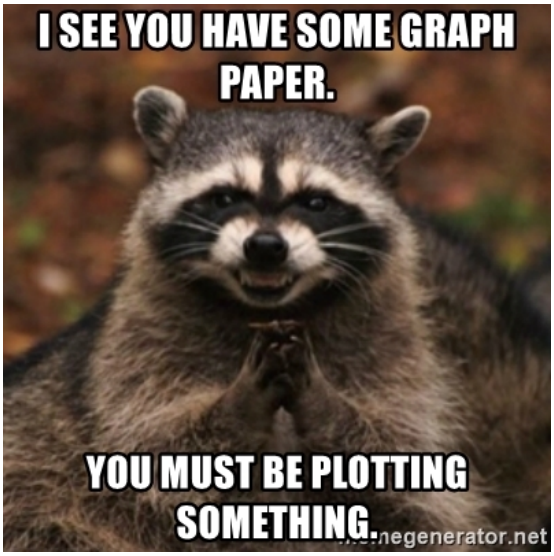
Calculus
Lesson 3.6: A Summary of Curve Sketching
Mrs. Snow, Instructor



In precalclulus we analyzed and sketched graphs of functions. While we determined x and y-intercepts, asymptotes, and the function's behavior as it approached the asymptotes, there is more that we can calculate using the derivatives of the function.

Steps in Analyzing the Graph of a Function

a. X-intercepts, Y-intercepts:
b. Vertical Asymptotes, Horizontal Asymptotes:
c. First derivative: Critical Points:
d. Increasing interval, Decreasing interval:
e. Second Derivative: Inflection Points:
f. Concave Up: Concave Down:
g. Sketch the Graph:

1. Analyze and sketch the graph of $f(x) = \dfrac{2\left(x^2 - 9\right)}{x^2 - 4}$

a. X-intercepts, Y-intercepts:
b. Vertical Asymptotes, Horizontal Asymptotes:
c. First derivative: Critical Points:
d. Increasing interval, Decreasing interval:
e. Second Derivative: Inflection Points:
f. Concave Up: Concave Down:
g. Sketch the Graph:

2. Analyze and sketch the graph of $f(x) = \dfrac{x^2 - 2x + 4}{x - 2}$

a. X-intercepts, Y-intercepts:
b. Vertical Asymptotes, Horizontal Asymptotes:
c. First derivative: Critical Points:
d. Increasing interval, Decreasing interval:
e. Second Derivative: Inflection Points:
f. Concave Up: Concave Down:
g. Sketch the Graph:

3. Analyze and sketch the graph of $f(x) = x\sqrt{9 - x^2}$

a. X-intercepts, Y-intercepts:

b. Vertical Asymptotes, Horizontal Asymptotes:

c. First derivative: Critical Points:

d. Increasing interval, Decreasing interval:

e. Second Derivative: Inflection Points:

f. Concave Up: Concave Down:

g. Sketch the Graph:

4. Analyze and sketch the graph of $f(x) = x^4 - 4x^3$

a. X-intercepts, Y-intercepts:

b. Vertical Asymptotes, Horizontal Asymptotes:

c. First derivative: Critical Points:

d. Increasing interval, Decreasing interval:

e. Second Derivative: Inflection Points:

f. Concave Up: Concave Down:

g. Sketch the Graph:

5. Analyze and sketch the graph of $f(x) = \sin x - \sqrt{3}\cos x \quad for\ the\ interval\ [0, 2\pi]$
   a. X-intercepts, Y-intercepts:
   b. Vertical Asymptotes, Horizontal Asymptotes:
   c. First derivative: Critical Points:
   d. Increasing interval, Decreasing interval:
   e. Second Derivative: Inflection Points:
   f. Concave Up: Concave Down:
   g. Sketch the Graph: