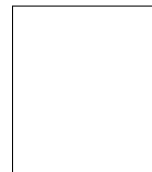




Quiz # 8
Math 101-Section 13 Calculus I
29 November 2018, Thursday
Instructor: Ali Sinan Sertöz
Solution Key



Bilkent University

Q-1) Evaluate $\int_0^1 x\sqrt{1-\sqrt{x}} dx$.

Solution: Let $u = 1 - \sqrt{x}$. Then $x = (1 - u)^2$ and $dx = -2(1 - u)du$. When x goes from 0 to 1, u goes from 1 to 0. We then have

$$\begin{aligned}\int_0^1 x\sqrt{1-\sqrt{x}} dx &= 2 \int_0^1 (1-u)^3 u^{1/2} du \\ &= 2 \int_0^1 (1-3u+3u^2-u^3)u^{1/2} du \\ &= \int_0^1 (u^{1/2} - 3u^{3/2} + 3u^{5/2} - u^{7/2}) du \\ &= 2 \left(\frac{2}{3}u^{3/2} - \frac{6}{5}u^{5/2} + \frac{6}{7}u^{7/2} - \frac{2}{9}u^{9/2} \right) \Big|_0^1 \\ &= \frac{64}{315} \approx 0.203.\end{aligned}$$