

Math 103 Day 15: Curve Sketching

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Outline

Guidelines for Curve Sketching

To sketch the graph of $y = f(x)$,

- 1 Find the domain of $f(x)$
- 2 Find the x and y intercepts of $f(x)$
- 3 Find the symmetries of $f(x)$ (odd, even, periodic)
- 4 Find the asymptotes of $f(x)$ (horizontal, vertical, slant)
- 5 Find the intervals of increase and of decrease for $f(x)$.
- 6 Find the local maxima and minima (first derivative test)
- 7 Finally, sketch the curve using all of the above information.

Definition

The line $y = mx + b$ is a slant asymptote for $f(x)$ if

$$\lim_{x \rightarrow \infty} [f(x) - (mx + b)] = 0$$

If $f(x) = \frac{p(x)}{q(x)}$ where $q(x)$ and $p(x)$ are polynomials, then $f(x)$ has a slant asymptote if and only if the degree of $p(x)$ is one more than the degree of $q(x)$.