Rational Functions

Name_____

Date_____

Identify the points of discontinuity, holes, vertical asymptotes, x-intercepts, and domain of each.

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

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

3) $f(x) = \dfrac{x^3 + 5x^2 + 4x}{-4x^3 - 24x^2 - 32x}$

4) $f(x) = \dfrac{-x^2 - 5x - 4}{x^2 - 9}$

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

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

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

8) $f(x) = \dfrac{x^3 - 2x^2 - 8x}{2x^2 - 2x}$

9) $f(x) = \dfrac{x + 2}{x^3 - x^2 - 6x}$

10) $f(x) = \dfrac{x^2 - 5x + 4}{3x - 6}$

11) $f(x) = \dfrac{x^3 - x^2 - 2x}{-x^3 + 9x}$

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

Answers to Rational Functions

1) Discontinuities: -2, 2
Vertical Asym.: $x = -2$
Holes: $x = 2$
X-intercepts: None
Domain: All reals except -2, 2

2) Discontinuities: -3
Vertical Asym.: $x = -3$
Holes: None
X-intercepts: 1, -1
Domain: All reals except -3

3) Discontinuities: -2, 0, -4
Vertical Asym.: $x = -2$
Holes: $x = 0$, $x = -4$
X-intercepts: -1
Domain: All reals except -2, 0, -4

4) Discontinuities: 3, -3
Vertical Asym.: $x = 3$, $x = -3$
Holes: None
X-intercepts: -4, -1
Domain: All reals except 3, -3

5) Discontinuities: 4, 1
Vertical Asym.: $x = 4$
Holes: $x = 1$
X-intercepts: -4
Domain: All reals except 4, 1

6) Discontinuities: 2, -2
Vertical Asym.: $x = 2$, $x = -2$
Holes: None
X-intercepts: None
Domain: All reals except 2, -2

7) Discontinuities: 3, 0
Vertical Asym.: $x = 3$
Holes: $x = 0$
X-intercepts: 1, -2
Domain: All reals except 3, 0

8) Discontinuities: 1, 0
Vertical Asym.: $x = 1$
Holes: $x = 0$
X-intercepts: 4, -2
Domain: All reals except 1, 0

9) Discontinuities: 0, 3, -2
Vertical Asym.: $x = 0$, $x = 3$
Holes: $x = -2$
X-intercepts: None
Domain: All reals except 0, 3, -2

10) Discontinuities: 2
Vertical Asym.: $x = 2$
Holes: None
X-intercepts: 4, 1
Domain: All reals except 2

11) Discontinuities: 3, -3, 0
Vertical Asym.: $x = 3$, $x = -3$
Holes: $x = 0$
X-intercepts: 2, -1
Domain: All reals except 3, -3, 0

12) Discontinuities: 0, -3
Vertical Asym.: $x = 0$, $x = -3$
Holes: None
X-intercepts: None
Domain: All reals except 0, -3