

HW 15.2 # 3, 5, 6, 7, 11, 19, 21, 25, 31, 33, 35, 37, 43, 49

3.)  $\int_0^1 \int_0^{1-x^2} xy \, dy \, dx = \int_0^1 \frac{xy^2}{2} \Big|_0^{1-x^2} dx = \int_0^1 \frac{x}{2} (1-x^2)^2 dx = -\frac{1}{12} (1-x^2)^3 \Big|_0^1 = 0 + \frac{1}{12} = \frac{1}{12}$  due 10/25

5.)  $\int_0^4 \int_{x/2}^2 x^2 y \, dy \, dx = \int_0^4 \frac{x^2 y^2}{2} \Big|_{x/2}^2 dx = \int_0^4 2x^2 - \frac{x^2}{2} (\frac{x}{2})^2 dx = ???$

6.)  $\int_0^4 \int_0^2 x^2 y \, dy \, dx = \int_0^4 \frac{x^2 y^2}{2} \Big|_0^2 dx = \int_0^4 2x^2 - \frac{x^4}{8} dx = \frac{2}{3} x^3 - \frac{x^5}{40} \Big|_0^4 = \frac{128}{3} - \frac{1024}{40} = 42.67 - 25.6 = 17.07$

7.)  $\int_0^2 \int_0^4 x^2 y \, dx \, dy = \int_0^2 \frac{x^3 y}{3} \Big|_0^4 dy = \int_0^2 \frac{64}{3} y - \frac{y^5}{5} dy = \frac{32}{3} y^2 - \frac{y^5}{15} \Big|_0^2 = \frac{128}{3} - \frac{32}{15}$

11.) Due to computer screen couldn't distinguish which was the shaded part

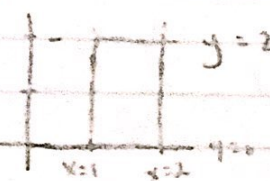
19.)  $\int_0^e \int_0^1 x \, dx \, dy = \int_0^e \int_1^{iny} x \, dy \, dx = \int_0^1 x \ln y - x \, dx = ???$

25.)  $\int_0^2 \int_0^4 f(x,y) \, dx \, dy$

31.) ???

33.)  $\int_0^1 \int_0^x \sin y/x \, dy \, dx$

35.)  $\int_0^1 \int_0^y x e^{y^2} \, dx \, dy$

37.)   $\int_0^2 \int_1^2 e^{xy} \, dx \, dy = \int_0^2 e^{xy} \Big|_1^2 dy = \int_0^2 e^{y+2} - e^{y+1} dy = e^{y+2} - e^{y+1} \Big|_0^2 = (e^4 - e^3) - (e^2 - e^1)$

43.)  $\int_1^2 \int_0^y \frac{\sin y}{y} \, dx \, dy = \int_1^2 \frac{\sin y}{y} x \Big|_0^y dy = \int_1^2 \sin y = -\cos y \Big|_1^2 = -\cos 2 + \cos 1$

49.)  $\bar{x} = x^2 + y^2, \bar{z} = 8 - x^2 - y^2 \rightarrow x^2 + y^2 = 4$

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

HW 15.1 # 9, 15, 21, 23, 25, 31, 33, 35, 37, 41 due 10/25

$$9.) \int_0^3 \int_0^5 15 - 3x \, dx \, dy = \int_0^3 \left[ 15x - \frac{3x^2}{2} \right]_0^5 dy = \int_0^3 \frac{75}{2} dy = \frac{75}{2} y \Big|_0^3 = \frac{225}{2}$$

$$15.) 0$$

$$21.) \int_4^9 \int_3^6 1 \, dx \, dy = \int_4^9 x \Big|_3^6 dy = \int_4^9 11 dy = 11y \Big|_4^9 = 55$$

$$23.) \int_{-1}^1 \int_0^{\pi} x^2 \sin y \, dy \, dx = \int_{-1}^1 x^2 \cos y \Big|_0^{\pi} dx = \int_{-1}^1 -2x^2 dx = -\frac{2x^3}{3} \Big|_{-1}^1 = -\frac{2}{3} - \frac{2}{3} = -\frac{4}{3}$$

$$25.) \int_2^6 \int_1^4 x^2 \, dx \, dy = \int_2^6 \left[ \frac{x^3}{3} \right]_1^4 dy = \int_2^6 21 dy = 21y \Big|_2^6 = 84$$

$$31.) \int_1^2 \int_0^4 \frac{1}{x+y} \, dy \, dx = \int_1^2 \ln(x+y) \Big|_0^4 dx = \int_1^2 \ln(x+4) - \ln(x) dx = \left( (x+4)(\ln(x+4)) - (x+4) \right) - \left( x \ln x - x \right) \Big|_1^2$$

$$= \left( (6 \ln 6 - 6) - (2 \ln 2 - 2) \right) - \left( (5 \ln 5 - 5) + 1 \right)$$

$$33.) \int_0^4 \int_0^5 \frac{1}{\sqrt{x+y}} \, dy \, dx = \int_0^4 \left[ -\frac{2}{3}(x+y)^{-3/2} \right]_0^5 dx = \int_0^4 \left[ -\frac{2}{3}(x+5)^{-3/2} + \frac{2}{3}x^{-3/2} \right] dx = \frac{4}{15}(x+5)^{-5/2} - \frac{4}{15}x^{-5/2} \Big|_0^4$$

$$= \frac{4}{15}(9)^{-5/2} - \frac{4}{15}(4)^{-5/2} - \frac{4}{15}(5)^{-5/2} - \frac{4}{15} \left( \frac{1}{243} - \frac{1}{32} - \frac{1}{25\sqrt{5}} \right)$$

$$35.) \int_1^2 \int_1^3 \frac{\ln(xy)}{y} \, dy \, dx = ???$$

$$37.) \int_1^2 \int_2^4 \frac{x}{y} \, dx \, dy = \int_2^4 \int_1^2 \frac{x}{y} \, dx \, dy = \int_2^4 x \ln y \Big|_1^2 dy = \int_2^4 \ln 3 x \, dx = \frac{\ln 3}{3} x^3 \Big|_2^4 = \frac{64 \ln 3}{3}$$

$$= \frac{64 \ln 3}{3} + \frac{8 \ln 3}{3} = 24 \ln 3$$

$$41.) \int_0^{\frac{\pi}{4}} \int_0^2 e^x \sin y \, dx \, dy = \int_0^{\frac{\pi}{4}} e^x \sin y \Big|_0^2 dy = \int_0^{\frac{\pi}{4}} \sin y (e^2 - 1) dy = -\cos y (e^2 - 1) \Big|_0^{\frac{\pi}{4}}$$

$$= -\frac{\sqrt{2}}{2} (e^2 - 1) + (e^2 - 1) = (e^2 - 1) \left( \frac{\sqrt{2} + 2}{2} \right)$$