

THE POISSON DISTRIBUTIONExamples:

- 1) The number of traffic accidents, per day, at a given intersection.
- 2) The number of defects in a circuit board per square inch.
- 3) The number of deaths, per year, caused by bee stings.

CONDITIONS

- 1) The probability that an event occurs in a certain unit of time, area, etc., must be equal for all units.
- 2) The number of events that happen in a unit of time, area, etc. is independent of the number of events in other units.

x = number of events in a certain unit of :-

λ = mean " " " " " "

$P(x)$ = the probability of getting x events in a unit of ...

$$P(x) = \frac{\lambda^x \cdot e^{-\lambda}}{x!} \quad (x = 0, 1, 2, \dots)$$

Example: Let's say that the mean number of car accidents, per month, at the intersection of Bird road and 107th Ave in Miami is 6.

Questions

1) what is the probability of getting 8 car accidents during next month at that intersection?

$$P(8) = \frac{6^x \cdot e^{-6}}{8!} = .103$$

CORRECTION ←

2) what is the probability of getting 10 car accidents in the next quarter?

$$\text{new } \lambda = 3 \cdot 6 = 18$$

$$P(10) = \frac{18^{10} \cdot e^{-18}}{10!} \approx .01498$$

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