* Poisson distribution

The poisson distribution is a discrete probability distribution that describes the no of events that occur within a fixed interval of time or space given a known average rate of occurence.

* No of events occuring in a fixed time interval.

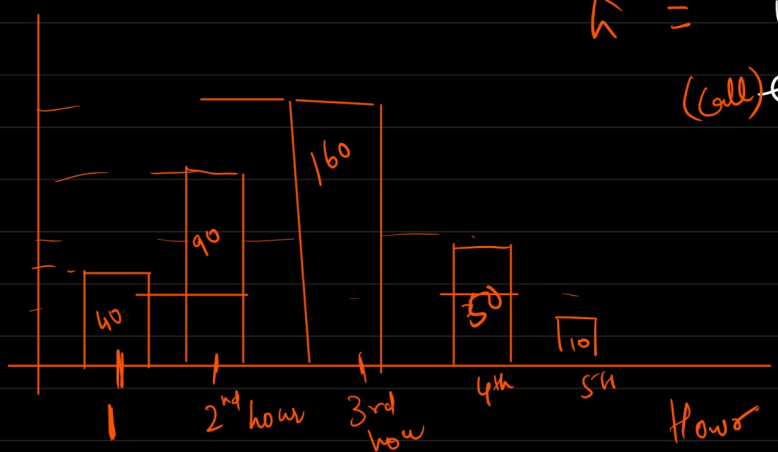
Customer care

λ = Expected no of (call) events to occur every time interval

$\lambda = 100$

(through out the day not possible)

1st hour = 40
2nd hour = 90
3rd hour = 160
— —



pmf.

Example

No of people visiting temple | hospital | banks | airport in any hour.

Eg: No of accident every hour at a busy route.

Eg: No of emails recieved every hour.

$$pmf \Rightarrow P(x=x) = \frac{e^{-\lambda} \cdot \lambda^{x}}{x!}$$

e (euler no) $= 2.71828$

$\lambda \rightarrow$ avg rate of events every interval.

* $\lambda = 10$ person visiting at 5th hour?

$$P(x=5) = \frac{e^{-\lambda} \cdot \lambda^{x}}{x!} = \frac{(2.718)^{-10} \cdot 10^{5}}{5!}$$

Q The average no of customers entering a store in an hour is 5. What is the probability of exactly 3 customers will enter the store next hour.

→ $\lambda = 5$

$P(x=3)$

$$\frac{e^{-\lambda} \lambda^x}{x!} = \frac{e^{-5} \cdot 5^3}{3!}$$

$$= \frac{(2.718)^{-5} \cdot 125}{6}$$

$$= \frac{0.00674 \times 125}{6} \approx 0.14$$

Mean of Poisson distn $= \lambda \times t$

↓

Avg no of event at every interval

Variance $= \lambda \times t$