E - Identifying Key Features of Graphs of Rational Functions WS#1

Identify the vertical asymptote(s), x-intercept(s), and horizontal asymptote(s) of each rational function.

1) $f(x) = \dfrac{x^3 + 7x^2 + 12x}{4x^2 + 4x - 8}$

$\times (x+3)(x+4)$

$4(x+1)(x-2)$

VA: $x = -1, x = 2$

HA: none

BOTN

x-ints: $0, -3, -4$

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

$(x+1)(x-3)$

VA: $x = -1, x = 3$

HA: $y = 0$

BOBO

x-ints: none

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

$x(x-1)(x-3)$

$-3(x+1)(x-2)$

VA: $x = -1, x = 2$

HA: $y = 0$

BOBO

x-ints: $0, 1, 3$

4) $f(x) = -\dfrac{1}{x^2 - 9}$

$(x-3)(x+3)$

VA: $x = 3, x = -3$

HA: $y = 0$

BOBO

x-ints: none

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

$x(x-2)$

$4(x+1)(x-2)$

VA: $x = -1, x = 2$

HA: $y = \frac{1}{4}$

EATS DC

x-ints: $0, 2$

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

$x(x-3)(x+4)$

$-2(x-1)(x+2)$

VA: $x = 1, x = -2$

HA: none

BOTN

x-ints: $0, 3, -4$

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

VA: $x = 3$

HA: $y = 1$

EATS DC

x-ints: -4

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

$x(x+1)(x+2)$

$-4(x+1)(x-2)$

VA: $x = 2$

HA: none

BOTN

x-ints: $0, -2$

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

$(x-2)(x-3)$

$-4(x+1)$

VA: $x = -1$

HA: none

BOTN

x-ints: $2, 3$

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

$(x+2)(x+4)$

$3(x+1)(x-2)$

VA: $x = -1, x = 2$

HA: $y = \frac{1}{3}$

EATS DC

x-ints: $-2, -4$

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

$(x-2)(x+2)$

$-4(x+3)$

VA: $x = -3$

HA: none

BOTN

x-ints: $2, -2$

12) $f(x) = \dfrac{x^3 - 16x}{-3x^2 + 9x}$

$x(x-4)(x+4)$

$-3x(x-3)$

VA: $x = 3$

HA: none

BOTN

x-ints: $4, -4$

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

$-1(x-2)(x+2)$

$(x+2)(x+4)$

VA: $x = -4$

HA: $y = -1$

EATS DC

x-ints: 2

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

$(x-1)(x-2)$

$-4x(x-3)$

VA: $x = 0, x = 3$

HA: $y = -\frac{1}{4}$

EATS DC

x-ints: $1, 2$

15) $f(x) = \dfrac{1}{x^2 - x - 6}$

$(x+2)(x-3)$

VA: $x = -2, x = 3$

HA: $y = 0$

BOBO

x-ints: none

16) $f(x) = \dfrac{x^2 + 5x + 4}{2x^2 - 2x - 12}$

$(x+1)(x+4)$

$2(x+2)(x-3)$

VA: $x = -2, x = 3$

HA: $y = \frac{1}{2}$

EATS DC

x-ints: $-1, -4$