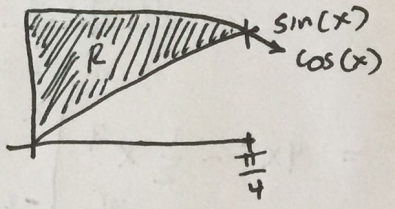
Lyell C Read

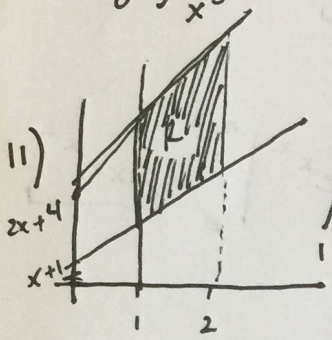
CH 13 Part 1 HW
pr 7-37 odd

11/11/2018

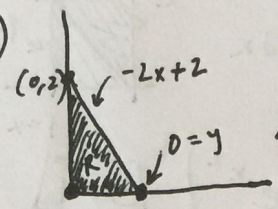
7) $\int_0^2 \int_{x^3}^{4x} f(x,y)\, dy\, dx$

9) 

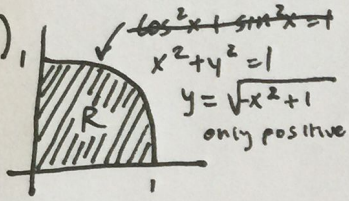
$\int_0^{\pi/4} \int_{\sin x}^{\cos x} f(x,y)\, dy\, dx$

11) 

$\int_1^2 \int_{x+1}^{2x+4} f(x,y)\, dy\, dx$

13) 

$\int_0^1 \int_0^{-2x+2} f(x,y)\, dy\, dx$

15) 

~~$\cos^2 x + \sin^2 x = 1$~~

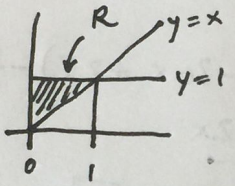
$x^2+y^2=1$

$y=\sqrt{x^2+1}$

only positive

$\int_0^1 \int_0^{\sqrt{1-x^2}} f(x,y)\, dy\, dx$

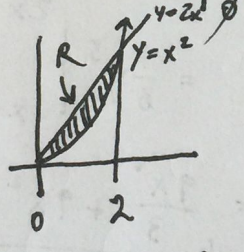
17) $\int_0^1 \int_x^1 6y\, dy\, dx$



$\int_x^1 6y\, dy = 3y^2\Big|_x^1 = \underline{3x^2-3}$

$\int_0^1 3x^2-3\, dx = x^3-3x\Big|_0^1 = 1-3 = \boxed{-2}$

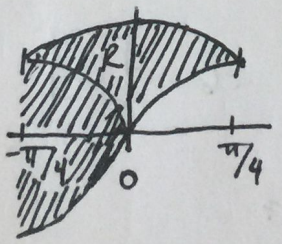
19) $\int_0^2 \int_{x^2}^{2x} xy\, dy\, dx$



$\int_{x^2}^{2x} xy\, dy = \frac{1}{2}xy^2\Big|_{x^2}^{2x} = 2x^3 - \frac{1}{2}x^5$

$\int_0^2 2x^3 - \frac{1}{2}x^5\, dx = \frac{1}{2}x^4 - \frac{1}{12}x^6\Big|_0^2 = \frac{24}{3} - \frac{16}{3} = \boxed{\frac{8}{3}}$

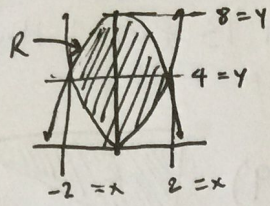
21) $\int_{-\pi/4}^{\pi/4} \int_{\sin x}^{\cos x} 1\, dy\, dx$



$\int_{\sin x}^{\cos x} 1\, dy = y\Big|_{\sin x}^{\cos x} \quad \underline{\cos x - \sin x}$

$\int_{-\pi/4}^{\pi/4} \cos x - \sin x\, dx = \sin x + \cos x\Big|_{-\pi/4}^{\pi/4} = \underbrace{\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}}_{=\sqrt{2}} - \left(\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2}\right)$

23) $\int_{-2}^{2}\int_{x^2}^{8-x^2} x\,dy\,dx$

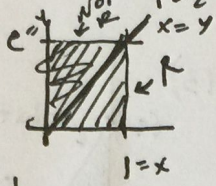


$\int_{x^2}^{8-x^2} x\,dy = yx\Big|_{x^2}^{8-x^2} = (8x - x^3) - (x^3)$

$= 8x - 2x^3$

$\int_{-2}^{2} 8x - 2x^3\,dx = 4x^2 - \frac{1}{2}x^4\Big|_{-2}^{2} = \boxed{0}$

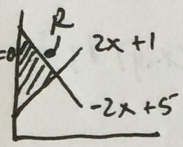
25) $\int_0^1\int_0^{x} 2e^{x^2}\,dy\,dx$



$\int_0^{x} 2e^{x^2}\,dy = y2e^{x^2}\Big|_0^{x} = 2xe^{x^2}$

$\int_0^1 2xe^{x^2}\,dx = e^{x^2}\Big|_0^1 = \boxed{e-1}$

27) $\iint_R xy\,dA \begin{cases} x=0 \\ y=2x+1 \\ y=-2x+5 \end{cases} = \int_0^1\int_{2x+1}^{-2x+5} xy\,dy\,dx$

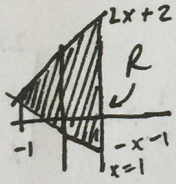


$\int_{2x+1}^{-2x+5} xy\,dy = \frac{1}{2}xy^2\Big|_{2x+1}^{-2x+5} = \frac{1}{2}x(4x^2-20x+25) - \frac{1}{2}x(4x^2+4x+1)$

$= -12x^2+12x$

$\int_0^1 -12x^2+12x = -4x^3+6x^2\Big|_0^1 = -4+6 = \boxed{2}$

29) $\iint_R y^2\,dA \begin{cases} x=1 \\ -x-1 \\ 2x+2 \end{cases}$



$\int_{-1}^{1}\int_{-x-1}^{2x+2} y^2\,dy\,dx = \frac{1}{3}y^3\Big|_{-x-1}^{2x+2}$

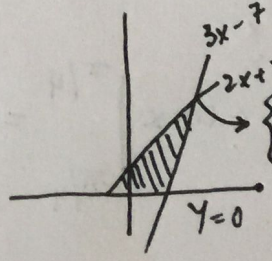
$= \frac{8x^3}{3} + 8x^2 + 8x + 8/3 - \left(-\frac{x^3}{3} - x^2 - x - \frac{1}{3}\right) = \frac{9x^3}{3} + 9x^2 + 9x + 3$

$\int_{-1}^{1} 3x^3 + 9x^2 + 9x + 3 = \frac{3}{4}x^4 + \frac{9}{3}x^3 + \frac{9}{2}x^2 + 3x\Big|_{-1}^{1}$

$= \frac{3}{4} + \frac{9}{3} + \frac{9}{2} + 3 - \left(\frac{3}{4} - \frac{9}{3} + \frac{9}{2} - 3\right) = \frac{18}{3} + 6 = \boxed{12}$

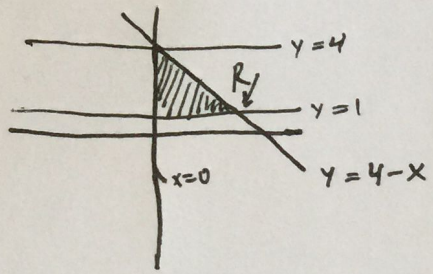
31) $\int_0^{16}\int_{y/2}^{\frac{y}{3}+3} f\,dx\,dy$

33)



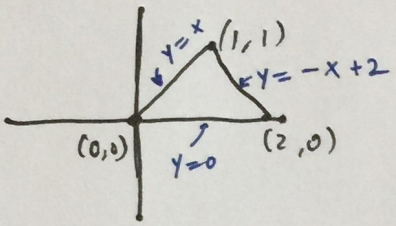
$\int_0^{23}\int_{\frac{y-3}{2}}^{\frac{y+7}{3}} f(x,y)\,dx\,dy$

35)



$$\rightarrow \int_{1}^{4} \int_{0}^{4-y} f(x,y)\, dx\, dy$$

37)



$$\rightarrow \int_{0}^{1} \int_{y}^{2-y} f(x,y)\, dx\, dy$$