

## Rational function discontinuities practice (A2 5.2, 5.3)

Identify the holes, vertical asymptotes, horizontal asymptote, and domain of each.

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

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

3)  $f(x) = \frac{x^3 + 4x^2 + 3x}{-3x^2 - 6x}$

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

5)  $f(x) = \frac{x^2 - 4}{3x^2 - 27}$

6)  $f(x) = \frac{1}{-x + 4}$

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

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

9)  $f(x) = \frac{1}{2x^2 + 4x - 6}$

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

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

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

## Answers to Rational function discontinuities practice (A2 5.2, 5.3)

- 1) Vertical Asym.:  $x = 0, x = 3$   
Holes: None  
Horz. Asym.:  $y = -1$   
Domain: All reals except 0, 3
- 2) Vertical Asym.:  $x = -1$   
Holes: None  
Horz. Asym.: None  
Domain: All reals except  $-1$
- 3) Vertical Asym.:  $x = -2$   
Holes:  $x = 0$   
Horz. Asym.: None  
Domain: All reals except  $-2, 0$
- 4) Vertical Asym.:  $x = 1, x = -3$   
Holes: None  
Horz. Asym.:  $y = 0$   
Domain: All reals except  $-3, 1$
- 5) Vertical Asym.:  $x = 3, x = -3$   
Holes: None  
Horz. Asym.:  $y = \frac{1}{3}$   
Domain: All reals except  $-3, 3$
- 6) Vertical Asym.:  $x = 4$   
Holes: None  
Horz. Asym.:  $y = 0$   
Domain: All reals except 4
- 7) Vertical Asym.:  $x = 2$   
Holes: None  
Horz. Asym.:  $y = 0$   
Domain: All reals except 2
- 8) Vertical Asym.:  $x = -3$   
Holes:  $x = 2$   
Horz. Asym.:  $y = 2$   
Domain: All reals except  $-3, 2$
- 9) Vertical Asym.:  $x = 1, x = -3$   
Holes: None  
Horz. Asym.:  $y = 0$   
Domain: All reals except  $-3, 1$
- 10) Vertical Asym.:  $x = -3$   
Holes: None  
Horz. Asym.:  $y = -2$   
Domain: All reals except  $-3$
- 11) Vertical Asym.:  $x = -4$   
Holes: None  
Horz. Asym.:  $y = -2$   
Domain: All reals except  $-4$
- 12) Vertical Asym.:  $x = 1$   
Holes:  $x = 0$   
Horz. Asym.: None  
Domain: All reals except 0, 1