

Include this worksheet in the homework you send me by snail mail.

Rational Functions Worksheet

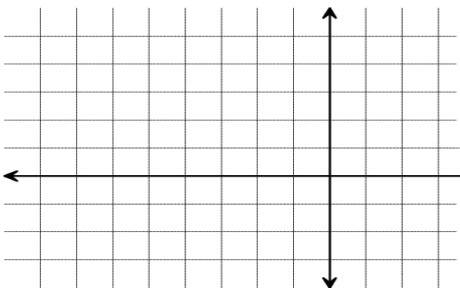
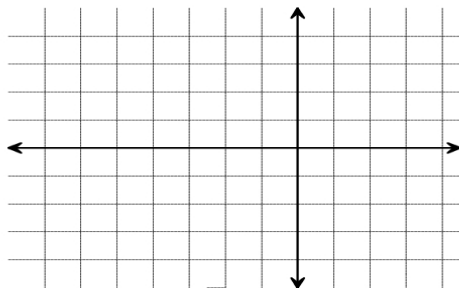
_____ name

Use the rules you have learned for $f(x) = \frac{a_0 x^m + \dots}{b_0 x^n + \dots}$.

Use your graphing calculator to help you to draw the following graphs on this worksheet include your work in your homework. For each problem be sure to note the asymptotes, domain, range, x intercepts, y intercepts, name any holes in the graph. Working these problems will help you learn the differences between the four different cases of rational functions. It will also help you understand the kinds of questions you will be asked about rational functions. Draw complete graphs

1. $y = \frac{1}{x+3}$ $m < n$ so $y = 0$ is the horizontal asymptote; $x = -3$ is a vertical asymptote.
 domain is $x \in \mathbb{R}_e, x \neq -3$;
 range is $x \in \mathbb{R}_e, y \neq 0$;
 one-to-one function ;
 there is no x intercept;
 the y intercept is $(0, \frac{1}{3})$

2. $y = \frac{2x}{x+3}$ $m = n$ so $y = \frac{a_0}{b_0}$ is the horizontal asymptote, so it is $y = 2$;
 $x = -3$ is the vertical asymptote;
 domain is $x \in \mathbb{R}_e, x \neq -3$;
 range is $y \in \mathbb{R}_e, y \neq 2$;
 the x & y intercept is at the origin $(0, 0)$.



3. $f(x) = \frac{x^2 + 2x - 3}{x+3}$ $x \neq -3$
 $m > n$, the denominator divides evenly so there is a hole in the graph.
 $y = \frac{(x+3)(x-1)}{x+3}$
 $y = \frac{(x+3)(x-1)}{x+3}$
 $y = x - 1$
 In $g(x) = x - 1$ let $x = -3$ to find the hole.
 $g(-3) = -3 - 1 = -4$ so hole is at $(-3, -4)$;
 domain $x \in \mathbb{R}_e, x \neq -3$; range $y \in \mathbb{R}_e, y \neq -4$;
 x intercept $(1, 0)$; y intercept $(0, -1)$