Poisson Distribution (only works for discrete)

Notation & Fundamentals
- Unbounded ⇒ no upper limit on probability.
- Each event is <u>independent</u> & <u>randomly</u> occur & discrete.

$$X \sim Po(\lambda)$$ ← mean ($\lambda = \mu$)

"The random variable X follows a poisson distribution with the mean, λ"

$$P(X = x) = \frac{e^{-\lambda} \lambda^{x}}{x!}$$ (the formula)

Key points
- For poisson: mode = median = mean & mean = variance / $\sigma^2 = \lambda$
- Reminder, this is only for "discrete".

If the mean is 2.3/s ⇒ the mean over 2s is 4.6.

Cumulative
- $P(X \leq 3) = P(X=0) + \dots + P(X=3)$
- On the calculator CD is cumulative & PD is single.

$$P(4 \leq X \leq 7) = P(X \leq 7) - P(X \leq 3)$$

1 2 3 | 4 5 6 7 | 8

Adding

If $X \sim P(\lambda)$ & $Y \sim P(\mu)$ & if independent
⇒ $X + Y \sim P(\lambda + \mu)$