10.5
1/2

10.5: More curve sketching (Asymptotes)

Recall finding limits in ch 9.

Hor. Asym: $y = f(x)$ has a hor. asym. at $y = b$, if

$\lim_{x \to \infty} f(x) = b$ or $\lim_{x \to -\infty} f(x) = b$.

Ver. Asym of a Rat. fct: The graph of that rat fct $h(x) = \frac{f(x)}{g(x)}$ has a ver. asym at $x = c$ if $g(c) = 0$ and $f(c) \neq 0$ (after simplification).

Ex1: Find all asymptotes.

a) $f(x) = \frac{3x+2}{x-4}$

b) $g(x) = \frac{x^2-1}{x+1}$

c) $h(x) = \frac{x+2}{x^2-4}$.

The curve sketching problem

1) Find the domain
2) Find V.A.
3) Find H.A.
4) Find relative extremes.
5) Find P.O.I.
6) Sketch the graph.

10.5
2/2

Ex 2: Sketch $y = \frac{(x-1)^2}{x^2}$ given $y' = \frac{2(x-1)}{x^3}$ and $y'' = \frac{6-4x}{x^4}$

Ex3: Suppose a film has weekly revenue of

$R(t) = \frac{50t}{t^2+36}$, $t \geq 0$. (R in mil.)

a) Graph $R(t)$

b) maximize R.

c) After 4 straight wks of declining Rev, the film is pulled from the theaters. 12 wks later the DVD is released. When does the DVD hit the shelves?

Ex4: An entrepreneur starts new companies and sells them. Suppose annual profit is given by $P(x) = 22 - \frac{1}{2}x - \frac{18}{x+1}$. If she sells before profits decline, when should she sell?