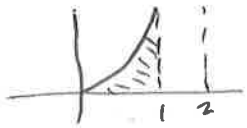
6.2 Setups

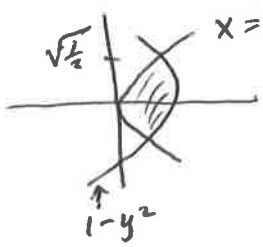
#1 $\int_{-1}^{1} \pi (1-x^2)^2 \, dx$ #3) $\int_{1}^{5} \pi \left(\sqrt{x-1}\right)^2 dx$

#9) $\int_{0}^{2} \pi \left((2y)^2 - (y^2)^2 \right) dy$ #11) $\int_{0}^{1} \pi \left((1-x)^2 - (1-\sqrt{x})^2 \right) dx$

#15) $\int_{0}^{1} \pi \left[(2-\sqrt[3]{y})^2 - (2-1)^2 \right] dy$



#17



Use washers with
inner radius: $3-(1-y^2)$
outer radius: $3-y^2$

#20) $\int_{0}^{1} \pi (1^2 - y^2) \, dy$ #22) $\int_{0}^{1} \pi \left((1-0)^2 - (1-x)^2 \right) dx$

#23) $\int_{0}^{1} \pi \left(1^2 - (x^{1/4})^2 \right) dx$ #25) $\int_{0}^{1} \pi \left(1^2 - (1-y^4)^2 \right) dy$

#27) $\int_{0}^{1} \pi \left((x^{1/4})^2 - x^2 \right) dx$ #29) $\int_{0}^{1} \pi \left((1-y^4)^2 - (1-y)^2 \right) dy$

#31, #33: Set ups only: #31 $\int_{-1}^{1} \pi (e^{-x^2})^2 \, dx$

#33: Solve for y: $y = \pm\sqrt{1-x^2}/4$ (+ = top half, − = bottom half)

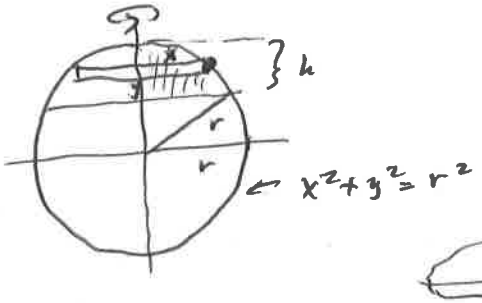
6.2, cont.

#41 (Example)

$$\pi \int_0^1 (y^2)^2 - (y^4)^2 \, dy$$

Rotate region between y^2 & y^4 about y-axis.

#49

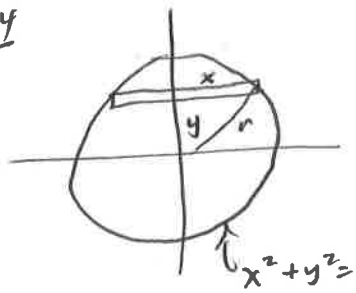


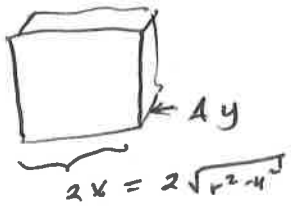
$R = \sqrt{r^2-y^2}$

Using

$$V = \pi \int_{r-h}^{r} \pi \left(\sqrt{r^2-y^2}\right)^2 dy$$

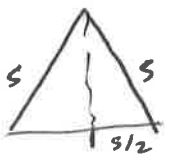
#54





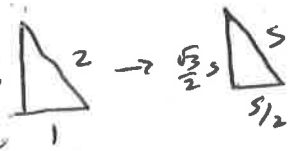
$$V = \int_{-r}^{r} \left(2\sqrt{r^2-y^2}\right)^2 dy$$

#56 Note:



Area is: ~~$\frac{\sqrt{3}}{4}s^2$~~

$\frac{\sqrt{3}}{2}s \cdot \frac{s}{2}$



If area is $\frac{\sqrt{3}}{4}s^2$, then: