

Rational Functions

Name _____

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Date _____

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

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

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

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

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

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

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

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

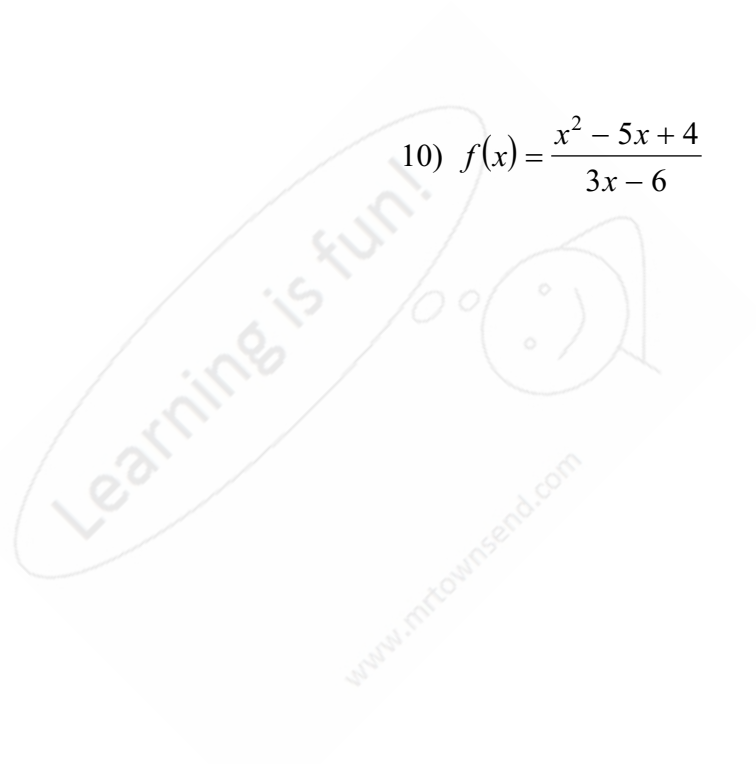
$$8) f(x) = \frac{x^3 - 2x^2 - 8x}{2x^2 - 2x}$$

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

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

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

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



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 $0, -3$