

Answer on Question #53983 – Math – Calculus

Use integration by parts to show that $\int_0^1 \frac{y}{e^{2y}} dy = \frac{1}{4} \left(1 - \frac{3}{e^2} \right)$

Solution. Let's compute integral by parts:

$$\begin{aligned} \int_0^1 \frac{y}{e^{2y}} dy &= \left\{ \begin{array}{l} u = y \quad \left| \quad du = dy \\ dv = e^{-2y} dy \quad \left| \quad v = -\frac{1}{2} e^{-2y} \right. \end{array} \right\} = -\frac{y}{2} e^{-2y} \Big|_0^1 + \int_0^1 \frac{1}{2} e^{-2y} dy = -\frac{1}{2} e^{-2} + \frac{0}{2} e^{-0} - \frac{1}{4} e^{-2y} \Big|_0^1 = \\ &= -\frac{1}{2} e^{-2} - \frac{1}{4} e^{-2} + \frac{1}{4} e^{-0} = \frac{1}{4} - \frac{3}{4} e^{-2} = \frac{1}{4} \left(1 - \frac{3}{e^2} \right) \end{aligned}$$

Answer. $\int_0^1 \frac{y}{e^{2y}} dy = \frac{1}{4} \left(1 - \frac{3}{e^2} \right)$