Calculus

May 2013

1. Prove or disprove that the following series converges

$$\sum_{n=2}^{\infty} \frac{(-1)^n}{n \ln n}.$$

2. Find the points on the surface $z^2 - xy = 4$ closest to the origin. (Hint: Use the Lagrange's multiplier method)

3. Find the volume of the solid bounded by the cone $z = \sqrt{x^2 + y^2}$ and the sphere $x^2 + y^2 + z^2 = 4$.