Examples:

1. Sketch the graph of the function $y = x^3 + 2x^2$.

Individual Questions:

1. For each of the following functions, do the following:
   
   • Determine where $f, f', f''$ are positive or negative.
   • Find all stationary points and classify them as maxima, minima, or neither.
   • Find any global maxima or minima, if they exist.
   • Determine all intervals where the function is increasing or decreasing and convex or concave.
   • Find all inflection points.
   • Find any horizontal, vertical, or slant asymptotes.
   • Sketch the graph of the function.

   (a) $f(x) = x^4 - 5x^2 + 4$,
   (b) $f(x) = \frac{x^2}{1+x^2}$,
   (c) $f(x) = x + \frac{1}{x}$.

2. We want to enclose a field with a rectangular fence. We have 500 feet of fencing material. A building is on one side of the field so we won’t need any fencing for that side. Determine the dimensions of the fence that will enclose the largest area.

Group Work Questions

1. A 20 inch piece of wire is cut into two pieces. One piece is bent into a square and the other is bent into a triangle which is similar to the right triangle with sides 3, 4, and 5. What is the minimal total area enclosed by both figures?