MATH 170 – Section 010 – Quiz 7

You may work with other class members on this quiz, but you may not receive assistance from people not in MATH 170 (Section 010). You must show all of your work to receive full credit. Do all your work on other sheets of paper and be sure to staple all the pieces of paper together or YOU WILL GET A ‘ZERO’ ON THE QUIZ. Do not use decimal approximations unless asked to do so. Your work on this quiz must be handed in by Monday, 8 November 2004 at 1640. GOOD LUCK!

1) Find all critical numbers for the function

\[ f(x) = \sin^2 x + \cos x \]

2) Find the global maximum point and global minimum point for the function

\[ f(x) = 3x^{5/3} - 15x^{2/3} \]

on the interval \([-1, 8]\).

3) A rectangular box without a top is to have a volume of 22,500 in\(^3\). The bottom of the box must be a square. Suppose the material for the bottom of the box costs 5 cents per square inch while the material for the sides of the box costs 3 cents per square inch. What should the dimensions of the box be if we wish to minimize its cost? What is the minimized cost?

4) Prove that the equation \(2x = \cos x\) has exactly one solution.

5) You begin a journey of 200 miles at 8 a.m. and finish at 1 p.m. What conclusion can you draw by using the Mean Value Theorem? Explain.