

c. [5 points] $\int_4^9 e^{\sqrt{x}} dx$

Solution: First, use the substitution $u(x) = \sqrt{x}$. Note $du = \frac{1}{2\sqrt{x}} dx$. Hence, we have

$$dx = 2\sqrt{x} du = 2u du$$

Then apply integration by parts to the integral in the u -domain:

$$\begin{aligned} & \int_4^9 e^{\sqrt{x}} dx \\ &= \int_2^3 2ue^u du \\ &= 2e^u u \Big|_2^3 - \int_2^3 2e^u du \\ &= 2(3e^3 - 2e^2 - e^3 + e^2) \\ &= 4e^3 - 2e^2 \end{aligned}$$

Answer: $4e^3 - 2e^2$