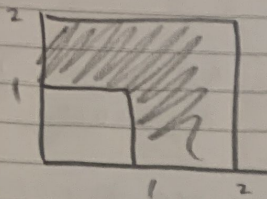


37.



$$\int_0^2 \int_0^2 e^{x+y} dx dy$$

$$\int_0^2 (e^{1+y} - e^y) dy$$

$$e^4 - e^2 - e^2 - e^0 = 37.88$$

$$43. y \leq x \leq 2y \quad 1 \leq y \leq 2$$

$$\int_1^2 \int_y^{2y} \frac{\sin y}{y} dx dy \rightarrow \int_1^2 \sin y dy \rightarrow \cos 1 - \cos 2$$

$$49. \text{ Intersection: } (2, -2) \quad f(2, 2) \quad f(-2, 2) \quad z = \pm \sqrt{4-x^2}$$

$$\int_{-2}^2 \int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}} [(8 - x^2 - y^2) - (x^2 + y^2)] dy dx$$

15.1

$$9. \iint_R (15-3x) dA, R = [0,5] \times [0,3]$$

$$\int_0^3 \int_0^5 (15-3x) dx dy \rightarrow \int_0^3 75/2 dy \rightarrow \boxed{225/2}$$

$$15. \iint_R (x^3) dA, R = [-4,4] \times [0,5] = \boxed{0}$$

$$21. \int_4^9 \int_2^8 1 dx dy \rightarrow \int_4^9 11 dy \rightarrow \boxed{55}$$

$$23. \int_1^4 \int_0^{\pi} x^2 \sin y dy dx \rightarrow \int_1^4 2x^2 dx \rightarrow \boxed{4/3}$$

$$25. \int_2^6 \int_1^4 x^2 dx dy \rightarrow \int_2^6 21 dy \rightarrow \boxed{184}$$

$$31. \int_2^5 \int_1^4 \frac{1}{x+y} dy dx \rightarrow \int_2^5 (\ln(x+4) - \ln(x)) dx \rightarrow \boxed{6 \ln 6 - 5 \ln 5 - 2 \ln 2}$$

$$33. \int_1^4 \int_0^5 \frac{1}{\sqrt{x+y}} dy dx \rightarrow \int_1^4 (2\sqrt{x+5} - 2\sqrt{x}) dx \rightarrow \boxed{\frac{76}{3} - \frac{20\sqrt{5}}{3}}$$

$$35. \int_1^2 \int_1^3 \frac{\ln xy}{y} dy dx \rightarrow \int_1^2 \left(-\frac{1}{2} \ln^2(3) + \ln(3) \ln(3x) \right) dx \rightarrow \boxed{\frac{3}{2} \ln^2 3 + 2 \ln 3 \ln 2}$$

$$37. \iint_R \frac{x}{y} dA, R = [-2,4] \times [1,3]$$

$$\int_1^3 \int_{-2}^4 \frac{x}{y} dx dy \rightarrow \int_1^3 \frac{6}{y} dy \rightarrow \boxed{6 \ln 3}$$

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

$$\int_0^{\pi/4} \int_0^2 e^x \sin y dx dy \rightarrow \int_0^{\pi/4} \sin y (e^2 - 1) dy$$

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

15.2

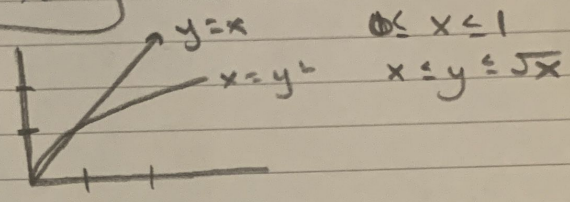
3. Vertical: $0 \leq x \leq 1$ $0 \leq y \leq 1-x^2$ $\int_0^1 \int_0^{1-x^2} xy \, dy \, dx$
 Horizontal: $0 \leq y \leq 1$ $0 \leq x \leq \sqrt{1-y}$ $\int_0^1 \int_0^{\sqrt{1-y}} xy \, dx \, dy$ } $\frac{1}{12}$

5. 6. and 7. I can't tell in the scans where the shaded region is.

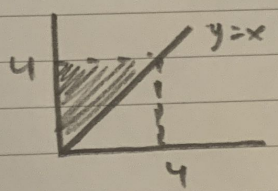
11. $\iint_D \frac{y}{x} \, dA$ $0 \leq y \leq \sqrt{4-x^2}$ $1 \leq x \leq 2 \rightarrow -\frac{3}{4} + \ln 4$

19. $f(x,y) = x$; $0 \leq x \leq 1$ $1 \leq y \leq e^{x^2} \rightarrow \int_0^1 \int_1^{e^{x^2}} x \, dy \, dx$
 $\int_0^1 (e^{x^2} - x) \, dx \rightarrow \left[\frac{e^{x^2}}{2} - \frac{x^2}{2} \right]_0^1 = \frac{e-1}{2} - \frac{1}{2}$

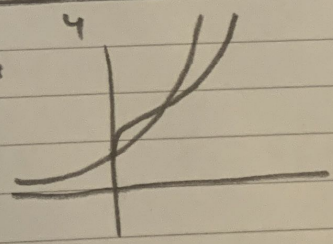
21. $f(x,y) = 2xy$ $x=y$, $x=y^2$
 $\int_0^1 \int_x^{\sqrt{x}} 2xy \, dy \, dx = \frac{1}{12}$



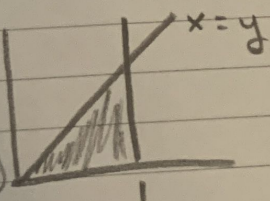
25. $\int_0^4 \int_x^4 f(x,y) \, dy \, dx$
 $0 \leq y \leq 4$ $0 \leq x \leq y$



31. $f(x,y) = (\ln y)^{-1}$ $y=e^x$ $y=e^{5x}$
 $\int_0^1 \int_{e^{5x}}^{e^x} (\ln y)^{-1} \, dx \, dy$
 $\int_0^1 (1 - \ln y) \, dy \rightarrow e - 2$



33. $\int_0^1 \int_y^1 \frac{\sin x}{x} \, dx \, dy$
 $0 \leq x \leq 1$ $0 \leq y \leq x \rightarrow 1 - \cos 1$



35. $\int_0^1 \int_{y=x}^1 x e^{y^3} \, dy \, dx$
 $0 \leq y \leq 1$ $0 \leq x \leq y \rightarrow \frac{e-1}{6}$

