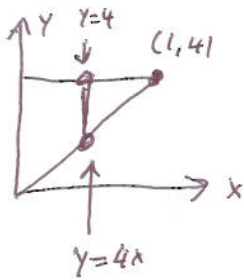


Quiz for April 4, 2008

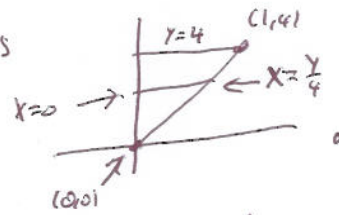
Compute

$$\int_0^1 \int_{4x}^4 e^{-y^2} dy dx$$

We do not know $\int e^{-y^2} dy$. Let's change the order of integration. Maybe we can then do the integrals. The integral is setup as



we now look at it as



The integral is $\int_0^4 \int_0^{\frac{y}{4}} e^{-y^2} dx dy = \int_0^4 e^{-y^2} x \Big|_0^{\frac{y}{4}} dy = \int_0^4 \frac{y}{4} e^{-y^2} dy$

$$= \left[\frac{e^{-y^2}}{-8} \right]_0^4 = \frac{1}{8} \left[1 - \frac{1}{e^{16}} \right]$$