



NATIONAL UNIVERSITY OF TECHNOLOGY, ISLAMABAD  
ASSIGNMENT VI (CALCULUS II), SPRING 2019  
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Q.1 Evaluate the following iterated integrals:

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

Q.2 Find the volume of the solid that lies under the plane  $3x + 2y + z = 12$  and above the rectangle  $R = \{(x, y) \mid 0 \leq x \leq 1, -2 \leq y \leq 3\}$ .

Q.3 Let  $R$  be the region bounded by the graphs of the equations  $y = \sqrt{x}$ ,  $y = \sqrt{3x - 18}$  and  $y = 0$ . If  $f$  is continuous on  $R$ , **express** the double integral of  $f$  over  $R$  in terms of iterated integrals using (a) vertical slicing and (b) horizontal slicing.

Q.4 Find the volume of the solid that lies under the surface  $z = xy$  and above the triangle with vertices  $(1, 1)$ ,  $(4, 1)$ , and  $(1, 2)$ .

Q.5 Reverse the order of integration in  $\int_0^4 \int_{\sqrt{y}}^2 y \cos(x^5) dx dy$  and evaluate the resulting integral.

Q.6 Integral  $\int_0^8 \int_{y^{1/3}}^2 \sqrt{x^4 + 1} dx dy$  has no closed formula with elementary functions. Switching the order of integration, evaluate this integral.

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“Shine like the whole universe is yours.” — Rumi