

$$\textcircled{1} \quad \frac{d}{dn} (1 - e^{-an}) = -e^{-an} (-a) = ae^{-an}$$

$$P.d.f = f(x) = ae^{-ax}$$

---


$$\text{Mean} = E(x) = \int_0^{\infty} x \cdot ae^{-ax} dx \quad \text{for } a > 0 \text{ \& } 0 \leq x < \infty$$

$$= \frac{1}{a}$$


---

$$\text{Variance} = E(x^2) - E(x)^2$$

$$= \int_0^{\infty} x^2 f(x) dx = \int_0^{\infty} x^2 (ae^{-ax}) dx$$

$$= \frac{2}{a^2} - \frac{1}{a^2} = \frac{1}{a^2}$$


---

$\textcircled{2}$  - Probability mass function

$$f_y(y) = \frac{e^{-b} b^y}{y!}, \quad y \in \{0, 1, \dots, \infty\}, \quad b > 0.$$

Mean =