



Topic/Objective: 5-3 RATIONAL FUNCTIONS

Name: \_\_\_\_\_  
Class/Period: 4  
Date: 3/11/17

Essential Question: How do we transform rational functions?

Questions: \_\_\_\_\_

Notes: def A RATIONAL FUNCTION IS A FUNCTION IN THE FORM:

$$f(x) = \frac{g(x)}{h(x)} = \frac{a_n x^n + \dots}{b_m x^m + \dots}$$

-  $g(x)$  IS A POLYNOMIAL OF DEGREE  $n$  AND LEADING COEFFICIENT OF  $a_n$   
-  $h(x)$  IS A POLYNOMIAL OF DEGREE  $m$  AND LEADING COEFFICIENT  $b_m$

\* IN THIS COURSE, WE WILL LIMIT OURSELVES TO  $g(x)$  AND  $h(x)$  BEING LINEAR

$$f(x) = \frac{ax+b}{cx+d}$$

(SOME) PROPERTIES OF RATIONAL FUNCTIONS

① X-INTERCEPT: OCCUR WHEN NUMERATOR IS ZERO  
ex)  $f(x) = \frac{3x}{x+2}$

② y-intercept  $f(0) = \frac{3(0)}{0+2} = \frac{0}{2} = 0$   
^ WHEN  $x=0$

③ ASYMPTOTES:

a. VERTICAL ASYMPTOTES: WHENEVER DENOMINATOR IS 0

b. HORIZONTAL / SLANT: (\* DEGREE)

$\frac{a_n x^n + \dots}{b_m x^m + \dots}$

- if  $n < m$  (top degree < bottom degree) then horizontal asymptote at  $y=0$
- if  $n = m$ , then the horizontal asymptote is  $y = \frac{a_n}{b_m}$
- if  $n > m$ , slant asymptote - will do division to find equation

Questions:

Notes:

Graph on GDC

$$R(x) = \frac{13}{x-1}, \quad P(x) = \frac{2}{x-1}$$

$x=1$                        $x=1$

$$Q(x) = \frac{2}{x+2}$$

$x=-2$

compare vertical asymptote  
(write equation of asymptote)