Name: Solutions

Math 233: Multivariate Calculus (Sect 13)
Instructor: Jennifer Li
Friday, November 9, 2018

Quiz 10

Please write neatly and show all of your work.

1. Evaluate

$$\int_0^1 \int_0^1 (x^2 + xy + y^2)\, dx\, dy$$

$$\int_0^1 \int_0^1 (x^2+xy+y^2)\,dx\,dy = \int_0^1 \left[\int_0^1 (x^2+xy+y^2)\,dx \right] dy \quad * \text{Treat } y \text{ as a constant}$$

$$= \int_0^1 \left[\int_0^1 x^2\,dx + y\int_0^1 x\,dx + y^2 \int_0^1 dx \right] dy$$

$$= \int_0^1 \left[\frac{x^3}{3} + y\cdot\frac{x^2}{2} + y^2 x \right]_{x=0}^{x=1} dy$$

$$= \int_0^1 \left(\frac{1}{3} + \frac{y}{2} + y^2\right) dy$$

$$= \left[\frac{1}{3}y + \frac{y^2}{4} + \frac{y^3}{3}\right]_{y=0}^{y=1}$$

$$= \boxed{\frac{11}{12}}$$