Universidad Tecnológica de Acapulco

Desarrollo y Gestión de Software

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Asignatura: Matemáticas para Ingeniería

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Parcial 3

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Actividad. Integral doble

Integral Doble

1.- $\int_1^2 \int_{-x}^{x^2} (8x - 10y + 2)\, dydx$

$$\int_1^2 \{\int_{-x}^{x^2} 8x - 10y + 2\, dy\}\, dx$$

$$\int_1^2 \{\int_{-x}^{x^2} 8x + 2 * -\frac{10y^2}{2}\}\, dx = \int_1^2 \{\int_{-x}^{x^2} 8x - \ 10y^2|_{-x}^{x^2}\} dx$$

$$\int_1^2 \{8x(x^2)^2 - 8x(-x)^2\} dx$$

$$\int_1^2 \{8x(x^4) - 8x(x^2)\} dx$$

$$\int_1^2 (8x^5 - 8x^3) dx$$

$$\int_1^2 \frac{4x^6}{3} - 2x^4|_1^2 = (\frac{4(2)^6}{3} - 2(2)^4) - (1) = \frac{157}{3}$$

2.- $\int_0^2 \int_0^1 (2x + y)\, dydx$

$$\int_0^2 \left\{ \int_0^1 2x + y\, dy \right\} dx$$

$$\int_0^2 \left\{ \int_0^1 2x * \frac{y^2}{2}\, dy \right\} dx$$

$$\int_0^2 \{xy^2|_0^1\}\, dx$$

$$\int_0^2 \{x(1)^2 - x(0)\}\, dx = \int_0^2 \{x - 0\}\, dx$$

3.- $\int_0^3 \int_{-x}^{2x-x^2} (x+y)\, dydx$

$$\int_0^3 \left\{ \int_{-x}^{2x-x^2} x + y\, dy \right\} dx$$

$$\int_0^3 \left\{ x * \frac{y^2}{2} |_{-x}^{2x-x^2} \right\} dx = \int_0^3 \left\{ \frac{xy^2}{2} |_{-x}^{2x-x^2} \right\} dx$$

$$\int_0^3 \left\{ \frac{x(2x-x^2)^2 \text{-x}(-x)^2}{2} \right\} dx = \int_0^3 \left\{ \frac{(4x^3 - 4x^4 + x^5 - x^3)}{2} \right\} dx$$

$$\int_0^3 \left\{ \frac{x^5 - 4x^4 + 3x^3}{2} \right\} dx = \frac{1}{2}\left(\frac{x^6}{6} - \frac{4x^5}{5} + \frac{3x^4}{4} \right) - 0$$

4.- $\int_0^2 \int_1^3 x^2 y\, dydx$

$$\int_0^2 \left\{ \int_1^3 x^2 y\, dy \right\} dx$$

$$\int_0^2 \left\{ x^2 * \frac{y^2}{2} |_1^3 \right\} dx = \int_0^2 \left\{ \frac{x^2 y^2}{2} |_1^3 \right\} dx$$

$$\int_0^2 \left\{ \frac{x^2(3)^2 - x^2(1)^2}{2} \right\} dx = \int_0^2 \left\{ \frac{x^2(9) - x^2(1)}{2} \right\} dx$$

$$\int_0^2 \left\{ \frac{(9x^2 - x^2)}{2} \right\} dx = \int_0^2 \{4x^2\} dx$$

$$\int_0^2 \{4x^2\} dx = \frac{4x^3}{3} |_0^2 = \left(\frac{64}{3} \right) - (0)$$

5.- $\int_0^2 \int_0^x 2x^2y^3\, dydx$

$$\int_0^2 \left\{\int_0^x 2x^2y^3\, dy\right\} dx = \int_0^2 \left\{2x^2 * \frac{y^4}{4}|_0^x\right\} dx = \int_0^2 \left\{\frac{x^2y^4}{2}|_0^x\right\} dx$$

$$\int_0^2 \left\{\frac{x(x)^2 - x(0)^2}{2}\right\} dx = \int_0^2 \left\{\frac{x^3 - 0}{2}\right\} dx = \int_0^2 \left\{\frac{x^3}{2}\right\} dx$$

$$\int_0^2 \left\{\frac{x^3}{2}\right\} dx = \frac{x^4}{8}|_0^2 = \left(\frac{16}{8}\right) - (0) = 2$$