

Quiz-5 - Solution Key

Question:

Evaluate $\int \frac{dx}{\sqrt{x}+1}$

Solution:

$$\text{Let } u = \sqrt{x} + 1$$

$$du = \frac{1}{2\sqrt{x}} dx$$

$$2(u-1) \cdot du = dx$$

$$\int \frac{dx}{\sqrt{x}+1} = 2 \int \frac{(u-1) \cdot du}{u} = 2 \cdot \int \left(1 - \frac{1}{u}\right) du$$

$$= 2(u - \ln|u|) + C$$

$$= 2(\sqrt{x} + 1 - \ln(\sqrt{x} + 1)) + C$$

or

$$\text{Let } u = \sqrt{x}$$

$$du = \frac{1}{2\sqrt{x}} dx$$

$$2u du = dx$$

$$\begin{aligned} \int \frac{dx}{\sqrt{x}+1} &= 2 \int \frac{u}{u+1} du = 2 \int \left(1 - \frac{1}{u+1}\right) du = 2(u - \ln|u+1|) + C \\ &= 2(\sqrt{x} - \ln(\sqrt{x}+1)) + C \end{aligned}$$