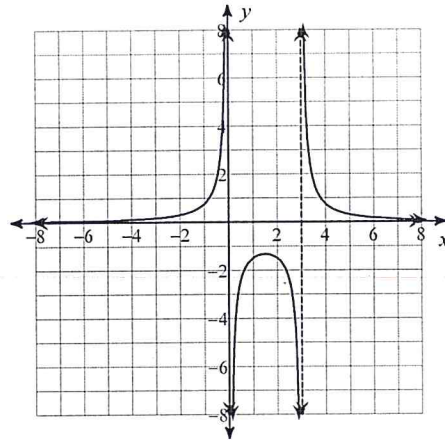
Discontinuities: 1, 3  
 Vertical Asym.:  $x = 1$   
 Holes:  $x = 3$   
 Horz. Asym.:  $y = 3$   
 X-intercepts: 4

$$5) f(x) = \frac{x^3 - 16x}{-2x^2 + 2x + 12}$$



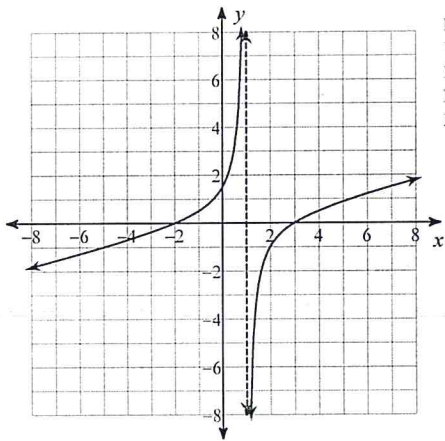
Discontinuities: 3, -2  
 Vertical Asym.:  $x = 3, x = -2$   
 Holes: None  
 Horz. Asym.: None  
 X-intercepts: 0, 4, -4

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



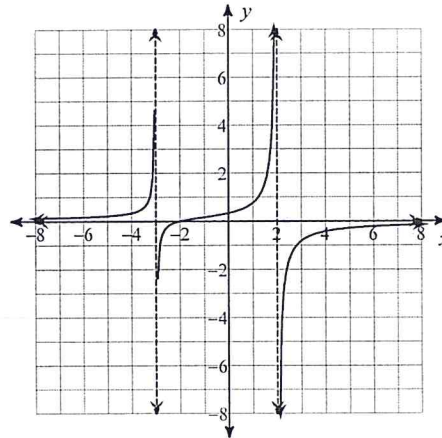
Discontinuities: 0, 3  
 Vertical Asym.:  $x = 0, x = 3$   
 Holes: None  
 Horz. Asym.:  $y = 0$   
 X-intercepts: None

$$7) f(x) = \frac{x^2 - x - 6}{4x - 4}$$



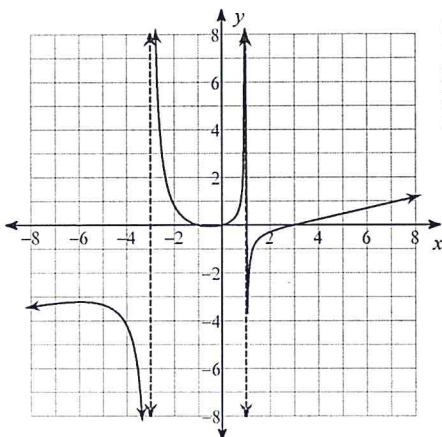
Discontinuities: 1  
 Vertical Asym.:  $x = 1$   
 Holes: None  
 Horz. Asym.: None  
 X-intercepts: 3, -2

$$8) f(x) = \frac{-x - 2}{x^2 + x - 6}$$



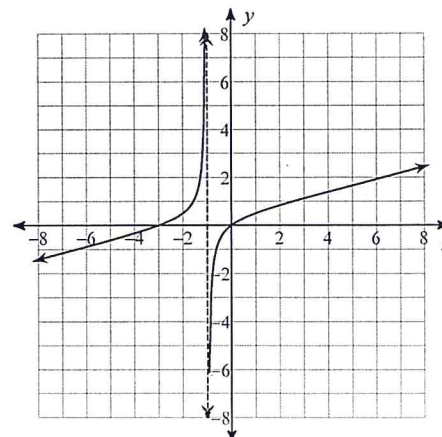
Discontinuities: 2, -3  
 Vertical Asym.:  $x = 2, x = -3$   
 Holes: None  
 Horz. Asym.:  $y = 0$   
 X-intercepts: -2

$$9) f(x) = \frac{x^3 - 2x^2 - 3x}{4x^2 + 8x - 12}$$



Discontinuities: 1, -3  
 Vertical Asym.:  $x = 1, x = -3$   
 Holes: None  
 Horz. Asym.: None  
 X-intercepts: 0, 3, -1

$$10) f(x) = \frac{x^2 + 3x}{4x + 4}$$



Discontinuities: -1  
 Vertical Asym.:  $x = -1$   
 Holes: None  
 Horz. Asym.: None  
 X-intercepts: 0, -3