Serial No.:_____ Student Name:_____ Student Number: _____

Instructor: M. Z. Abu-Sbeih . Math 101- Q5 Date: 23-5-2007 A

Problem 1: (6 points) A light is on the top of a building 20 feet high. A man 5 feet tall walks away from the building with speed 6 ft/sec along a straight path. How fast is the tip of his shadow moving when he is 40 ft from the building?

Problem 2: (5 points) Find a linear approximation of $y = e^{2x}$ at a = 0. Use this approximation to approximate $e^{0.06}$.

Problem 3: (6 points) Find the absolute maximum and absolute minimum of $f(x) = (x^2 - 1)^3$ on the interval [-1, 2].

Problem 4: (8 points) Show that the equation $2x - 1 - \sin x = 0$ has only one real solution. (State the name of any theorem you use)

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Problem 1: (6 points) At noon ship A is 6 km west of ship B. Ship A is cruising north at 1 km/h and ship B is cruising south at 3 km/h. How fast is the distance between the ships changing at 2 P.M.?

Problem 2: (5 points) Use differentials to approximate $e^{0.06}$.

Problem 3: (6 points) Find the absolute maximum and absolute minimum of $f(x) = x^4 - 2x^2 + 3$ on the interval [-2, 3].

Problem 4: (8 points) Show that the equation $1 - 2x + \cos x = 0$ has only one real solution. (State the name of any theorem you use)