

MA 242 Section 5 – Test 2 – Review

This review sheet contains questions that are similar to what I will ask on the test. The actual test will have fewer questions. Remember, the test will take place during the first 50 minutes of class.

- (1) Section 3.1.5 numbers 1,5,7,9
- (2) Section 3.2.4 numbers 1,3,9,15,17,19,21
- (3) Find the equation for the tangent plane to the surface $z = \sqrt{1 + x^2 + y^2}$ at the point $(4, \sqrt{8}, 5)$ (this is basically 3.3.6 number 17, which has a solution given).
- (4) 3.3.6 number 19(ignore the “normal line” bit (or read up on it and figure it out if you’re feeling adventurous)).
- (5) 3.4.5 numbers 11,13,15
- (6) 3.5.7 numbers 7, 10
- (7) Suppose an ant is climbing a mound whose shape is given by the equation

$$z = 20 - x^2 - y^2$$

where x, y, z are given in centimeters. The positive x -axis points east, and the positive y -axis points north. Assume the ant starts at coordinates $(1, 1, 18)$.

- (a) If the ant walks northeast, will it move up, down, or stay at the same height?
At what rate?
- (b) In which direction is the slope largest?
- (c) In which direction is the slope smallest?
- (8) 3.6.5 numbers 1,3,13,15
- (9) Find three positive numbers whose sum is 100 and whose product is a maximum
- (10) The world now knows that Brad Pitt is single again so he needs to build a fence around his property to keep out unwanted visitors. He’s in the middle of a costly divorce so he can only afford 300m of fencing. If his fence encloses a rectangle then what is the maximum amount area he can enclose?
- (11) Find the dimensions of the box with volume 1000 cm^3 that has minimal surface area
- (12) Section 3.7.1 (ignore the “determine if the extrema are global” part) numbers 1,3,5