4.6 Summary of Curve Sketching

Guidelines for sketching a curve

0. Determine the domain of the function (if it is not all reals).
1. Determine the signs of $f'$ and $f''$ on various intervals.
2. Note transition points and sign combinations (of $f'$ and $f''$).
3. Determine the asymptotic behavior of $f(x)$.
4. Draw arcs of appropriate shape and asymptotic behavior.
5. (not in text) Locate intercepts and 'important' points on graph.

example: $f(x) = x^3 + 6x^2 - 36x + 27$

example: $f(x) = x e^{-x^2}$

example: $f(x) = \sqrt{x}(x - 8) = x^{4/3} - 8x^{1/3}$

example: $y = \frac{4x^2 - 9}{x + 2}$

example: $y = 2 \cos x - \sin(2x)$
example: \( f(x) = x e^{-x^2} \)

\[
\begin{align*}
\text{example: } f(x) &= \sqrt[3]{x}(x - 8) = x^{4/3} - 8x^{1/3} \\
\text{example: } y &= \frac{4x^2 - 9}{x + 2} \\
\text{example: } y &= 2\cos x - \sin(2x)
\end{align*}
\]