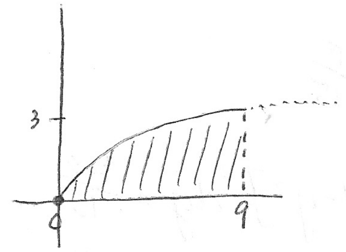
Volumes of Known Cross Sections:

1.



a. $\int_0^9 [\sqrt{x}]^2\,dx = \frac{81}{2}$

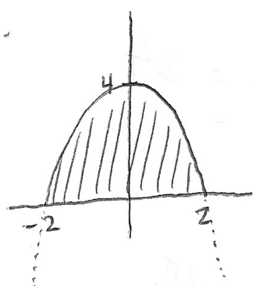
b. $\frac{\pi}{8}\int_0^9 [\sqrt{x}]^2\,dx = 81\pi/16$

c. Leg in Base: $\frac{1}{2}\int_0^9 [\sqrt{x}]^2\,dx = \frac{81}{4}$

Hyp in Base: $\frac{1}{4}\int_0^9 [\sqrt{x}]^2\,dx = \frac{81}{8}$

d. $\frac{\sqrt{3}}{4}\int_0^9 [\sqrt{x}]^2\,dx = \frac{81\sqrt{3}}{8}$

2.



a. $\int_{-2}^2 [4-x^2]^2\,dx = \frac{512}{15}$

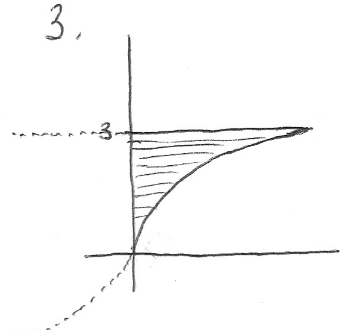
b. $\frac{\pi}{8}\int_{-2}^2 [4-x^2]^2\,dx = \frac{64\pi}{15}$

c. Leg in Base: $\frac{1}{2}\int_{-2}^2 [4-x^2]^2\,dx = \frac{256}{15}$

Hyp in Base: $\frac{1}{4}\int_{-2}^2 [4-x^2]\,dx = \frac{128}{15}$

d. $\frac{\sqrt{3}}{4}\int_{-2}^2 [4-x^2]^2\,dx = \frac{128\sqrt{3}}{15}$

3.



a. $\int_0^3 [y^3]^2\,dy = \frac{2187}{7}$

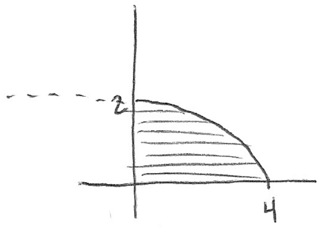
b. $\frac{\pi}{8}\int_0^3 [y^3]^2\,dy = 2187\pi/56$

c. Leg in Base $\frac{1}{2}\int_0^3 [y^3]^2\,dy = 2187/14$

Hyp in Base $\frac{1}{4}\int_0^3 [y^3]^2\,dy = 2187/28$

d. $\frac{\sqrt{3}}{4}\int_0^3 [y^3]^2\,dy = 2187\sqrt{3}/28$

4.



a. $\int_0^2 [4-y^2]^2 dy = \frac{256}{15}$

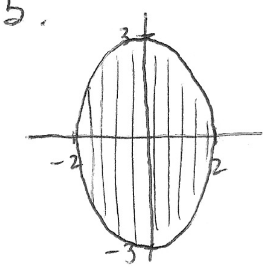
b. $\frac{\pi}{8}\int_0^2 [4-y^2]^2 dy = \frac{32\pi}{15}$

c. Leg in Base $\frac{1}{2}\int_0^2 [4-y^2]^2 dy = \frac{128}{15}$

Hyp in Base $\frac{1}{4}\int_0^2 [4-y^2]^2 dy = \frac{64}{15}$

d. $\frac{\sqrt{3}}{4}\int_0^2 [4-y^2]^2 dy = \frac{64\sqrt{3}}{15}$

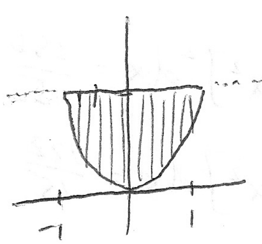
5.



$9x^2+4y^2=36 \Rightarrow y=\pm\sqrt{9-\frac{9}{4}x^2}$

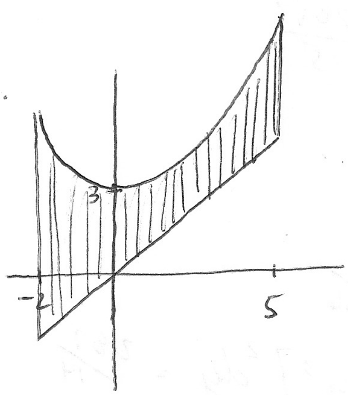
$\frac{1}{4}\int_{-2}^{2}\left[\sqrt{9-\frac{9}{4}x^2} - -\sqrt{9-\frac{9}{4}x^2}\right]^2 dx = 24$

6.



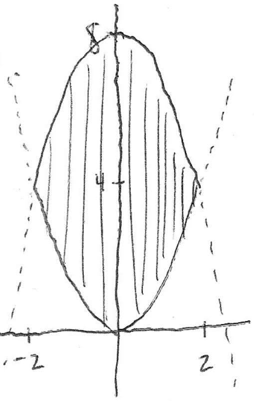
[redacted] $\frac{\pi}{8}\int_{-1}^{1}[1-x^2]^2 dx = \frac{2\pi}{15}$

7.



$\frac{\sqrt{3}}{4}\int_{-2}^{5}[x^2+3-x]^2 dx = \frac{326221\sqrt{3}}{120}$

8.



a. $2\int_{-2}^{2}\left[8-x^2-x^2\right]^2 dx = \frac{4096}{15}$

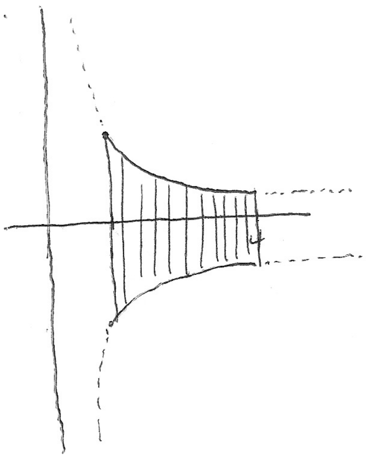
b. $f(x)=x^2 \Rightarrow f(y)=\pm\sqrt{y}$

$g(x)=8-x^2 \Rightarrow g(y)=\pm\sqrt{8-y}$

$$\int_0^4\left[\sqrt{y}--\sqrt{y}\right]^2 dy + \int_4^8\left[\sqrt{8-y}--\sqrt{8-y}\right]^2 dy$$

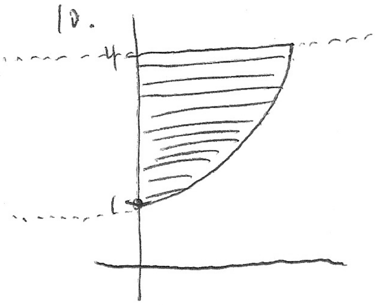
$$= 64$$

9.



$$\frac{1}{2}\int_1^4\left[\frac{1}{\sqrt{x}}-\frac{-1}{\sqrt{x}}\right]^2 dx = 4\ln(2)$$

10.



$$\frac{\pi}{8}\int_1^4\left[\ln y\right]^2 dy = 1.020$$