

Exam Question**Topic: Double Integral**

Evaluate the integral

$$\int_0^2 dy \int_{2y}^4 \exp(-x^2) dx.$$

Solution

We need to change the order of integration, to give

$$\begin{aligned} I &= \int_0^4 dx \int_0^{x/2} \exp(-x^2) dy = \int_0^4 \frac{1}{2} \exp(-x^2) dx \\ &= \left[-\frac{1}{4} \exp(-x^2) \right]_0^4 = \frac{1}{4} (1 - e^{-16}). \end{aligned}$$