Name: _____ **Precalculus Unit 5, Lesson 5**

Aim: How do we graph rational functions with slant asymptotes

I. Do Now: There is another method of finding horizontal asymptotes of rational functions:

For the rational function $f(x)=\frac{N(x)}{D(x)}$, the equation of the horizontal asymptote may be found by the following procedure:

i. Dividing the numerator $N(x)$ by the denominator $D(x)$.
ii. If the quotient is the constant k (disregard the remainder), then the equation of the horizontal asymptote is $y=k$.

Example: $f(x)=\frac{2x+1}{x-5}$

$$x-5\overline{)\,2x+1}\qquad 2+\tfrac{11}{x-5}$$
$$2x-10$$
$$11$$

HA: $y=2$

Use this procedure to find equations of horizontal asymptotes for each rational function:

1. $f(x)=\frac{10x+1}{2x-6}$ 2. $g(x)=\frac{8x^2-7}{2x^2+1}$ *3. $h(x)=\frac{x^2-x}{x+1}$

II. Notes

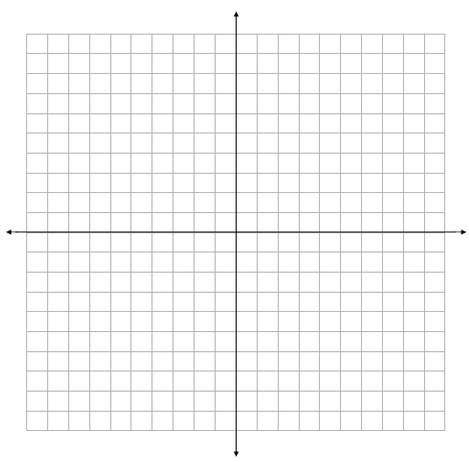
Given a rational function $f(x)=\frac{N(x)}{D(x)}$. A _____ occurs if the degree of $N(x)$ is _____.

To find the equation of the slant asymptote, use long division to divide $N(x)$ by $D(x)$ to get a quotient $ax+b$ (disregard the remainder). The slant asymptote has the equation $y=ax+b$.

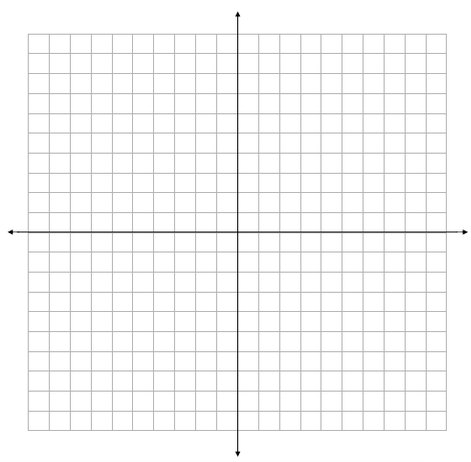
III. Practice

Analyze and graph each rational function.

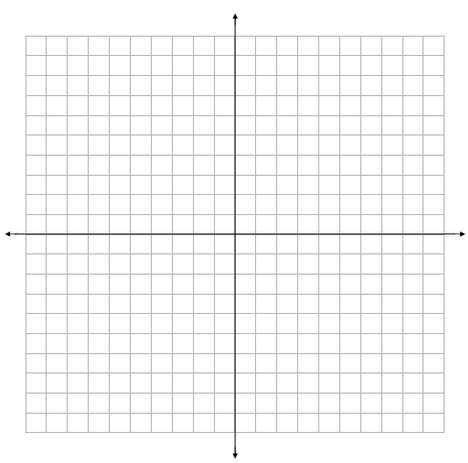
4. $f(x)=\frac{x^2-x}{x+1}$



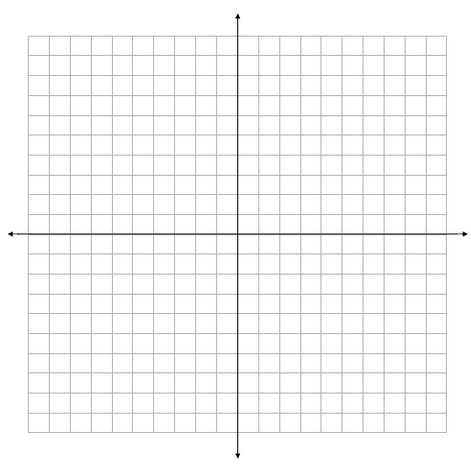
5. $f(x)=\frac{x^2+1}{x}$



6. $f(x)=\frac{x^2}{2x-2}$



7. $f(x)=\frac{x^2-3x+2}{2x-3}$



HW39
- p. 158: 49, 50, (use graph paper), 95
- Complete this sheet (skip #7).