MATH 30: LECTURE 56: MORE REVIEW PROBLEMS

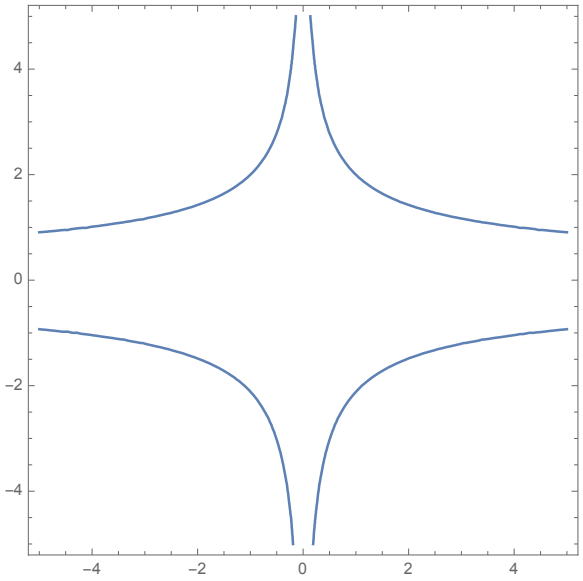
(1) Find the derivative of the function $f(x) = \sqrt{1 + x^6}$.

(2) Sketch the graph of a function that is continuous on $[0, 5]$ and has:
   (a) an absolute maximum at 0,
   (b) an absolute minimum at 2,
   (c) a local maximum at 3,
   (d) local minima at 2 and 4.

(3) Consider the function $f(x) = x^3 - 6x + 2$.
   (a) Find the intervals on which f is increasing or decreasing.
   (b) Find those x for which $f(x)$ is a local maximum or local minimum.
   (c) Find the intervals of concavity and the inflection points.

(4) A particle is moving along the curve $y = x^2 + 1$. Let $R(x)$ denote the rectangle with vertices $(0, 0)$, $(x, 0)$, $(x, x^2 + 1)$, and $(0, x^2 + 1)$. As the particle passes through the point $(2, 5)$, its x-coordinate increases at a rate of 3 miles per hour. How fast is the area of $R(x)$ changing at this instant?
   (a) Draw the relevant picture.
   (b) Set up mathematical notation for this problem.
   (c) Write the given information using your mathematical notation.
   (d) Write the *question* using your mathematical notation.
   (e) Answer the question.

(5) Say hello to Starjamz, whose equation is $y + x^2y^4 = 18$.
   Find the equation of the tangent line at the point $(x, y) = (1, 2)$ and plot it.



Gotta Diff 'Em All!