

$$\int_4^9 x\sqrt{x} dx$$

$$\int_4^9 x \cdot x^{1/2} dx = \int_4^9 x^{3/2} dx$$

$$\left. \frac{2}{5} x^{5/2} \right]_4^9$$

$$\frac{2}{5} 9^{5/2} - \frac{2}{5} 4^{5/2}$$

$$\frac{2}{5} \cdot 243 - \frac{2}{5} \cdot 32$$

$$\frac{486}{5} - \frac{64}{5} = \frac{422}{5}$$

$$42. \int_1^2 \frac{1}{x^2} - \frac{1}{x^3} dx$$

$$\int_1^2 x^{-2} - x^{-3} dx$$

$$43. \quad 2\pi \int_0^1 (y+1) \sqrt{1-y} \, dy$$

$$+y = u+1$$

$$u = 1-y$$

$$u_i = 1-0 = 1$$

$$u_f = 1-1 = 0$$

$$-du = +dy$$

$$2\pi \int_1^0 (-u+2) u^{1/2} (-du)$$

$$2\pi \int_1^0 u^{3/2} - 2u^{1/2} \, du$$

$$2\pi \left[\frac{2}{5} u^{5/2} - \frac{4}{3} u^{3/2} \right]_1^0$$

$$-2\pi \left[\frac{2}{5} - \frac{4}{3} \right] = -2\pi \left(-\frac{14}{15} \right)$$

$$\frac{28\pi}{15}$$

$$44. \quad 2\pi \int_{-1}^0 x^2 \sqrt{x+1} \, dx$$

$$\begin{aligned} u &= x+1 & x &= u-1 & u_i &= -1+1=0 \\ du &= dx & x^2 &= (u-1)^2 & u_f &= 0+1=1 \\ & & x^2 &= u^2-2u+1 & & \end{aligned}$$

$$2\pi \int_0^1 (u^2-2u+1)u^{1/2} \, du$$

$$2\pi \int_0^1 u^{5/2} - 2u^{3/2} + u^{1/2} \, du$$

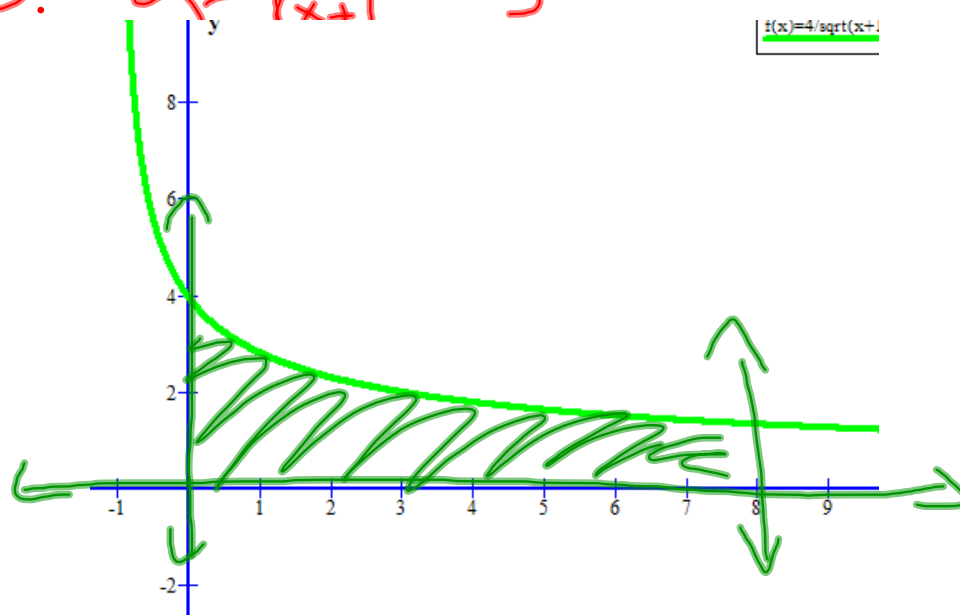
$$2\pi \left[\frac{2}{7} u^{7/2} - \frac{4}{5} u^{5/2} + \frac{2}{3} u^{3/2} \right]_0^1$$

$$2\pi \left(\frac{2}{7} - \frac{4}{5} + \frac{2}{3} \right)$$

$$\frac{32\pi}{105}$$

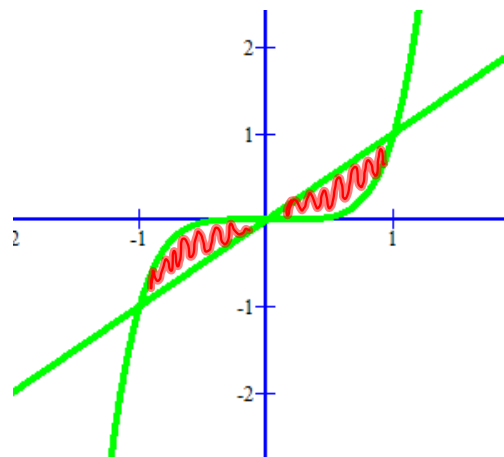
$$\begin{aligned} & 4/5 \int_0^{\pi} \cos \frac{x}{2} dx \\ & u = \frac{x}{2} \\ & 2du = \left(\frac{1}{2} dx\right) 2 \\ & 2du = dx \\ & 2 \sin u \Big|_0^{\pi/2} = 2 \end{aligned}$$

53. $u = \frac{4}{\sqrt{x+1}}$ $y=0$ $x=0$ $x=8$



$$\int_0^8 \frac{4}{\sqrt{x+1}} dx$$

54. $y=x$ $y=x^5$



55.

$$y = \sec^2 x \quad y = 0 \quad x = 0 \quad x = \frac{\pi}{3}$$

$$\int_0^{\pi/3} \sec^2 x \, dx$$
$$\left. \tan x \right|_0^{\pi/3}$$

$$\frac{\sin \pi/3}{\cos \pi/3} - \frac{\sin 0}{\cos 0}$$

$$\frac{\sqrt{3}/2}{1/2} - \frac{0}{1} = \sqrt{3}$$

$$46. \int_{-\pi/4}^{\pi/4} \sin$$