MATH 330 · Calculus III
Autumn 2016

Homework 6: Due in class November 9

Reminder

Your submitted homework solutions should show not only your answers, but should show a clearly reasoned logical argument, written using **complete English sentences**, leading to that solution. Each mathematical symbol that you will encounter stands for one or more English words[1], and if you elect to use symbols, you must use them properly. In particular, please avoid the use of the "running equals sign", as this is an abuse of notation and is unacceptable: `http://www.wikiwand.com/en/Equals_sign#/Incorrect_usage`. Write your solutions so that a student one course behind you in the sequence would understand them.

Problem 1. [**10 points**] The line segment joining the origin to the point (h, r) is revolved about the x-axis to generate a cone of height h and base radius r. Find the cone's surface area with the parametric equations $x = ht$, $y = rt$, $0 \leq t \leq 1$. Check your result against the standard formula: $A = \pi r \cdot$(slant height).

Problem 2. Graph the following *limaçons*, without using graphing software or computational aids. Please see Section 11.4.

(a) [**2 points**] $r = \frac{1}{2} + \cos\theta$ (this limaçon has an inner loop).

(b) [**2 points**] $r = 1 - \cos\theta$ (this limaçon looks like a cardioid).

(c) [**3 points**] $r = \frac{3}{2} + \cos\theta$ (this limaçon has a dimple instead of a loop).

(d) [**3 points**] $r = 2 + \cos\theta$ (this limaçon looks like an oval).

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[1]See a list of mathematical symbols and their meanings here: `http://en.wikipedia.org/wiki/List_of_mathematical_symbols`