Problem Set 10 - Math Tutorial Calculus II

1. Use the total differential to approximate the value $(6.57)^2(1.23)^3$.

2. To estimate the volume of a cone of radius approximately 2 m and height approximately 6 m, how accurately should the radius and height be measured so that the error in the calculated volume estimate does not exceed 0.2 m^3? Assume that the possible error in measuring the radius and height are the same.

3. Consider the function

$$f(x_1, x_2, \ldots, x_n) = e^{x_1+2x_2+\ldots+nx_n}.$$

(a) Calculate $Df(0, \ldots, 0)$ and $Hf(0, \ldots, 0)$.

(b) Determine the first and second order Taylor polynomials of f at the origin.