Lyell C Read

CH 13.2 Part 2 HW
pr 45-67 odd

11/13/2018

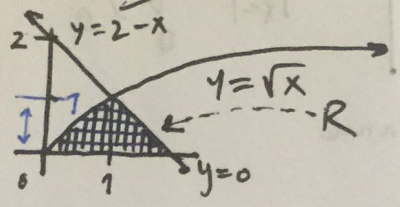
45) $\int_0^{\pi/2}\int_y^{\pi/2} 6\sin(2x-3y)\,dx\,dy \rightarrow$

1] $\int_y^{\pi/2} 6\sin(2x-3y)\,dx = -3\cos(2x-3y)\Big|_y^{\pi/2} = \underline{-3\cos(\pi-3y)+3\cos(-y)}$

2] $\int_0^{\pi/2} -3\cos(\pi-3y)+3\cos(-y)\,dy = \sin(\pi-3y)-3\sin(-y)\Big|_0^{\pi/2}$

$= \left[\sin(-\pi/2)-3\sin(-\frac{\pi}{2})\right]-\left[\sin(\pi)-\sin(0)\right] = 3-1 = \boxed{2}$

47) $\iint_R 12y\,dA$ $\begin{cases} y=2-x \\ y=\sqrt{x} \\ y=0 \end{cases}$



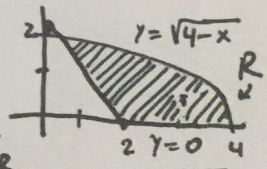
$= \int_0^1\int_{2-y}^{y^2} 12y\,dx\,dy$

1] $\int_{2-y}^{y^2} 12y\,dx = 12xy\Big|_{2-y}^{y^2} = 12y(2-y)-12y(y^2) = \underline{24y-12y^2-12y^3}$

2] $\int_0^1 24y-12y^2-12y^3\,dy = 12y^2-4y^3-3y^4\Big|_0^1 = 12-4-3 = \boxed{5}$

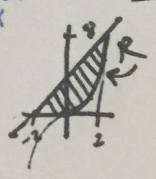
49) (just set-up) $\iint_R 3xy\,dA$ $\left.\begin{cases} y=2-x, \\ y=0 \\ x=4-y^2 \end{cases}\right\}$ 1st Q.

↳ $y=\sqrt{4-x}$



$\int_0^2\int_{2-y}^{4-y^2} 3xy\,dx\,dy = \boxed{14}$

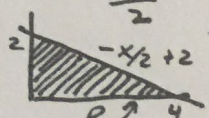
51) (just set-up) $\iint_R 3x^2\,dA$ $\begin{cases} y=0 \\ y=2x+4 \\ y=x^3 \end{cases}$



$\int_0^8\int_{\frac{y-4}{2}}^{\sqrt[3]{x}} 3x^2\,dx\,dy = \boxed{32}$

53) Plane: $z=8-2x-4y$. Flattened on x-y

$\therefore$ Vol $= \iint_R 8-2x-4y\,dA = \int_0^4\int_0^{-\frac{x}{2}+2} 8-2x-4y\,dy\,dx$

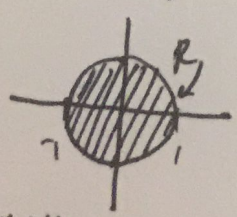


$z=0;\ 8-2x-4y$

$= y=-\frac{x}{2}+2$

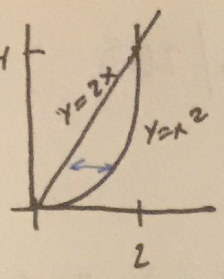
solver $= \boxed{\frac{32}{3}}$

55) Cylinder with base $x^2+y^2=1$ and terminating at plane $z=0$ and plane $z=12+x+y$



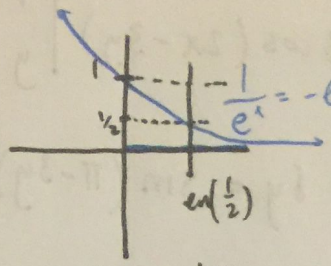
$\iint_R 12+x+y\,dA = \int_{-1}^{1}\int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} 12+x+y\,dy\,dx$

$= \boxed{12\pi}$

57) 

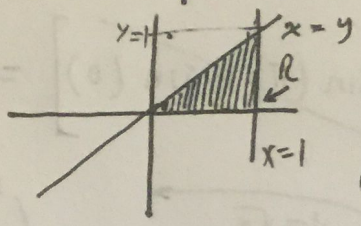
$$\int_0^2 \int_{x^2}^{2x} f(x,y)\,dy\,dx \rightarrow \int_0^4 \int_{\sqrt{y}}^{\frac{1}{2}y} f(x,y)\,dx\,dy$$

59) $\int_{1/2}^{1} \int_{0}^{-\ln y} f(x,y)\,dx\,dy$ $\quad -\ln y \sim \frac{1}{e^x}$ $\quad 0 = x$



$$\int_0^{\ln(\frac{1}{2})} \int_{1/2}^{\frac{1}{e^x}} f(x,y)\,dy\,dx$$

63) $\int_0^1 \int_y^1 e^{x^2}\,dx\,dy$



$$\int_0^1 \int_0^x e^{x^2}\,dy\,dx = \frac{1}{2}(e-1)$$

skipped test b/c procedure is the same