Random variables:

Ex: of a random variable:

$$X = \begin{cases} \text{value} & \text{condition} \\ \text{another value} & \text{another condition} \end{cases}$$

** lim(1 + a/n)^n = e^n

Types of random variables:

1: discrete: takes a finite number of discrete distinct separate values.

2: continuous: takes infinite number of values

Ex: Y =exact mass of a random animal selected at the zoo.

$$P(x=k) = \lim_{n\to\infty} \binom{n}{k}^1 \left(\frac{\lambda}{n}\right)^k \left(1 - \frac{\lambda}{n}\right)^{n-k} = \frac{\lambda^k}{k!} * e^{-\lambda}$$

Where:

X: is a random variable

K: is a particular number

The law of large numbers:

Ex:

1- if I have a random variable X = # of heads after 100 tosses of a fair coin

2- then the expected value = E(X) = 100 * 0.5 = 50

3- Now we calculate the mean of X = $(X_1+X_2+X_3+X_n)/n$

The law of large numbers tells us that the mean of all observations is going to be 50 if n approaches ∞

F = probability of making a free throw

P(exactly K scores in N attempts) = $\binom{n}{k} F^k * (1-F)^{n-k}$