Theoretical Distributions of Data

Type-1

$\Rightarrow {}^{n}C_{\gamma}\ p^{\gamma}\ q^{n-\gamma}$

$\rightarrow p+q=1$

$p \leq 1 \quad q \leq 1$

n, p, γ

n = No of Trials.
γ = No of success.
p = Prob. of success.
q = Prob. of failure.

eg:- $n = 10$ 3 Head

${}^{10}C_{3} \left(\frac{1}{2}\right)^{3} \left(\frac{1}{2}\right)^{7}$

eg:- die $n=7$ 6 success. 3 times

${}^{7}C_{3} \left(\frac{1}{6}\right)^{3} \left(\frac{5}{6}\right)^{4}$

Imp.

Type-2 Base on Property

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Type1 $B(n,p) = {}^{n}C_{\gamma}\ p^{\gamma}\ q^{n-\gamma}$ $\gamma = 0, 1, 2 \ldots n$

Type3 $P(X=3) = 4P(X=4)$

Date .....

Poission Distribution

⇒ (n) finite Success failure:

$n=1000 \quad r=70 \quad P=1/6$

$n_{C_r} p^r q^{n-r}$

$1000_{C_{70}} \left(\frac{1}{6}\right)^{70} \left(\frac{5}{6}\right)^{930}$

$n \to \infty \quad P < \frac{1}{2} \quad P \to 0 \quad q \to 1$ Tends To

$nP = 1000 \times \frac{1}{6}$ finite

$$P(X=r) = \frac{e^{-m} \cdot m^r}{r!}$$

Type-3

Equation

$m=?$

$P(X=1) = P(X=2)$

$$\frac{e^{-m} \cdot m^1}{1!} = \frac{e^{-m} \cdot m^2}{2!}$$

Normal Distribution

Type-1 $f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{\frac{-(x-\mu)^2}{2\sigma^2}} \quad -\infty < x < \infty$

$f(x) = \frac{1}{2\sqrt{2\pi}} e^{\frac{-(x-10)^2}{8}} \quad -\infty < x < \infty$

Mean = 10 Variance = 4

Mean Symbles → μ
Median Symbles → $\tilde{\mu}$
Mode Symbles → μ_0

Sample of 500 Workers of a factory :-

$\bar{x} = 500 \quad \sigma = 48$

No. of Workers having Wages.

(i) More than Rs 600 $0 < Z < 2.08$ [.4812]

$\Rightarrow 500 \times 0188 \Rightarrow 9$ Persons

(ii) less than Rs 450 $0 < Z < 1.04$ [.3508]

$\Rightarrow 500 \times .1492 \Rightarrow 75$ Persons

(iii) Between Rs 548 & Rs 600 $0 < Z < 1$ [.3413]

$\Rightarrow 500 \times .1399 \Rightarrow 70$ Persons

(iv) between Rs 452 & Rs 600

$\Rightarrow 500 \times .8225 = 411$ Persons

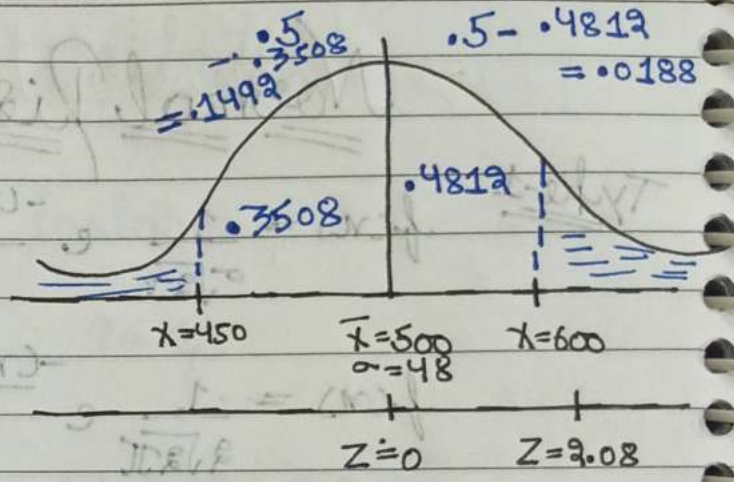
Date .....

$\bar{X} = 500 \quad \sigma = 48$

(i) $z = \frac{X - \bar{X}}{\sigma}$

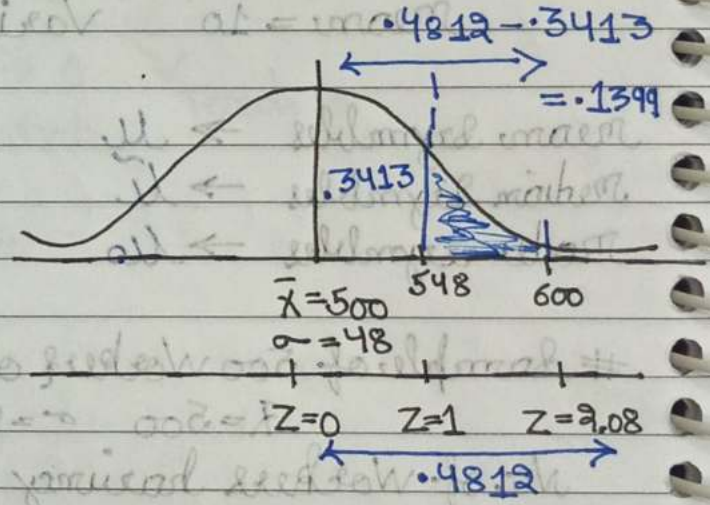
$= \frac{600 - 500}{48}$

$z = 2.08$



(ii) $z = \frac{X - \bar{X}}{\sigma} = z = \frac{450 - 500}{48} \Rightarrow z = -1.04$

(iii) $z = \frac{X - \bar{X}} = z = \frac{600 - 500}{48} = 2.08$



(iv) $\Rightarrow .3413 + .4812$

$= .8225$