

§ 15.1:

$$9. \int_0^{\ln 2} \int_1^5 e^{2x+y} dy dx = \int_0^{\ln 2} e^{2x+y} \Big|_1^5 dx = \int_0^{\ln 2} (5e^{2x} - e^{2x+1}) dx$$

$$= \left(\frac{5}{2} e^{2x} - \frac{1}{2} e^{2x+1} \right) \Big|_0^{\ln 2} = \frac{3}{2} (5 - e)$$

$$19. \iint_R \frac{xy^3}{x^2+1} dA = \int_0^1 \int_0^2 \frac{xy^3}{x^2+1} dy dx = \int_0^1 \frac{xy^4}{4(x^2+1)} \Big|_0^2 dx = \int_0^1 \frac{4x}{x^2+1} dx = 2 \ln|x^2+1| \Big|_0^1$$

$$= 2 \ln 2$$

$$22. \int_0^1 \int_0^\pi y \cos(xy) dx dy = \int_0^1 \sin(xy) \Big|_0^\pi dy = \int_0^1 \sin \pi y dy = -\frac{1}{\pi} \cos(\pi y) \Big|_0^1$$

$$= \frac{2}{\pi}$$

$$24. V = \iint_R f(x,y) dA = \int_0^2 \int_0^2 (16 - x^2 - y^2) dy dx = \int_0^2 (16y - xy^2 - \frac{1}{3}y^3) \Big|_0^2 dx$$

$$= \int_0^2 \left(\frac{88}{3} - 2x^2 \right) dx = \left(\frac{88}{3}x - \frac{2}{3}x^3 \right) \Big|_0^2 = \frac{160}{3}$$

$$28. V = \iint_R f(x,y) dA = \int_0^1 \int_0^2 (4 - y^2) dy dx = \int_0^1 (4y - \frac{1}{3}y^3) \Big|_0^2 dx = \int_0^1 \frac{16}{3} dx$$

$$= \frac{16x}{3} \Big|_0^1 = \frac{16}{3}$$