

Exam Question**Topic: Double Integral**

T is the triangle in the x - y plane with vertices $(0, 0)$, $(0, 3)$, $(1, 3)$.

Evaluate the integral

$$\iint_T 6 \exp(-y^2) d(x, y).$$

Express your answer in terms of e , and also as an approximation correct to 6 decimal places using your calculator.

Solution

The correct choice of order of integration has to be made. It can't be done the other way round

$$\begin{aligned} I &= \int_0^3 dy \int_0^{y/3} 6 \exp(-y^2) dx = \int_0^3 2y \exp(-y^2) dy \\ &= \left[-\exp(-y^2) \right]_0^3 = 1 - e^{-9} = 0.99877 \quad (6 \text{ d.p.}) \end{aligned}$$