## Math 11, Multivariable Calculus Written Homework 2

- 1. Section 13.1: problem 28. Show that the curve given parametrically by  $x = \sin t$ ,  $y = \cos t$  and  $z = \sin^2 t$  is the curve of intersection of the surfaces  $z = x^2$  and  $x^2 + y^2 = 1$ . Use this information to help sketch the curve.
- 2. Section 13.2: problem 27. Find a vector equation for the tangent line to the curve of intersection of the cylinders  $x^2 + y^2 = 25$ , and  $y^2 + z^2 = 20$  at the point (3, 4, 2).
- 3. Section 13.2: problem 28. Find the point on the curve  $\mathbf{r}(t) = \langle 2\cos t, 2\sin t, e^t \rangle$   $(0 \le t \le \pi)$  where the tangent line is parallel to the plane  $\sqrt{3}x + y = 1$ .
- 4. Section 13.3: problem 15. Suppose you start at the point (0, 0, 3) and move 5 units along the curve  $\mathbf{r}(t) = \langle 3 \sin t, 4t, 3 \cos t \rangle$  in the "positive" direction (increasing t). Where are you then?
- 5. Section 13.4: problem 28. A batter hits a baseball 3 feet above the ground straight towards the center field fence which is 10 feet high and 400 feet from where the batter strikes the ball. The ball leaves the bat with a velocity of 115 ft/sec and at an angle of 50 degrees above horizontal. Does the ball clear the fence?
- 6. Section 14.2: problem 18. Consider the limit

$$\lim_{(x,y)\to(0,0)}\frac{xy^4}{x^2+y^8}.$$

If it exists, find its value; if not show that it does not exist.