

Math 170: Quiz 20

Sayan Mukherjee's discussion

April 9, 2021

Problem 1. Compute the following indefinite integral:

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

Solution. Let $u = x + 1$, then $du = dx$, and we can rewrite the original integral as

$$\begin{aligned} \int \frac{u-1}{\sqrt{u}} du &= \int \frac{u-1}{u^{1/2}} du \\ &= \int \left(\frac{u}{u^{1/2}} - \frac{1}{u^{1/2}} \right) du \\ &= \int \left(u^{1/2} - u^{-1/2} \right) du \\ &= \frac{u^{3/2}}{3/2} - \frac{u^{1/2}}{1/2} + c \\ &= \frac{2(x+1)^{3/2}}{3} - 2(x+1)^{1/2} + c. \end{aligned}$$

□

Rubric.

- Left to the grader's discretion.