

MAT 170 Section 005

October 31, 2005

Please work in pairs and complete these questions during class. Hand in one Maple worksheet which includes both text and Maple output.

1. Produce a graph of $f(x) = \sqrt{3}\cos(x/2) + \sin x$ that reveals all of the important aspects of the curve.
 - (a) From the graph, estimate the intervals of increase, decrease, extreme values, intervals of concavity, and inflection points.
 - (b) Find the derivatives and use fsolve to give better estimates of the intervals in (a).
2. Investigate the family of functions $f(x) = \ln(\sin x + C)$ where C is a constant.
 - (a) What is the domain?
 - (b) For which values of C is f continuous on $(-\infty, \infty)$?
 - (c) For which values of C does f have no graph at all?
 - (d) Graph $f(x)$ for various C including $C < 0$, $C = 0$, $C > 0$.
 - (e) Find the x and y intercepts (if any).
 - (f) Give the intervals of increase and decrease.
 - (g) Are there any local maximum or minimum?
 - (h) What features do members of this family have in common? How do they differ?
 - (i) What happens as $C \rightarrow \infty$?