Pre-Calculus

Name_____

Graphing Rational Functions

Date_____ Period____

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

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

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

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

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

Identify the holes, roots, vertical asymptotes, horizontal asymptote, and domain of each. Then sketch the graph.

5) $f(x) = \dfrac{x^2 + 5x + 6}{2x^2 + 2x - 12}$

6) $f(x) = \dfrac{x^2 - x - 12}{-2x^2 + 8}$

7) $f(x) = \dfrac{x^3 - 2x^2 - 8x}{3x^3 - 15x^2 + 12x}$

8) $f(x) = \dfrac{x^2 - x - 6}{3x^2 + 3x - 18}$

9) $f(x) = \dfrac{4}{x+3}$

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

Identify the holes, vertical asymptotes, x-intercepts, slant asymptote, and domain of each. Then sketch the graph.
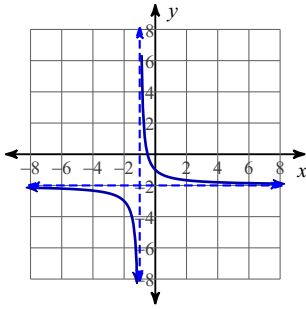
11) $f(x) = \dfrac{x^2 + x}{4x + 12}$

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

13) $f(x) = \dfrac{x^3 + x^2 - 2x}{3x^2 - 27}$

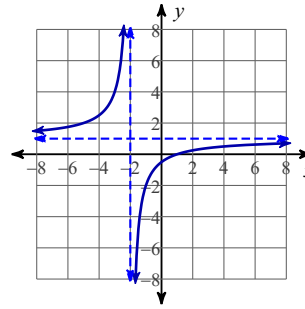14) $f(x) = \dfrac{x^3 + x^2 - 2x}{-4x^2 + 4x + 8}$
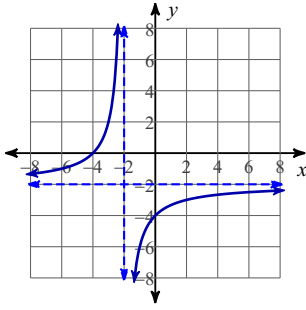
Answers to Graphing Rational Functions

1)

Vertical Asym.: $x = -1$
Holes: None
Horz. Asym.: $y = -2$
X-intercepts: $-\frac{1}{2}$

Domain:
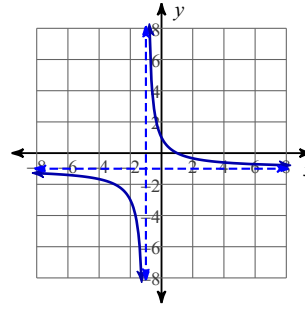 All reals except -1
Range:
  All reals except -2

2)

Vertical Asym.: $x = -2$
Holes: None
Horz. Asym.: $y = 1$
X-intercepts: 1
Domain:
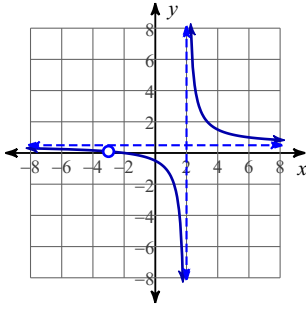 All reals except -2
Range:
  All reals except 1

3)

Vertical Asym.: $x = -2$
Holes: None
Horz. Asym.: $y = -2$
X-intercepts: -4
Domain:
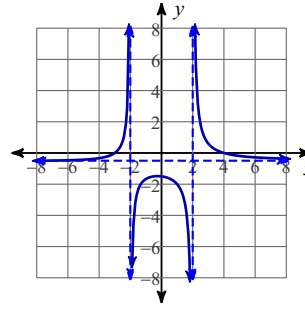 All reals except -2
Range:
  All reals except -2

4)

Vertical Asym.: $x = -1$
Holes: None
Horz. Asym.: $y = -1$
X-intercepts: 1
Domain:
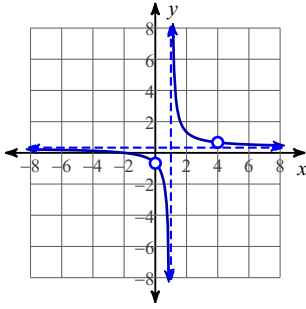 All reals except -1
Range:
  All reals except -1

5)

Vertical Asym.: $x = 2$
Holes: $x = -3$
Horz. Asym.: $y = \frac{1}{2}$
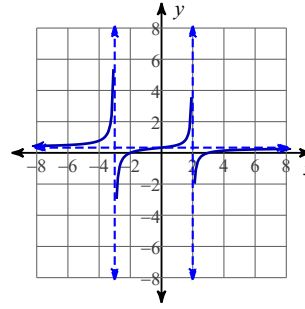X-intercepts: -2
Domain:
  All reals except $2, -3$

6)

Vertical Asym.: $x = 2, x = -2$
Holes: None
Horz. Asym.: $y = -\frac{1}{2}$
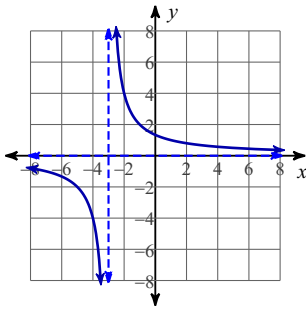X-intercepts: $4, -3$
Domain:
  All reals except $2, -2$

7)

Vertical Asym.: $x = 1$
Holes: $x = 0, x = 4$
Horz. Asym.: $y = \frac{1}{3}$
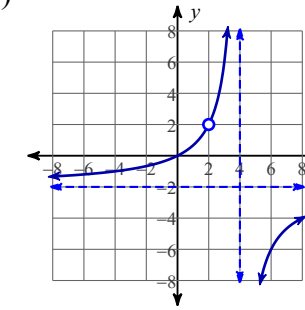X-intercepts: -2
Domain:
  All reals except $1, 0, 4$

8)

Vertical Asym.: $x = 2, x = -3$
Holes: None
Horz. Asym.: $y = \frac{1}{3}$
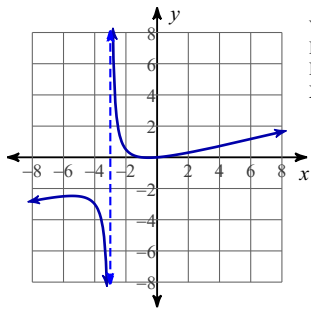X-intercepts: $3, -2$
Domain:
  All reals except $2, -3$

9)

Vertical Asym.: $x = -3$
Holes: None
Horz. Asym.: $y = 0$
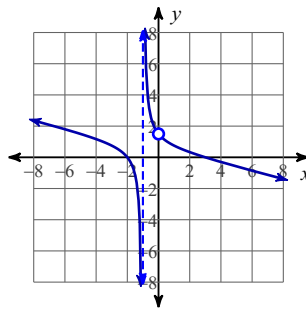X-intercepts: None
Domain:
  All reals except -3

10)

Vertical Asym.: $x = 4$
Holes: $x = 2$
Horz. Asym.: $y = -2$
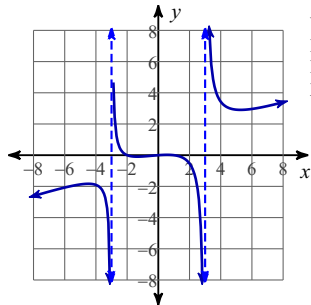X-intercepts: 0
Domain:
  All reals except $4, 2$

11)

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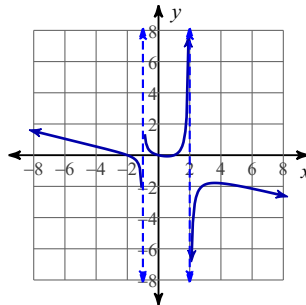Horz. Asym.: None
X-intercepts: 0, −1

12)

Vertical Asym.: $x = -1$
Holes: $x = 0$
Horz. Asym.: None
X-intercepts: 3, −2

13)

Vertical Asym.: $x = 3$, $x = -3$
Holes: None
Horz. Asym.: None
X-intercepts: 0, 1, −2

14)

Vertical Asym.: $x = 2$, $x = -1$
Holes: None
Horz. Asym.: None
X-intercepts: 0, 1, −2