Knock, Knock... Who's there? Key

AP Calculus AB: 9.3 Disk Method

1. (Calculator)Consider the equations $f(x) = x^3 + 1$, y=0, and x=1.
   a. Find the **area** enclosed by the equations above. (Ans: 2)

$$\int_{-1}^{1} (x^3+1)\,dx = \boxed{2}$$

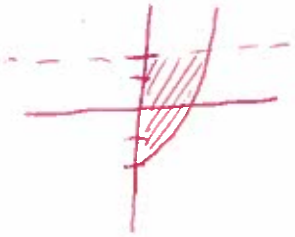
   b. Find the **volume** of the solid generated by rotating the enclosed region about the x-axis. (Ans: $\frac{16\pi}{7}$)

$$\pi\int_{-1}^{1} (x^3+1)^2\,dx = \boxed{\frac{16\pi}{7}}$$

2. (Calculator) Find the volume of the region bounded by $y = x^2 + 2$, the x-axis, x=-2 and x=2 around the x-axis. (Ans: $\frac{752\pi}{15}$)

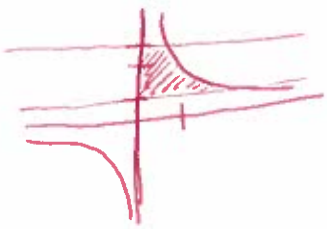
$$\pi\int_{-2}^{2} (x^2+2)^2\,dx = \boxed{\frac{752\pi}{15}}$$

3. (No Calculator) Find the volume of the region enclosed by $x = \sqrt{y+2}$, x=0, and y=2 and revolved around the y-axis. (Ans: 8π)



$$\pi\int_{-2}^{2} (\sqrt{y+2})^2\,dy = \boxed{8\pi}$$

4. (No Calculator) Find the volume of the solid that is generated by revolving the region enclosed by $y = \frac{1}{x}$, the y-axis, y=1, and y=3 around the y-axis. (Ans: $\frac{2\pi}{3}$)



$$\pi\int_{1}^{3} \left(\frac{1}{y}\right)^2 dy = \boxed{\frac{2\pi}{3}}$$