

V63.0123-1 : Calculus III. Homework 5

due Wed Mar 5 at lecture. Longer—start early!

15.3: (Review partial differential equations)

66. Parts a)-d) only.

15.5: (Chain rule) [carried over from HW4, apart from one which is changed]

2.

8. Please ensure your answer is in terms of s, t only (rather than involving x, y). You may then be able to simplify somewhat.

40.

15.6: (Gradient vector)

3.

8.

21.

39.

46.

50. [Hints: Sketch an ellipsoid and a plane. Use your knowledge about the tangent plane to the level surfaces of $F(x, y, z) = x^2 + 2y^2 + 3z^2$. This gives some relation which points (x, y, z) must satisfy. Is this a line or a plane? Maybe massage it into a standard equation form. Finally, you must restrict your solution(s) to the surface $F(x, y, z) = 1$ given.]

15.7: (Minima, maxima, saddle-points)

2.

3.

6.

41.