$$= 4\int_0^{\frac{\pi}{3}} \sec^3\theta\, d\theta - 4\int_0^{\frac{\pi}{3}} \sec\theta\, d\theta$$

$$= \left[4\cdot\frac{1}{2}\left(\sec\theta\tan\theta + \ln|\sec\theta+\tan\theta|\right) - 4\ln|\sec\theta+\tan\theta|\right]\Big|_0^{\frac{\pi}{3}}$$

$$= 2\left(\sec\theta\tan\theta - \ln|\sec\theta+\tan\theta|\right)\Big|_0^{\frac{\pi}{3}}$$

$$= 2\left[\left(2\sqrt{3} - \ln(2+\sqrt{3})\right) - \left(0 - \ln(1+0)\right)\right]$$

$$= \boxed{2\left[2\sqrt{3} - \ln(2+\sqrt{3})\right]}$$