

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Find the vertical & horizontal asymptotes, x & y ints, holes, and domain & range. Graph when appropriate:

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

Vert:  $x=2$  Hor:  $y=0$

x-Int.: none y-int.:  $(0, -1/2)$

hole: none

D:  $(-\infty, 2)(2, \infty)$  R:  $(-\infty, 0)(0, \infty)$

stop @ VA + x-hole | stop @ HA + y-hole

2.  $f(x) = \frac{x^2 - 5x + 6}{x^2 - 4x + 3} = \frac{(x-3)(x-2)}{(x-3)(x-1)} = \frac{x-2}{x-1}$

Vert:  $x=1$  Hor:  $y=1$

x-Int.:  $(2, 0)$  y-int.:  $(0, 2)$

hole:  $(3, 1/2)$

D:  $(-\infty, 1)(1, 3)(3, \infty)$  R:  $(-\infty, 1/2)(1/2, 1)(1, \infty)$

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

Vert: none Hor: none

x-Int.:  $(0, 0)$  y-int.:  $(0, 0)$

hole:  $(-1, -1)$

D:  $(-\infty, -1)(-1, \infty)$  R:  $(-\infty, -1)(-1, \infty)$

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

Vert:  $x=0$  Hor: none

x-Int.:  $(4, 0)(-3, 0)$  y-int.: none

hole: none

D:  $(-\infty, 0)(0, \infty)$  R:  $(-\infty, \infty)$

5.  $f(x) = \frac{5}{x+3}$

Vert:  $x=-3$  Hor:  $y=0$

x-Int.: none y-int.:  $(0, 5/3)$

hole: none

D:  $(-\infty, -3)(-3, \infty)$  R:  $(-\infty, 0)(0, \infty)$

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

Vert:  $x=-3$  Hor:  $y=0$

x-Int.: none y-int.:  $(0, 1)$

hole:  $(2, 3/5)$

D:  $(-\infty, -3)(-3, 2)(2, \infty)$  R:  $(-\infty, 0)(0, 3/5)(3/5, \infty)$

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

Vert:  $x=1, -1$  Hor: none

x-Int.:  $(0, 0)$  y-int.:  $(0, 0)$

hole: none

D:  $(-\infty, -1)(-1, 1)(1, \infty)$  R:  $(-\infty, \infty)$

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

Vert:  $x=2$  Hor: none

x-Int.:  $(3, 0)(-1, 0)$  y-int.:  $(0, 3/2)$

hole: none

D:  $(-\infty, 2)(2, \infty)$  R:  $(-\infty, \infty)$

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

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

x	y
-3	-0.25
-1	-0.5
2	1
3	0.5

Vert:  $x=1$

Hor:  $y=0$

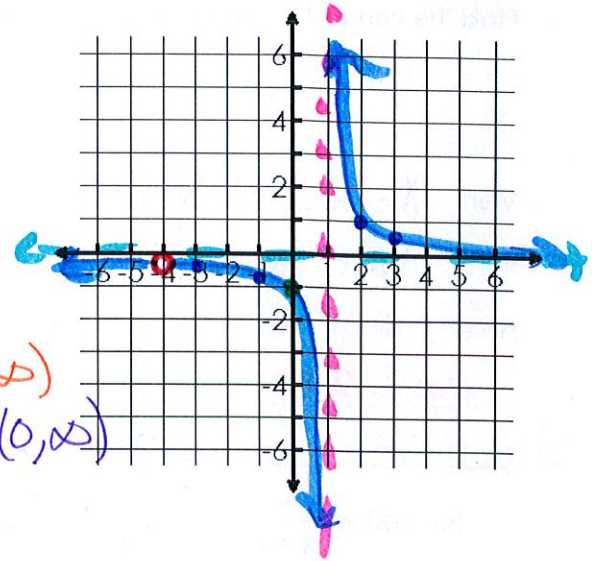
x-int.: none

y-int:  $(0, -1)$

hole:  $(-4, -1/5)$

Domain:  $(-\infty, -4) \cup (-4, 1) \cup (1, \infty)$

Range:  $(-\infty, -1/5) \cup (-1/5, 0) \cup (0, \infty)$



10.  $f(x) = \frac{x^2}{x^2-4}$

$$\frac{x^2}{(x+2)(x-2)}$$

x	y
-4	1.3
-3	1.8
-1	-0.33
0	0
1	-0.33
3	1.8
4	1.3

Vert:  $x=2, -2$

Hor:  $y=1$

x-int.:  $(0, 0)$

y-int:  $(0, 0)$

holes: none

Domain:  $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$

Range:  $(-\infty, 0] \cup (1, \infty)$

