Chapter 3
Applications of Derivatives

3.5 Summary of Curve Sketching

A. Find the domain of the function.

B. Find the y-intercept and x-intercept, that is $f(0)$ and when $y = 0$.

C. Search for symmetries in the function (facultative)

- If $f(x) = f(-x)$, then the function is even.
- If $-f(x) = f(-x)$, then the function is odd.
- If $f(x + p) = f(x)$, then the function repeats itself after a period p (it is periodic).

D. Find the asymptotes of the function:

- The Horizontal asymptotes.
- The Vertical asymptotes.

E. Find the intervals of increase and decrease.

F. Find the local maximum and minimum values.

G. Find the concavity and the points of inflections.

EXAMPLE 1 Use the guidelines to sketch the curve $y = \dfrac{2x^2}{x^2 - 1}$.

EXAMPLE 2 Sketch the graph of $f(x) = \dfrac{x^2}{\sqrt{x+1}}$.

EXAMPLE 3 Sketch the graph of $f(x) = \dfrac{\cos x}{2 + \sin x}$.