2C.3 WS #1 Graphing Rational Functions

1. Use the rational function $f(x) = \dfrac{3-x}{2-x}$ to complete the following. Show all work and label the graph appropriately.

   a. Vertical Asymptote(s):

   $2 - x = 0$

   $-x = -2$

   $\boxed{x = 2}$

   b. Horizontal Asymptote:

   $n = m$

   $y = \dfrac{-1}{-1} \rightarrow \boxed{y = 1}$

   c. Slant Asymptote:

   $\boxed{\text{NONE}}$

   d. Additional Points:

x	$f(x)$
1	$\dfrac{3-1}{2-1} = \dfrac{2}{1} = 2 \cdot (1,2)$
3	$0 \quad (3,0)$
4	$\dfrac{3-4}{2-4} = \dfrac{-1}{-2} = \frac{1}{2} \ (4, \frac{1}{2})$

   $x = 2$

   e. x-intercept(s):

   $3 - x = 0$

   $-x = -3$

   $x = 3$

   $\boxed{(3,0)}$

   f. y-intercept(s):

   $f(0) = \dfrac{3-0}{2-0} = \dfrac{3}{2}$

   $\boxed{(0, \frac{3}{2})}$

   g. Domain:

   $\boxed{\text{all real } x, \ x \neq 2}$

   h. Sketch the graph of the rational function.
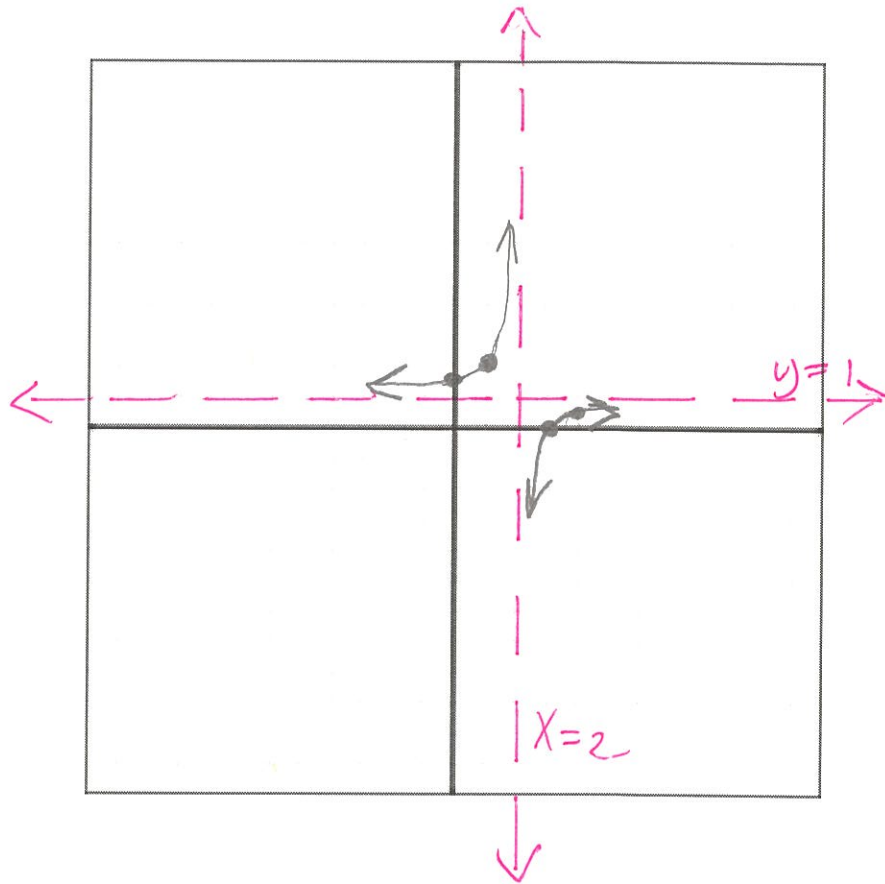
2. Use the rational function $f(x) = \frac{x+1}{x^2-x-6}$ to complete the following. Show all work and label the graph appropriately.

1st simplify

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

a. Vertical Asymptote(s):

$(x+2)(x-3) = 0$

$x+2=0 \qquad x-3=0$

$\boxed{x=-2} \quad \boxed{x=3}$

b. Horizontal Asymptote:

$n < m$

$\boxed{y = 0}$

c. Slant Asymptote:

$\boxed{NONE}$

d. Additional Points:

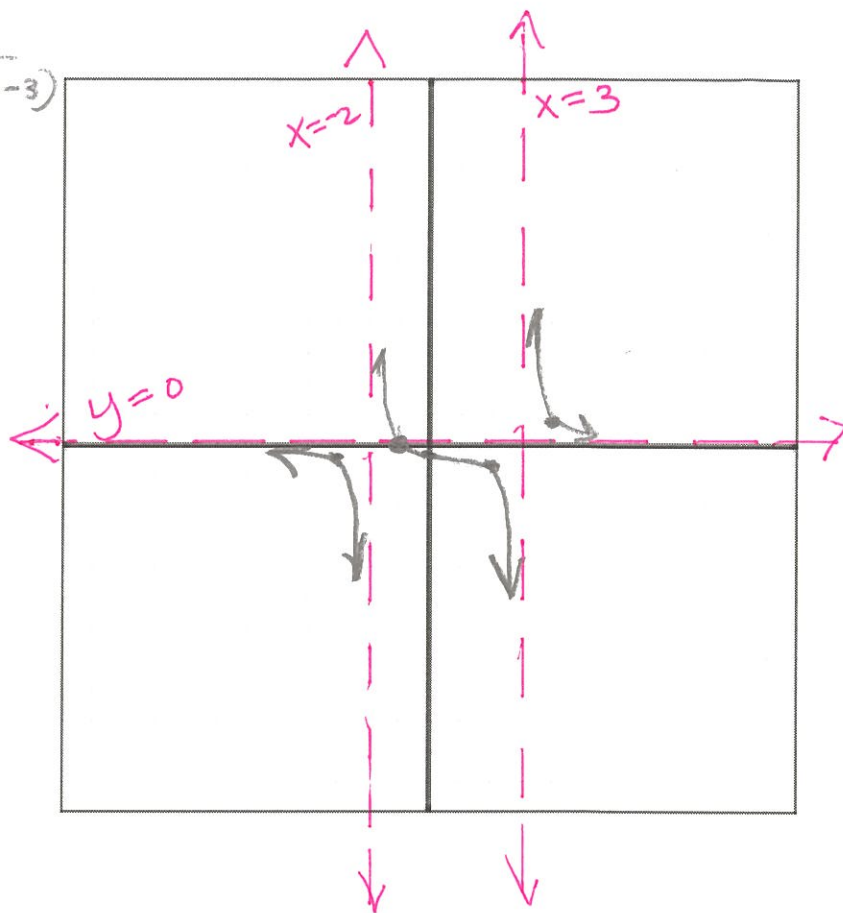| x	$f(x)$
-3	$-.33$
0	$-.17 \ (-\frac{1}{6})$
2	$-.75$
4	$.83$

e. x-intercept(s):

$x+1=0$

$x=-1$

$\boxed{(-1, 0)}$

f. y-intercept(s):

$f(0) = \frac{0+1}{0^2-0-6} = \frac{1}{-6} = -\frac{1}{6}$

$\boxed{(0, -\frac{1}{6})}$

g. Domain:

$\boxed{\text{all real } x, \ x \neq -2, 3}$

h. Sketch the graph of the rational function

$x=-2 \qquad x=3$

$y=0$