

Assignment 1

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Download latex-tikz codes from

<https://github.com/96143/Assignment-1/tree/main>

1 PROBLEM

If

$$F_v(x) = \begin{cases} 1 - e^{-ax} & x \geq 0 \\ 0 & x < 0 \end{cases} \quad (1.0.1)$$

Find a.

2 SOLUTION

Given CDF:

$$F_v(x) = \begin{cases} 1 - e^{-ax} & x \geq 0 \\ 0 & x < 0 \end{cases} \quad (2.0.1)$$

After differentiating above CDF we get PDF as:

$$f_v(x) = \begin{cases} ae^{-ax} & x \geq 0 \\ 0 & x < 0 \end{cases} \quad (2.0.2)$$

Total Probability = 1 i.e.

$$\int_{-\infty}^0 f_v(x)dx + \int_0^{\infty} f_v(x)dx = 1 \quad (2.0.3)$$

$$\int_{-\infty}^0 0dx + \int_0^{\infty} ae^{-ax}dx = 1 \quad (2.0.4)$$

$$0 + a \cdot \frac{1}{-a}(0 - 1) = 1 \quad (2.0.5)$$

$$\implies 1 = 1 \quad (2.0.6)$$

Any value of $a \geq 0$ satisfies the condition given in the question.