P. 467 #1,7,13

P. 473 #7,11,15,19,27*

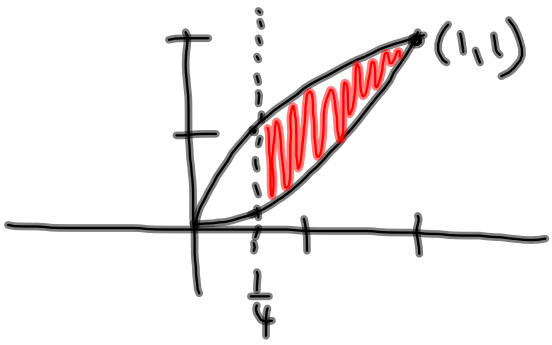
P. 479 #3,7,15

1) $\int_{-1}^{2}[(x^2+1)-x]\,dx = \int_{-1}^{2}(x^2-x+1)\,dx$

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

$= \frac{8}{3} - \left(-\frac{11}{6}\right) = \frac{27}{6} = \frac{9}{2}$

7) $y=x^2$ $\quad y=\sqrt{x}$ $\quad \left[\frac{1}{4},1\right]$




$$A=\int_{\frac{1}{4}}^{1}\left(\sqrt{x}-x^2\right)dx$$

$$=\frac{x^{3/2}}{3/2}-\frac{x^3}{3}\Big|_{\frac{1}{4}}^{1}=\frac{2}{3}-\frac{1}{3}-\left(\frac{1}{12}-\frac{1}{192}\right)=\frac{1}{3}-\left(\frac{15}{192}-\frac{1}{192}\right)$$

$$=\frac{64}{192}-\left(\frac{15}{192}\right)=\frac{49}{192}$$

$\frac{1}{4}\ \frac{2}{3}\quad\frac{1}{64}\ \frac{1}{3}$

$64$ $\quad 12$

$2\cdot 32$ $\quad 4\cdot 3$

$2\cdot 16$

$4\cdot 4$ $\quad \frac{64}{192}$

13) $\int_0^{\ln 2} (e^{2x} - e^x)\,dx$

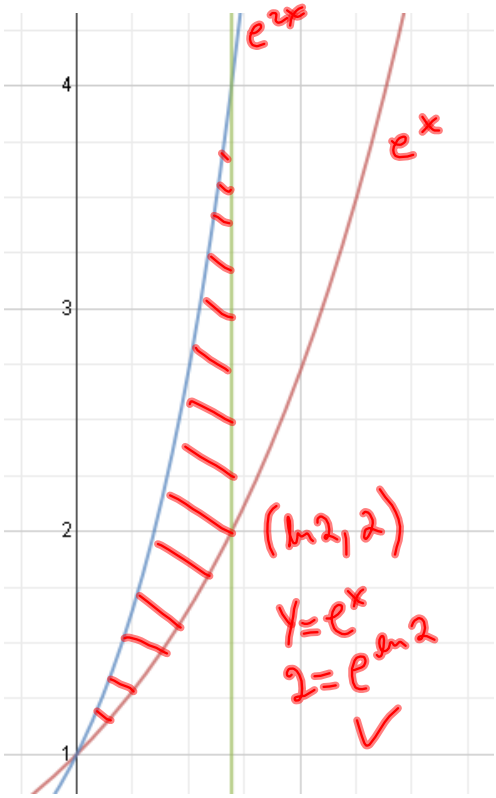
$\frac{1}{2}\int_0^{\ln 2} e^{2x}\,2dx - \int_0^{\ln 2} e^x dx$

$\frac{1}{2}e^{2x}\Big|_0^{\ln 2} - e^x\Big|_0^{\ln 2}$

$\frac{1}{2}\left(e^{2\ln 2} - 1\right) - \left(e^{\ln 2} - 1\right)$

$\frac{1}{2}(4-1) - (2-1)$

$\frac{1}{2}(3) - 1 = \frac{1}{2}$



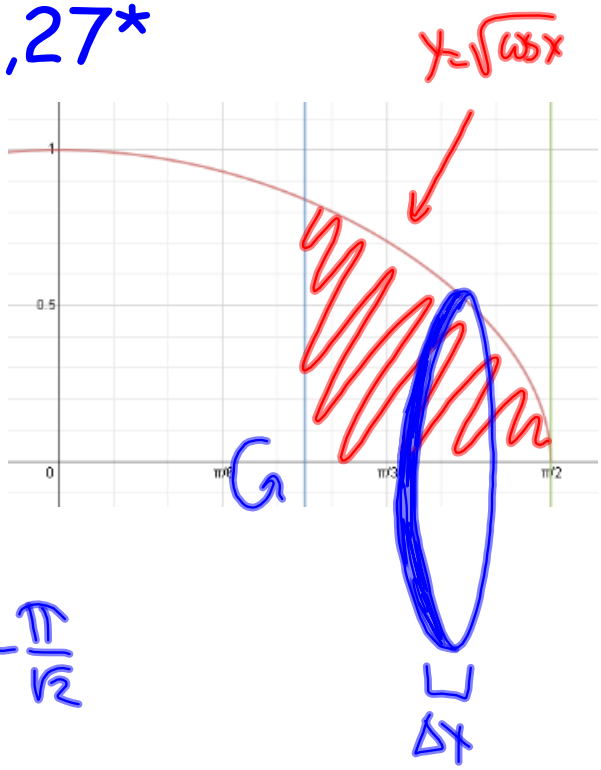
# P. 473 #7,11,15,19,27*

7) $r=\sqrt{\cos x}$

$A=\pi(\sqrt{\cos x})^2$

$V=\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \pi \cos x\,dx$

$\pi \sin x\Big|_{\frac{\pi}{4}}^{\frac{\pi}{2}} = \pi\left(1-\frac{1}{\sqrt{2}}\right) = \pi - \frac{\pi}{\sqrt{2}}$



11) $y = e^x$

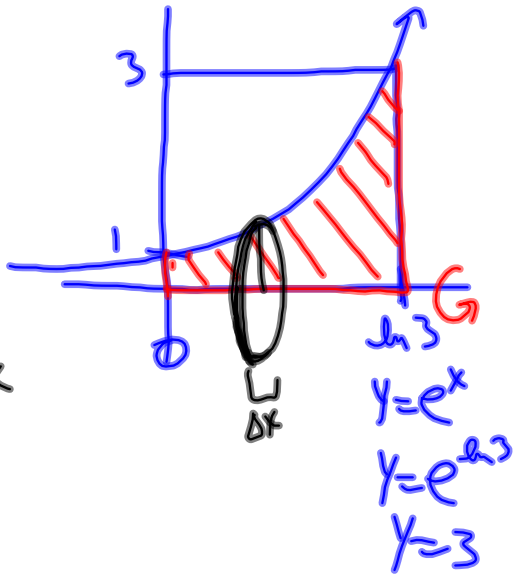
$r = e^x$

$A = \pi (e^x)^2 = \pi e^{2x}$

$$V = \int_0^{\ln 3} \pi e^{2x}\,dx = \frac{\pi}{2}\int_0^{\ln 3} e^{2x}\cdot 2\,dx$$

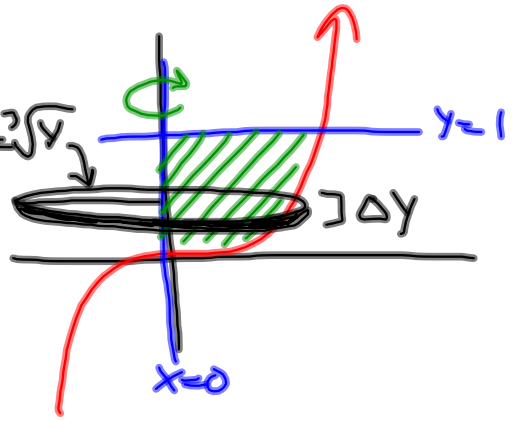
$$= \frac{\pi}{2}\left(e^{2x}\Big|_0^{\ln 3}\right) = \frac{\pi}{2}\left(e^{2\ln 3} - 1\right)$$

$$= \frac{\pi}{2}(9-1) = 4\pi$$



15) $y=x^3$ $x=0, y=1$

$x=\sqrt[3]{y}$




$$\int_0^1 \pi(\sqrt[3]{y})^2\,dy$$

$$\pi\int_0^1 y^{\frac{2}{3}}\,dy = \pi\left(\frac{3y^{\frac{5}{3}}}{5}\right)\Big|_0^1$$

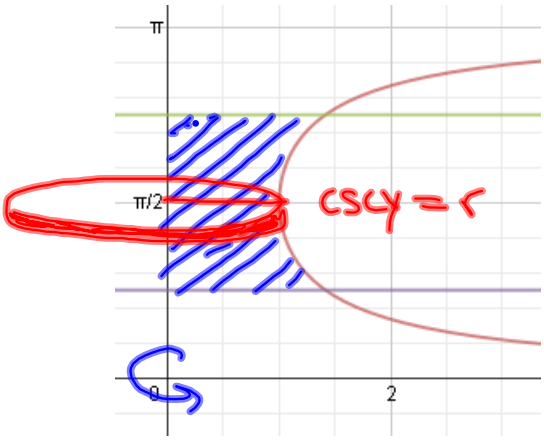
$$= \pi\left(\frac{3}{5}-0\right) = \frac{3\pi}{5}$$

19) $x = \csc y$

$$\int_{\pi/4}^{3\pi/4} \pi(\csc y)^2 dy$$

$$\pi \int_{\pi/4}^{3\pi/4} \csc^2 y \, dy$$

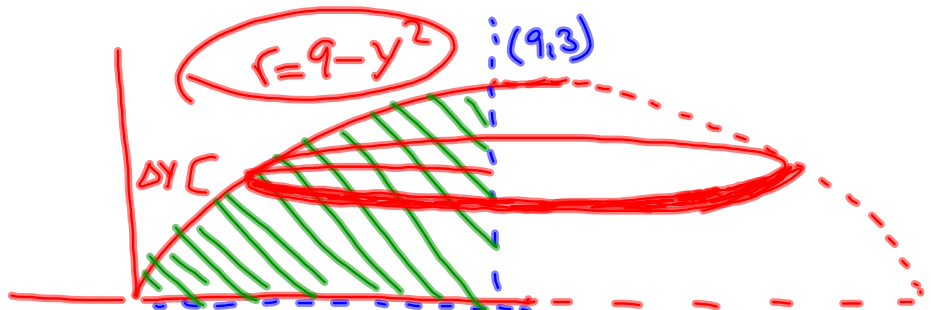
$$-\pi \cot y \Big|_{\pi/4}^{3\pi/4} = -\pi(-1-1) = 2\pi$$

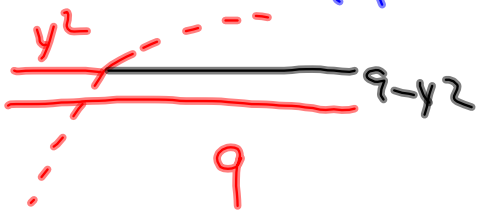


27)

$y=\sqrt{x}$

$x=y^2$



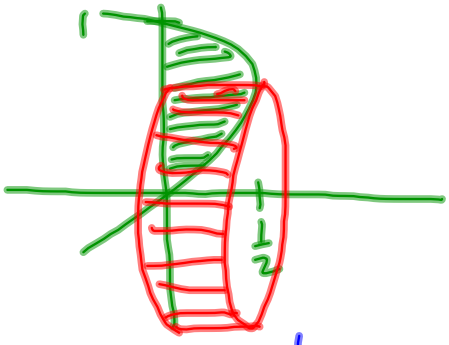




$$\int_0^3 \pi(9-y^2)^2\,dy = \pi\int_0^3 (81-18y^2+y^4)\,dy = \pi\left(81y-6y^3+\frac{y^5}{5}\right)\Big|_0^3$$

$$= \pi\left(243-162+\frac{243}{5}\right)-0 = \pi\left(\frac{1215-810+243}{5}\right) = \frac{648\pi}{5}$$

## P. 479 #3,7,15

3) $x = 2y - 2y^2$

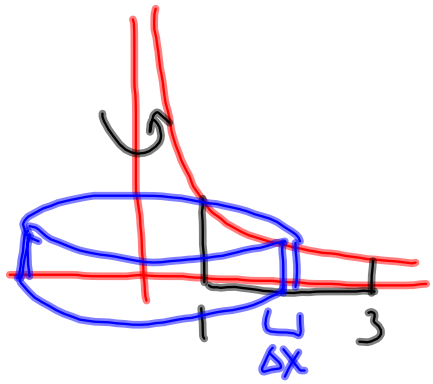



$$V = 2\pi \int_0^1 y(2y - 2y^2)\,dy$$

$$4\pi \int_0^1 (y^2 - y^3)\,dy = 4\pi \left( \frac{y^3}{3} - \frac{y^4}{4} \right) \Big|_0^1$$

$$= 4\pi \left( \frac{1}{3} - \frac{1}{4} \right) = \frac{4\pi}{12} = \frac{\pi}{3}$$

7) $y=\frac{1}{x}$ $y=0$ $x=1$ $x=3$

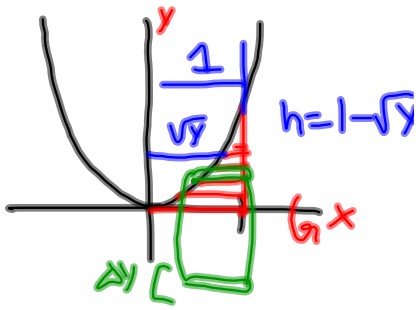



$$\int_1^3 2\pi x \frac{1}{x}\,dx$$

$$= 2\pi \int_1^3 dx = 2\pi x \Big|_1^3 = 2\pi(3-1) = 4\pi$$

15) $y=x^2$ $x=1$ $y=0$

$x=\sqrt{y}$




$2\pi \int x \underbrace{f(x)\,dx}_{\text{different}}$

$2\pi \int_0^1 y\left(1-\sqrt{y}\right)dy$

$2\pi \int_0^1 \left(y-y^{3/2}\right)dy = 2\pi\left(\frac{y^2}{2}-\frac{y^{5/2}}{\frac{5}{2}}\right)_0^1 = 2\pi\left(\frac{1}{2}-\frac{2}{5}\right)-0$

$2\pi\left(\frac{1}{10}\right)=\frac{\pi}{5}$