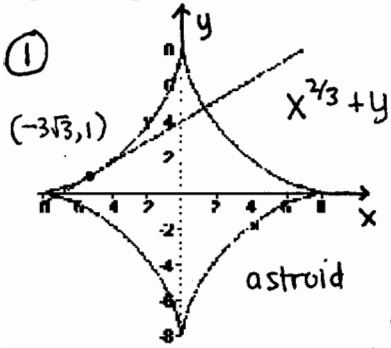
MAT1500-04/06 04F Quiz 6 Print Name (Last, First) _____

Show all work, including mental steps, in a clearly organized way that speaks for itself. Use proper mathematical notation, identifying expressions by their proper symbols (introducing them if necessary), and use arrows and equal signs when appropriate. Always simplify expressions. BOX final short answers. LABEL parts of problem. Keep answers EXACT (not decimal approximations, if possible).

① 

astroid

a) Show that the point $(-3\sqrt{3}, 1)$ lies on this curve.

b) Use implicit differentiation to evaluate the slope of the tangent line to the curve at this point. (exactly!)

c) Write an equation for the tangent line there, solving for y. (Does your slope value agree with an estimate from the diagram?)

② For an ideal gas at constant temperature, the pressure P and volume V satisfy the equation $PV = C$, where C is a constant. Suppose that at a certain instant the pressure is 500 kPa and the volume is 1000 cm^3 and the volume is decreasing at a rate of 20 cm^3/min. At what rate is the pressure increasing at this instant?