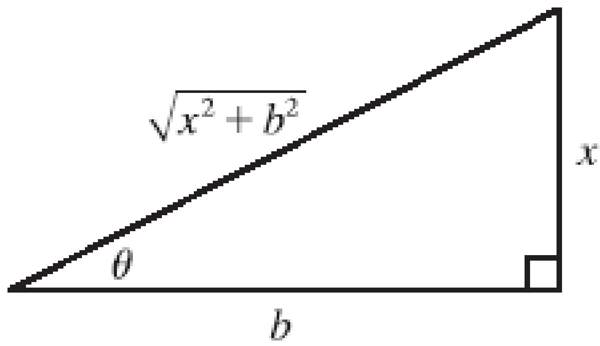
Let $x = 9\tan\theta$, where $-\frac{\pi}{2} < \theta < \frac{\pi}{2}$. Then $dx = 9\sec^2\theta\, d\theta$ and

$$\begin{aligned}\sqrt{x^2+81} &= \sqrt{81\tan^2\theta + 81} = \sqrt{81(\tan^2\theta+1)} = \sqrt{81\sec^2\theta} \\ &= 9\,|\sec\theta| = 9\sec\theta \quad \text{for the relevant values of } \theta.\end{aligned}$$

$$\begin{aligned}\int \frac{x^3}{\sqrt{x^2+81}}dx &= \int \frac{729\tan^3\theta}{9\sec\theta} 9\sec^2\theta d\theta = 729\int \tan^3\theta\sec\theta d\theta \\ &= 729\int \tan^2\theta\tan\theta\sec\theta d\theta \\ &= 729\int (\sec^2\theta - 1)\tan\theta\sec\theta d\theta \\ &= 729\int (u^2-1)du \quad [u = \sec\theta, du = \sec\theta\tan\theta d\theta] \\ &= 729\left(\tfrac{1}{3}u^3 - u\right) + C = 729\left(\tfrac{1}{3}\sec^3\theta - \sec\theta\right) + C \\ &= 729\left[\frac{1}{3}\frac{(x^2+81)^{3/2}}{729} - \frac{\sqrt{x^2+81}}{9}\right] + C \\ &= \tfrac{1}{3}(x^2+81)^{3/2} - 81\sqrt{x^2+81} + C\end{aligned}$$



$b = 9$