7.1 #1-9 odd; 19, 37 area between curves

7.2 #11, 13, 17, 19, 21, 25, 29, 37 volume of solids of revolution

7.4 #7,9,19, 37,39 arc length & surface area of solids of revolution

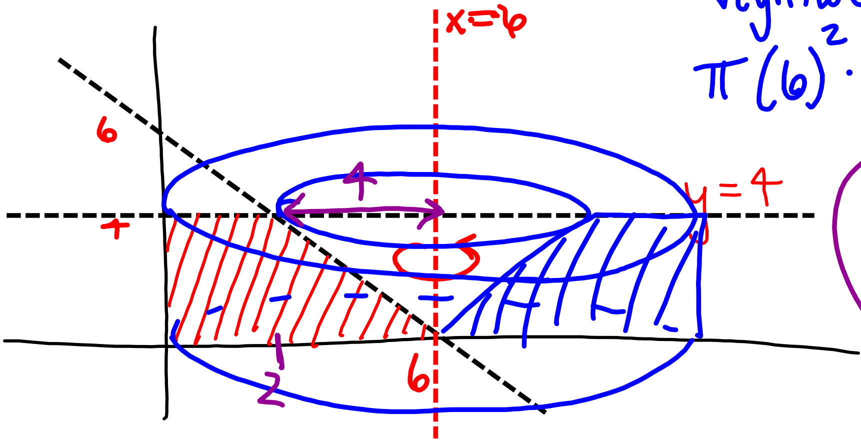
needs to be updated for new text:

- 7.1 #5-53 odd basic integration techniques
- 7.2 #1-35 odd integration by parts

6.2

20. $y=6-x$, $y=0$, $y=4$, $x=0$

around $x=6$



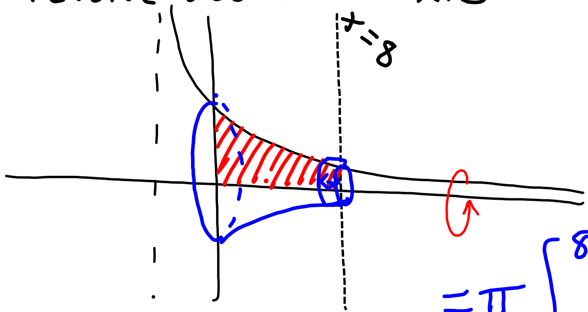
$V_{cylinder} - V_{cone}$

$\pi(6)^2\cdot 4 - \frac{1}{3}\pi(4)^2\, 4$

$144\pi - \frac{64\pi}{3}$

26. $y=\frac{3}{x+1}$, $y=0$, $x=0$, $x=8$

revolve about x-axis



height : $\Delta x = dx$

radius : $\frac{3}{x+1}$

$$\int_0^8 \pi\left(\frac{3}{x+1}\right)^2 dx$$

$$=\pi\int_0^8 \frac{9}{(x+1)^2}\,dx$$

$u=x+1$

$du=dx$

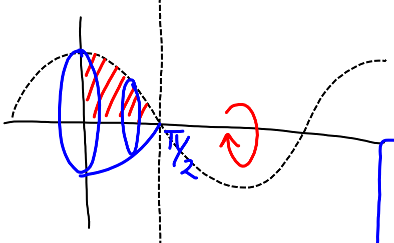
$$=\pi\int_{x=0}^{8} \frac{9\,du}{u^2} = \pi\int_{x=0}^{8} 9u^{-2}\,du$$

$$=\pi\left(-9u^{-1}\right)\Big|_{x=0}^{8} = \frac{-9\pi}{x+1}\Big|_0^8$$

$$= \frac{-9\pi}{8+1} - \frac{-9\pi}{0+1} = -\pi+9\pi = \boxed{8\pi}$$

34. $y=\cos x$, $y=0$, $x=0$, $x=\frac{\pi}{2}$

revolve about x-axis



$$\pi\int_0^{\pi/2} \cos^2 x\,dx$$

$\cos 2x = 2\cos^2 x - 1$

$\frac{\cos 2x + 1}{2} = \cos^2 x$

$$\pi\int_0^{\pi/2} \frac{\cos 2x + 1}{2}\,dx$$

$$= \int_0^{\pi/2} \frac{\pi}{2}\,dx + \frac{\pi}{2}\int_0^{\pi/2} \cos 2x\,dx$$

$u=2x$

$du=2dx$

$\frac{1}{2}du=dx$

$\int \frac{1}{2}\cos u\,du$

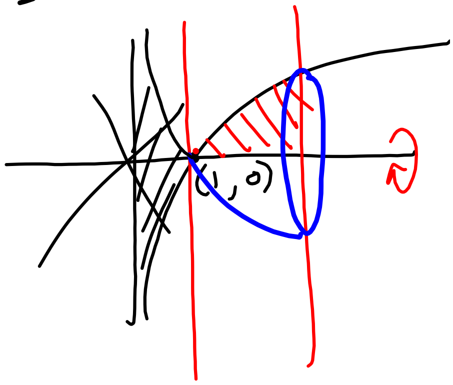
$=\frac{1}{2}\sin u$

$$= \frac{\pi}{2}x\Big|_0^{\pi/2} + \frac{\pi}{2}\cdot\frac{1}{2}\sin 2x\Big|_0^{\pi/2}$$

$$= \frac{\pi^2}{4} + \frac{\pi}{4}\cdot 0 = \boxed{\pi^2/4}$$

36. $y = \ln x$, $y = 0$, $x = 1$, $x = 3$

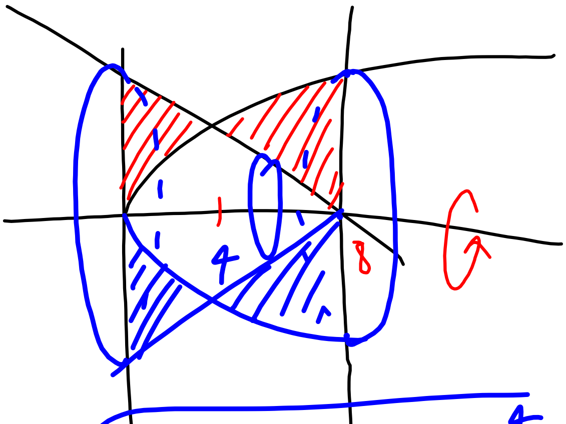
about x-axis



$$\int_1^3 \pi (\ln x)^2 \, dx$$

30. $y = \sqrt{x}$, $y = -\frac{1}{2}x + 4$, $x = 0$, $x = 8$

about x-axis



$$\sqrt{x} = -\frac{1}{2}x + 4$$

$$x = \left(-\frac{1}{2}x + 4\right)^2$$

$$x = \frac{1}{4}x^2 - 4x + 16$$

$$4x = x^2 - 16x + 64$$

$$0 = x^2 - 20x + 64$$

$$0 = (x - 16)(x - 4)$$

$$x = 16, 4$$

$$\boxed{\int_0^4 \pi\left(-\frac{1}{2}x+4\right)^2 dx - \int_0^4 \pi(\sqrt{x})^2 dx}$$

$$+ \int_4^8 \pi(\sqrt{x})^2 dx - \int_4^8 \pi\left(-\frac{1}{2}x+4\right)^2 dx$$