MA 113 Calculus I, Fall 2018

Written Assignment #2

Due Friday, September 7, 2018, at beginning of lecture

Instructions: The purpose of this assignment is to develop your ability to formulate and communicate mathematical arguments. Your complete assignment should have your name and section number on each page, be stapled, and be neat and legible. *Unreadable work will receive no credit.*

You should provide well-written, complete answers to each of the questions. We will look for correct mathematical arguments, complete explanations, and correct use of English. Your solution should be formulated in complete sentences. As appropriate, you may want to include diagrams or equations written out on a separate line. You may read your textbook to find examples of how we communicate mathematics.

Students are encouraged to use word-processing software to produce high quality solutions. However, you may find that it is simpler to add graphs and equations using pen or pencil.

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1. (4 points) The height of an airplane after t minutes is given by $s(t) = t^4 - 2t^3 + 2$ kilometers.

   (a) Create a table giving the position of the particle at t minutes for

   $$t = -1.0, -0.75, -0.5, -0.25, 0.0, 0.25, 0.5, 0.75, 1.0, 1.25, 1.5, 1.75, 2.0$$

   (b) Create a table giving the average velocity over the consecutive time intervals in this table (for example, $[-0.5, -0.25]$, $[1, 1.25]$, etc).

   (c) Based on your table, when do you think the height of the rocket is at a minimum? Why?

2. (4 points) A bug is located at the point $(1000, 0)$ at time $t = 0$ and crawls at a rate of 7 units/minute in the clockwise direction along a circle of radius 1000 centered at the origin. Find the coordinates (x, y) of the bug after 43 minutes. Explain your work.