1.(1 pt)

Electric charge is distributed over the disk $x^2 + y^2 \leq 16$ so that the charge density at (x,y) is $\sigma(x,y) = 1 + x^2 + y^2$ coulombs per square meter.

Find the total charge on the disk.

2.(1 pt)

A lamina occupies the part of the disk $x^2 + y^2 \leq 9$ in the first quadrant and the density at each point is given by the function $\rho(x,y) = 2(x^2 + y^2)$.

A. What is the total mass? _____

B. What is the moment about the x-axis? _____

C. What is the moment about the y-axis? _____

D. Where is the center of mass? (_____ , _____)

E. What is the moment of inertia about the origin? _____

3.(1 pt)

A lamp has two bulbs, each of a type with an average lifetime of 3 hours. The probability density function for the lifetime of a bulb is $f(t) = \frac{1}{3}e^{-t/3}, t \leq 0$.

What is the probability that both of the bulbs will fail within 3 hours?

4.(1 pt)

You are getting married and your dearest relative has baked you a cake which fills the volume between the two planes, $z = 0$ and $z = 2x + 6y + c$, and inside the cylinder $x^2 + y^2 = 1$. You are to cut it in half by making two vertical slices from the center outward. Suppose one of the slices is at $\theta = 0$ and the other is at $\theta = \psi$.

What is the limit, $\lim_{c \to \infty} \psi$?