

April 18, 2016  
Asymptotes

- Vertical  $\rightarrow$  setting the denominator equal to zero. Domain! and solve  $x =$  that result.
- Horizontal
  - If  $n < m$ , then  $y = 0$  i.e.  $x$  axis
  - If  $n = m$ , then  $y = \frac{a_n}{b_n}$
  - If  $n > m$ , then no horizontal asymptote
- Slant  
If the degree of the numerator is one more than the denominator, we have a slant asymptote.  

$$g(x) = \frac{x^2 - 4x - 5}{x - 3}$$

\* Tend slant by division

Apr 18-10:57 AM

$f(x) = \frac{x^2 - 4x + 5}{x^2 - 2x + 1} = 0$   $n = 2$   $m = 2$   $y = \frac{2}{1} = 2$

$$(x-1)(x-1) = 0$$

$$\sqrt{(x-1)^2} = \sqrt{0}$$

$$x-1 = 0$$

$$x = 1$$

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

Apr 18-11:01 AM

$g(x) = \frac{x^2 - 4x - 5}{x - 3}$   $n = 2$   $m = 1$

$$3 \overline{) 1 \quad -4 \quad -5}$$

$$\underline{3 \quad -3}$$

$$1 \quad -1 \quad -8$$

$x-1 = \frac{8}{x-3}$

$y = x-1$  is the slant asymptote.

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Sketching Graphs of Rational Functions

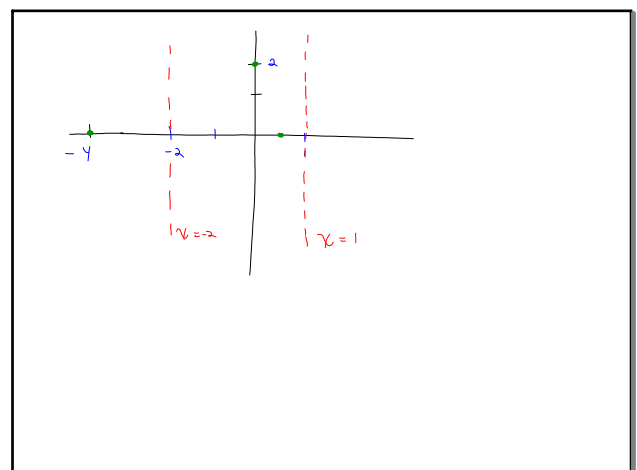
- Factor numerator & denominator
- Find  $x$  &  $y$  intercepts
  - To find  $x$ -intercept find the zeros of the numerator.
  - To find the  $y$ -intercept from the value of the function at  $x = 0$
- Find Vertical asymptote by finding the zeros of the denominator, and see if  $y \rightarrow \infty$  or  $y \rightarrow -\infty$  on each side of vertical asymptote by using test values.
- Find Horizontal asymptote
- Sketch graph from info above.

Apr 18-11:29 AM

$g(x) = \frac{2x^2 + 7x - 4}{x^2 + x - 2}$

- $(2x-1)(x+4) = 0$   $x = \frac{1}{2}$  &  $x = -4$   
 $(x+2)(x-1) = 0$   $x = -2$  &  $x = 1$   
 V.A.:  $x = -2$  &  $x = 1$
- $y$ -int:  $g(0) = \frac{2(0)^2 + 7(0) - 4}{(0)^2 + 0 - 2} = \frac{-4}{-2} = 2$   
 $(0, 2)$

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