

Problem Set 12 - Math Tutorial Calculus II

1. Evaluate the double integral $\iint_R (\sqrt{x} - y^2) \, dx dy$ where R is the bounded region enclosed by the curves $y = x^2$ and $y = x^{\frac{1}{4}}$.
2. Evaluate the double integral $\iint_R \cos\left(\frac{\pi}{2}x^2\right) \, dx dy$ where R is the triangle enclosed by the line $y = x$, the vertical line $x = 1$ and the x -axis.
3. Evaluate the following double integrals.

(a) $\int_0^1 \int_{x^2}^x xy^2 \, dy dx,$

(b) $\int_{\pi/2}^{\pi} \int_0^{x^2} \frac{1}{x} \cos\left(\frac{y}{x}\right) \, dy dx,$

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

(d) $\int_0^1 \int_x^1 (1 - y^2)^{-\frac{1}{2}} \, dy dx,$

(e) $\int_0^1 \int_{y^2}^1 2\sqrt{x}e^{x^2} \, dx dy.$