MATH 1351 TI-85 EXERCISE VI
Chords and tangent lines

Name: _____ SID: _____

Graph the function **y = 3 ((x + .5)^3 - (x + .5)^2) + .375** in the following viewing window: **ZDECM** followed by **ZIN** on (0 , 0) . Exit back to the GRAPH screen menu and choose **MATH** from the screen menu. From the new screen menu choose **DIST.** Observe that the cursor is at the center of the graph ((0 , 0) in this case). The TRACE feature has been automatically activated, so the *lt/rt arrow* moves you around the graph. With the cursor at (0 , 0) press **ENTER.** This has the effect of setting one end of a chord. Now move the cursor along the graph to the right, going all the way to (.6 , .738). Observe the TI drawing the chord from (0 , 0), the first cursor position, to each position as the cursor moves along the graph.

Since the initial end of each chord is at (0 , 0), the slope of each chord is just given by y/x. For example the slope of the chord from (0 , 0) to the point (.6 , .738) is 1.23. For each value of x record the corresponding value for y and the slope of the chord from (0 , 0) to (x , y) in the following table.

x	y	slope
.6		
.5		
.4		
.3		
.25		
.2		
.15		
.1		
.075		
.05		
.025		
0		
-.025		
-.05		
-.075		
-.1		

With the cursor back at (0 , 0) choose **TANLN** (still in MATH screen menu) and **ENTER.** The TI draws the tangent line and displays its' slope in the lower left corner of the screen. What is the slope of this tangent line through (0 , 0) ? _____ How does it compare to the slopes near (0 , 0) of the chords in the above table? _____

To draw the tangent lines at other points again choose **TANLN**, move the cursor to the desired point on the graph and press **ENTER.** What is the slope of the tangent line at x = -.5 ?_____

In your own words describe how the point on the graph were x = -.5 is related to the rest of the graph; in other words, what is special about this point?_____
_____

Thinking of the graph as a hill to be climbed from left to right, how would you describe the change in the hill that takes place from one side of x = -.5 to the other?_____
_____

There is another point on this graph where it looks like the tangent line should have slope 0, where? _____ What's special about this other point?_____
_____

How would you describe the change that takes place in the hill on either side of this point?_____
_____

Try drawing the tangent line at this point. What do you observe?_____
_____

Sketch the graph of **y = (x - 1)^3 + 1** in the ZDECM viewing window. There is a point on this graph where it looks like the tangent line should have slope 0, where? _____ Draw the tangent line at this point. What do you observe?_____
_____

What's special about this point?_____
_____

Thinking of this graph as a hill, how would you describe the change that takes place on either side of this point?_____
_____

These examples are intended to exhibit the three types of phenomena that can occur at points on a graph where the tangent line has slope 0. They are *local maximum, local minimum, & inflection.*