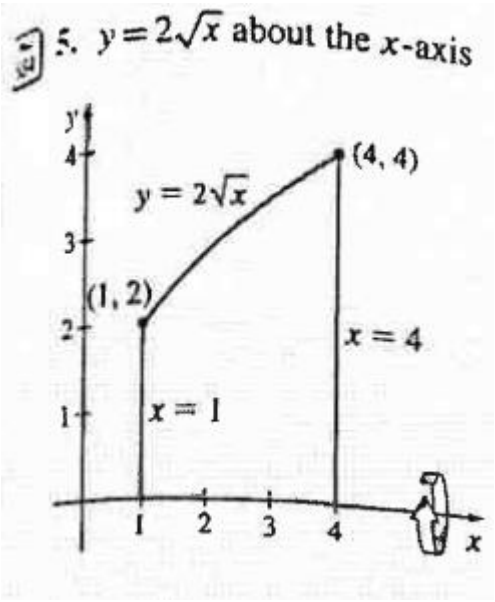
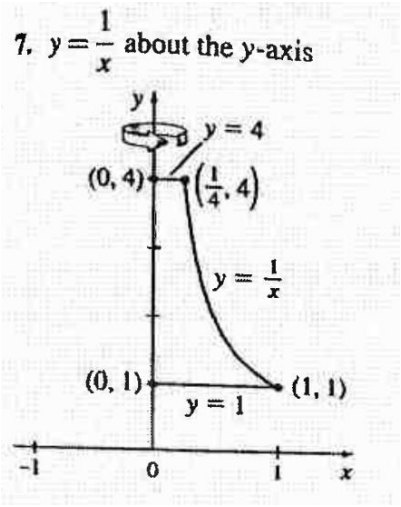
AP Calculus – 8.2a Disc Method - Homework Solutions pg. 592-596



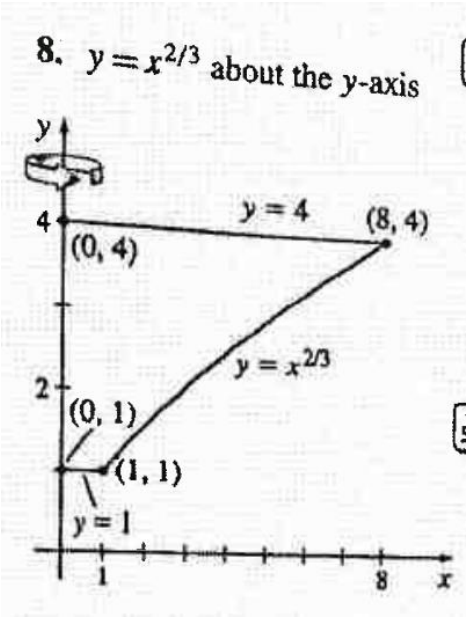
5. Using the disk method, the radius of each disk is $2\sqrt{x}$, so the volume is

$$V = \pi \int_1^4 \left(2\sqrt{x}\right)^2 dx = 4\pi \int_1^4 x\,dx = 4\pi \left[\frac{1}{2}x^2\right]_1^4 = \boxed{30\pi}.$$



7. Since we are revolving around the y-axis with the disk method, first solve the equation for x to get $x = \frac{1}{y}$. Then the radius of each disk is $\frac{1}{y}$, so the volume is

$$V = \pi \int_1^4 \left(\frac{1}{y}\right)^2 dy = \pi \int_1^4 \frac{1}{y^2}\,dy = \pi \left[-\frac{1}{y}\right]_1^4 = \pi\left(1 - \frac{1}{4}\right) = \boxed{\frac{3}{4}\pi}.$$



8. Since we are revolving around the y-axis with the disk method, first solve the equation for x to get $x = y^{3/2}$. Then the radius of each disk is $y^{3/2}$, so the volume is

$$V = \pi \int_1^4 \left(y^{3/2}\right)^2 \, dy = \pi \int_1^4 y^3 \, dy = \pi \left[\frac{1}{4}y^4\right]_1^4 = \boxed{\frac{255}{4}\pi}.$$