

Dr. T's Fall 2019 Recitation Quiz Question.

Find the area of the region under the the graph of $y = \frac{e^{\sqrt{t}}}{\sqrt{t}}$ above the t -axis on the interval of $[4, 25]$. Simplify your final answer as much as possible.

- A) $3(e^5 - e^3)$ B) $2(e^5 - e^2)$ C) $2(e^5 - e^4)$ D) None

$$\int_4^{25} \frac{e^{\sqrt{t}}}{\sqrt{t}} dt$$

$$u = \sqrt{t} = t^{1/2}$$

$$du = \frac{1}{2} \cdot t^{-1/2} dt = \frac{dt}{2\sqrt{t}}$$

$$2 \cdot du = \frac{1}{2} \cdot \frac{dt}{\sqrt{t}} \cdot 2$$

$$2 \cdot du = \frac{dt}{\sqrt{t}} \quad \checkmark$$

$$t=25 \Rightarrow u=\sqrt{t} \Rightarrow u=\sqrt{25}=5$$

$$t=4 \Rightarrow u=\sqrt{t} \Rightarrow u=\sqrt{4}=2$$

$$\int_2^5 e^u \cdot 2 \cdot du = 2e^u \Big|_2^5 = 2e^5 - 2 \cdot e^2 = 2(e^5 - e^2)$$