**“I Can” Statements for Chapter 4**

(Circle one)

Yes/Not Sure I can identify absolute (or global) maximum and minimum values on a graph and where they occur.

Yes/Not Sure I can identify relative (or local) maximum and minimum values on a graph and where they occur.

Yes/Not Sure I can use my graphing calculator to identify local extrema of a function on an interval.

Yes/Not Sure I can state the Extreme Value Theorem (EVT) and recognize when its hypotheses are satisfied.

Yes/Not Sure I can use terminology correctly, recognizing that extreme values of functions are y-values, that absolute extrema are also relative extrema, and that extrema is the plural of extremum, meaning either a maximum or minimum value.

Yes/Not Sure I can identify potential extrema by comparing y-values at endpoints and at critical values (critical points).

Yes/Not Sure I can find critical values (critical points) by finding x-values where the derivative is zero or undefined.

Yes/Not Sure I can state the Mean Value Theorem (MVT) and recognize when its hypotheses are satisfied.

Yes/Not Sure I can interpret the Mean Value Theorem in terms of slopes or in terms of rates of change.

Yes/Not Sure I can explain what it means for a function to be increasing/decreasing on an interval.

Yes/Not Sure I can use derivatives to determine where a function is increasing and decreasing, and I can use this information to determine whether a critical point is a maximum or a minimum (1st derivative test).

Yes/Not Sure I can use what I know about derivatives to write an antiderivative, including an arbitrary constant.

Yes/Not Sure I can find the constant for an antiderivative by plugging in the coordinates of a point on the curve and solving for C.

Yes/Not Sure I can use second derivatives to determine where a function is concave up and concave down.

Yes/Not Sure I can use second derivatives to determine where a function has a point of inflection.

Yes/Not Sure I can recognize on a graph (approximately) where a graph is concave up/down and (approximately) where points of inflection are located.

Yes/Not Sure I can use second derivatives to determine whether a critical point is a maximum or minimum (2nd derivative test).

Yes/Not Sure I can draw a sketch of a derivative of a function given a graph of the original function and vice versa.

Yes/Not Sure I can (still) find the domain of a rational or a radical function (or a composition of the two).

Yes/Not Sure I can model a word-problem situation mathematically and use derivatives to find optimal solutions both with and without a calculator in a variety of situations, including (but not limited to) maximum area of a rectangle bounded by a curve, maximum volume of an open-top box made from rectangular cardboard, minimum area of paper necessary to print a poster, minimum fence necessary to enclose a specified area, minimum material necessary to make a 3-dimensional container, etc.

Yes/Not Sure I can use derivatives to find maximum profit or minimum average cost. (applications from economics)

Yes/Not Sure I can use the constraints/conditions given in a word problem to substitute for extra variables in a multivariable formula thereby reducing it to a function of one variable (so that the derivative can be taken with respect to that variable).

Yes/Not Sure I can (still) find derivatives of implicitly defined functions (i.e. implicit derivatives).

Yes/Not Sure I can determine which quantities in a problem situation are variable and which are constant.

Yes/Not Sure I can use known formulas along with given values to find the related rates of change of the variables in the formula with respect to time in a variety of situations, including (but not limited to) finding the rate at which the distance between 2 cars is changing as they approach/leave an intersection, the rate at which height of water in a conical tank is changing, the rate that that a specified line segment is changing (like a radius or a diagonal) given the rate of change of the area/volume, the rate at which an angle is changing in a right triangle, the rate at which the surface area/volume of a sphere is changing given the rate of change of the radius, etc.

Yes/Not Sure I can (still) use derivatives to find a linearization (linear approximation) of a differentiable function in a small neighborhood around a given point. (same as tangent line)