Day 11 Notes
Wednesday March 5th
Slant asymptotes and 3.1 Exponential Functions and Their Graphs

We have one more type of asymptote for rational functions.

Let $f(x) = \dfrac{P(x)}{Q(x)}$ be a rational function. If the degree of the top polynomial $P(x)$ is exactly one more than the degree of the bottom polynomial $Q(x)$, then the function $f(x)$ will have a slant or oblique asymptote of the form $y = mx + b$.

Example 1. How to get the slant asymptote. Let $f(x) = \dfrac{x^3}{2x^2 - 2} = \dfrac{x^3}{2(x-1)(x+1)}$

you do long division

$\frac{1}{2}x$ → slant asym. ↙ quotient

$2x^2-2 \overline{) x^3 + 0x^2 + 0x + 0}$ → dividend

divisor

$x^3 \quad -x$

x → reminder

$\dfrac{x^3}{2x^2} = \frac{1}{2}x$

$\frac{1}{2}x \cdot 2x^2$

$\frac{1}{2}x(-2)$

$$\frac{x^3}{2x^2-2} = \frac{1}{2}x + \frac{x}{2x^2-2}$$

↓ slant asymptote