

$$= 8 \ln |e^2| - 8 \ln |1| = 8 \ln |e^2| = 8 \ln(e^2) = 8 \cdot 2 = 16$$

$$\text{aplicando } \int \ln(e^x) = x$$

EXERCÍCIOS 14.1

Para revisão de prova, faça de 1-12. Pág 1007

1-12 Calcule os integrais iterados.

$$1) \int_0^1 \int_0^2 (x+3) \, dy \, dx = \int_0^1 (xy + 3y) \Big|_0^2 \, dx = \int_0^1 (2x + 6) \, dx = x^2 + 6x \Big|_0^1 = 7$$

$$2) \int_1^3 \int_{-1}^1 (2xy - 4y) \, dy \, dx = \int_1^3 (2xy^2 - 2y^2) \Big|_{-1}^1 \, dx = \int_1^3 [2x - 2 + 2x + 2] \, dx = 4x$$

$$2x^2 \Big|_1^3 = 18 - 2 = 16$$

$$3) \int_2^4 \int_0^1 x^2 y \, dx \, dy = \int_2^4 \left[\frac{x^3}{3} y \right]_0^1 \, dy = \int_2^4 \left(\frac{1}{3} y \right) \, dy = \frac{1}{3} \cdot \left[\frac{y^2}{2} \right]_2^4 = \frac{1}{3} \cdot (8 - 2) = 2$$

13-16 Calcule as integrais duplas na região retangular R

$$(13) \iint_R 4xy^3 \, dA; \quad R = \{(x,y) : -1 \leq x \leq 1, -2 \leq y \leq 2\}$$

$$\int_{-2}^2 \int_{-1}^1 4xy^3 \, dx \, dy = \int_{-2}^2 4x^2 y^3 \Big|_{-1}^1 dy = \int_{-2}^2 2x^2 y^3 \Big|_{-1}^1 dy = \int_{-2}^2 2y^3 - 2y^3 = 0$$

$$(14) \iint_R \frac{xy}{\sqrt{x^2+y^2+1}} \, dA; \quad R = \{(x,y) : 0 \leq x \leq 1, 0 \leq y \leq 1\}$$

$$\int_0^1 \int_0^1 \frac{xy}{\sqrt{x^2+y^2+1}} \, dx \, dy \Rightarrow u = x^2 + y^2 + 1, \quad \frac{du}{2} = x \, dx$$

$$\frac{y}{2} \int \frac{du}{\sqrt{u}} \Rightarrow \frac{y}{2} \int u^{-1/2} du \Rightarrow \frac{y}{2} \cdot 2 u^{1/2} \Rightarrow y u^{1/2}$$

$$\int_0^1 \frac{xy}{\sqrt{x^2+y^2+1}} \Big|_0^1 = y \sqrt{x^2+y^2+1} \Big|_0^1 = y \sqrt{y^2+2} - y \sqrt{y^2+1}$$

$$\int_0^1 y \sqrt{y^2+2} \, dy - \int_0^1 y \sqrt{y^2+1} \, dy$$

Fazer de revisão q/ prova 29-30, 31-32, 35-40, 38.