

34. Let $u = x^{1/6}$, $u^2 = x^{1/3}$, $u^3 = x^{1/2}$, $u^6 = x$, $6u^5 du = dx$.

$$\begin{aligned}\int \frac{1}{\sqrt{x} - \sqrt[3]{x}} dx &= \int \frac{6u^5 du}{u^3 - u^2} = 6 \int \frac{u^3 du}{u - 1} \\ &= 6 \int \left(u^2 + u + 1 + \frac{1}{u - 1} \right) du \quad (\text{long division}) \\ &= 6 \left(\frac{u^3}{3} + \frac{u^2}{2} + u + \ln|u - 1| \right) + C \\ &= 2\sqrt{x} + 3x^{1/3} + 6x^{1/6} + 6 \ln|x^{1/6} - 1| + C\end{aligned}$$