

15.1 HW

9.  $\iint_R (15-3x) dA$   $R = [0,5] \times [0,3]$   $A = \frac{1}{2} \times 5 \times 15 = 75/2$   $V = 3 \times \frac{75}{2} = \boxed{\frac{225}{2}}$

15.  $\iint_R x^3 dA = 0$

21.  $\int_4^{\pi} \int_3^8 1 dx dy = 55$

23.  $\int_1^1 \int_0^{\pi} x^2 \sin y dy dx = 4/3 \times \pi$

25.  $\int_2^6 \int_1^4 x^2 dx dy = 84$

31.  $\int_1^2 \int_0^4 \frac{dy dx}{x+y} = \int_1^2 (\ln(x+4) - \ln(x)) dx = \boxed{1.317}$

33.  $\int_1^2 \int_0^4 \frac{dy dx}{\sqrt{x+y}} = 4/3 (17 - 5\sqrt{5})$

35.  $\int_1^2 \int_1^3 \frac{\ln(xy) dy dx}{y} = \frac{1}{2} (\ln 3) (-2 + \ln 40)$

37.  $\iint_R \frac{A}{y} dA$ ,  $R = [-2,4] \times [1,3] = 6 \ln(3)$

41.  $\iint_R e^x \sin y dA$   $R = [0,2] \times [0, \pi/4]$   $= \int_0^{\pi/4} \int_0^2 e^x \sin y dA = \boxed{1.87}$

15.2 HW

5.  $f(x,y) = x^2y \quad \int_0^4 (x^3 - \frac{x^4}{4}) dx = \frac{x^4}{4} - \frac{x^5}{20} \Big|_0^4 = 38.4$

6. same as 7 = 38.4

7.  $\int_0^2 \int_y^4 x^2y \, dx \, dy = 40.5$

11.  $\iint_D \frac{y}{x} \, dA$  region is  $1 \leq x \leq 2, 0 \leq y \leq \sqrt{4-x^2}$   $\int_1^2 \int_0^{\sqrt{4-x^2}} \frac{y}{x} \, dy \, dx = 2 \ln 2 - 3/4$

19.  $f(x,y) = x; 0 \leq x \leq 1, 1 \leq y \leq e^{x^2}$   $\int_0^1 \int_1^{e^{x^2}} x \, dy \, dx = \frac{e-2}{2}$

21.  $f(x,y) = 2xy$ ; bounded by  $x=y, x=y^2$   $\int_0^1 \int_x^{\sqrt{x}} 2xy \, dy \, dx = 1/12$

25.  $\int_0^4 \int_x^4 f(x,y) \, dy \, dx \quad \int_0^4 \int_x^y f(x,y) \, dy \, dx \quad \int_0^4 \int_0^y f(x,y) \, dx \, dy$

31.  $f(x,y) = (\ln y)^{-1}$   $x=0$  and  $x=1$   $\int_1^{e^{1/y}} \int_0^1 (\ln y)^{-1} \, dx \, dy = (e-1) - (e-2e) = \boxed{e-2}$

33.  $\int_0^1 \int_y^1 \frac{\sin x}{x} \, dx \, dy \quad \int_0^1 \int_y^1 \frac{\sin x}{x} \, dx \, dy = \int_0^1 \int_0^x \frac{\sin x}{x} \, dy \, dx = 1 - \cos 1$

35.  $\int_0^1 \int_{y^2}^1 x e^{y^3} \, dy \, dx = \int_0^1 \int_0^y x e^{y^3} \, dx \, dy = \boxed{\frac{e-1}{6}}$

37.  $e^4 - 3e^2 + 2e$

43.  $f(x,y) = \frac{\sin y}{y}$   $\int_1^2 \int_y^{2y} \frac{\sin y}{y} \, dx \, dy = [-\cos y]_1^2 = \boxed{\cos 1 - \cos 2}$

49.  $z = x^2 + y^2 \quad z = 8 - x^2 - y^2$