Mathematics 21a Fall 2006
In class problems. Nov. 2

1. The height in the vicinity of Mt. Fuji is given by $h = 16e^{-(\frac{x^2}{2}+\frac{y^2}{8})}$. You are at the point $P(1,2)$ and have a choice among three possible routes: North, Northeast or East.

- Which one of these routes will begin taking you down the fastest.
- Suppose you have a choice to descend in any direction. Use linear approximation to estimate the maximal possible decrease in altitude after travelling the distance 0.1 from the point P.

2. Use linear approximation to estimate $\sqrt{(2.1)^2 + (1.8)^2 + (0.9)^2}$.

3. Peter brings a solid golden cone of radius 2cm and height 6cm to Jack (a gold specialist) and asks him to polish it to a perfect cone by keeping its radius and height within 1 %. Jack measures the cone and finds that the cone is already perfect. How much gold can Jack steal from Peter's cone for his new golden tooth? (The gold's density is 19.3 gr/cm^3 and volume of a cone is $\frac{1}{3}\pi r^2 h$).