

Day 4

Identify all key features of the rational functions below, then graph those functions.

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

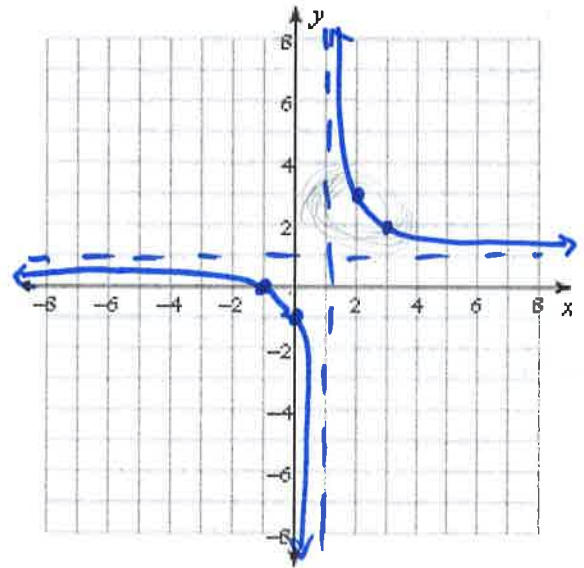
x-intercept(s)  $(-1, 0)$       y-intercept  $(0, -1)$   
 $x+1=0$        $f(x) = \frac{0+1}{0-1} = \frac{1}{-1}$

Vertical Asymptote(s)  $x=1$   
 $x-1=0$

End Behavior  $y=1$   
 $n=1$        $n=m$   
 $m=1$

Domain \_\_\_\_\_ Range \_\_\_\_\_

Holes? none



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

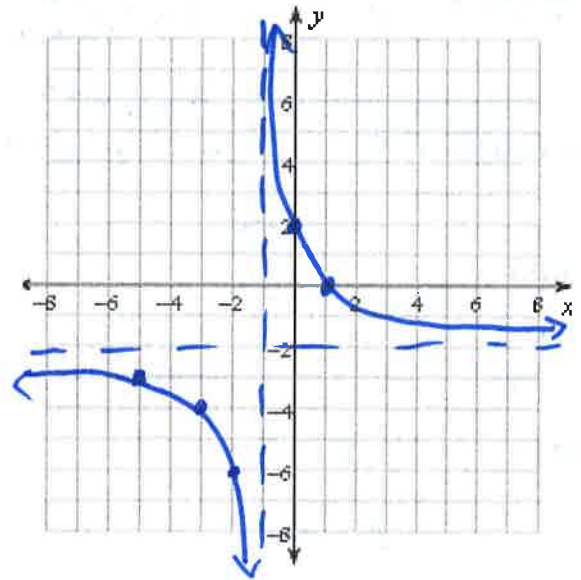
x-intercept(s)  $(1, 0)$       y-intercept  $(0, 2)$   
 $-2x+2=0$        $f(x) = \frac{-2(0)+2}{0+1} = \frac{2}{1}$   
 $-2x = -2$        $x=1$

Vertical Asymptote(s)  $x=-1$   
 $x+1=0$

End Behavior  $y=-2$   
 $n=1$        $n=m$   
 $m=1$

Domain \_\_\_\_\_ Range \_\_\_\_\_

Holes? none



$$3) f(x) = \frac{x-4}{-x-1}$$

x-intercept(s) (4,0) y-intercept (0,4)  
 $x-4=0$   $f(x) = \frac{0-4}{0-1} = \frac{-4}{-1}$

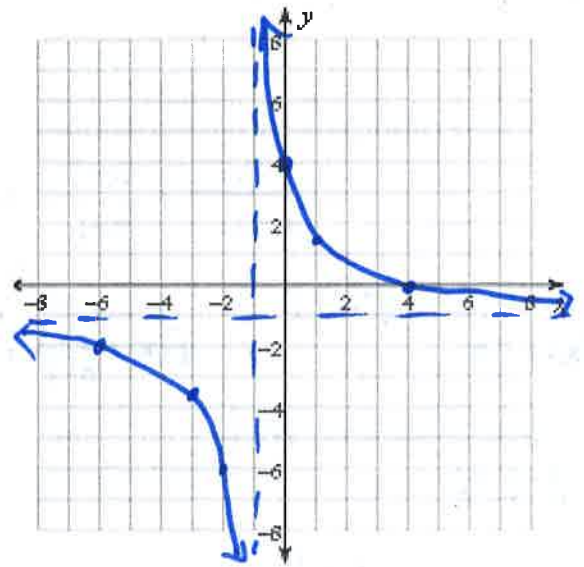
Vertical Asymptote(s)  $x = -1$   
 $-x-1=0$   
 $-x=1$

End Behavior  $y = -1$

$n=1$   $n=m$   
 $m=1$

Domain \_\_\_\_\_ Range \_\_\_\_\_

Holes? None



$$4) f(x) = \frac{x-2}{2x^3-10x^2+12x} = \frac{x-2}{2x(x^2-5x+6)} = \frac{x-2}{2x(x-2)(x-3)}$$

$x \cancel{-2}$  Hole  
 $\frac{x-2}{2x(x-3)(x-2)}$

x-intercept(s) ~~(2,0)~~ None y-intercept None  
 $x \neq 0$   $f(x) = \frac{0-2}{0-0+0} = \frac{-2}{0}$

Vertical Asymptote(s)  $x=0, x=3, x=2$   
 $2x(x-3)(x-2)=0$

End Behavior  $y = 0$

$n=1$   $n < m$   
 $m=3$

Domain \_\_\_\_\_ Range \_\_\_\_\_

Holes?  $x-2=0$   
 $x=2$

