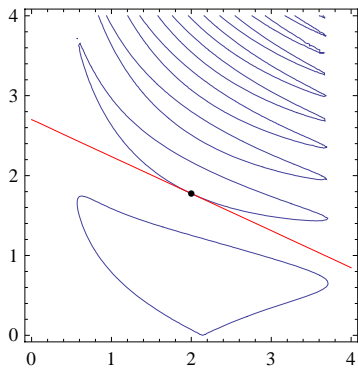


■ Calculus I Writing Assignment #2

Your goal for this assignment is to use *Mathematica* to create a graph of the curve $\cos(x + 1) + 1 = \sin(x^2)$ together with its tangent line at the point with x -coordinate 2 and y -coordinate approximately 1.8.

The curve $\cos(x + 1) + 1 = \sin(x^2)$
and a line tangent at $x = 2$.



Your write-up should include a statement of the problem and step-by-step commentary of how you solve the problem. Be sure that your commentary appears in text cells. A possible outline of how to solve the problem appears below.

When you're finished print out a copy. If there is more than one page, STAPLE the pages together. (Do this before you come to class as there is no stapler in the classroom.) Turn in your assignment at the start of class on October 22nd. Also, before the start of class, send your finished notebook to me as an email attachment. Use the SUBJECT line CAS 2.

1. The x coordinate of the point of tangency is 2. The y -coordinate is approximately 1.8. Use *Mathematica* to find an accurate numerical approximation of the y -coordinate. Tip: Give this y -coordinate a name, say y_1 , so that you can use y_1 in subsequent calculations rather than copy/pasting the long, nasty decimal.
2. Use implicit differentiation to find the slope of the tangent line at the point of tangency. You can either demonstrate how to do this by hand *in a text cell* or you might be able to figure out how to use *Mathematica's* differentiation command $D[]$ to find the derivative for you.
3. Give an equation of the tangent line and solve it for y . You might use *Mathematica's* $Solve[]$ command for this, or it might be easier just to do it by hand in a text cell.
4. Create the picture by combining the following commands. Use the Help menu to find details on the commands.
 - a. Use $ContourPlot$ to get a graph of the curve $\cos(x + 1) + 1 = \sin(x^2)$.
 - b. Use $Plot$ to get a graph of the tangent line. Use the $PlotStyle$ option to give the line a color other than blue.
 - c. Combine the two graphs using the $Show$ command.
5. Clean up your presentation by deleting unnecessary cells. Be sure to spellcheck and proofread.