ASSIGNMENT SOLUTION - STATISTICS (MAJOR)

Example - 1, $N = 19$

$$\text{Median} \Rightarrow \frac{n+1}{2} \Rightarrow \frac{19+1}{2} \Rightarrow \frac{20}{2} = 10$$

So, the Median is the 10^{th} value that is 48.

Example - 2,

$$\text{Mean } (\bar{x}) = \frac{45+39+53+45+43+48+50+45}{8}$$

$$\Rightarrow \frac{368}{8} = 46$$

So, the Mean $(\bar{x})$ is 46.

Example - 3, Total Monthly Salary of 10 workers = ?

No. of workers = 10

Mean = 1445

$\because$ Mean = $\frac{\text{Total Salaries}}{\text{No. of workers}}$

$$1445 = \frac{\text{Total Salaries}}{10}$$

Total Salaries = 14450 ₹

After joining of New worker

Total Salaries ⇒ 14450 + 1500 = 15950

No. of workers ⇒ 10 + 1 = 11

Mean ⇒ ?

$$\text{Mean} = \frac{\text{Total Salaries}}{\text{No. of workers}}$$

$$= \frac{15950}{11}$$

$$= 1450$$

So the Mean of 11 worker's Monthly Salary is 1450

Example- 4,

	Height	No. of girls	
			$L_1 = 150$
	120 - 130	4	$f_0 = 12$
	130 - 140	7	$f_1 = 20$
	140 - 150	$12 = f_0$	$f_2 = 8$
$L_1 =$	150 - 160	$20 = f_1$	$i = 10$
	160 - 170	$8 = f_2$	
		50	

$$\therefore \text{Mode} = L_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times i$$

$$\text{or} = 150 + \frac{20 - 12}{(2 \times 20) - 12 - 8} \times 10$$

$$\text{or} = 150 + \frac{8}{40 - 20} \times 10$$

$$\text{or} = 150 + \frac{8}{20} \times 10$$

$$\text{or} = 150 + \frac{80}{20}$$

$$\text{or} = 150 + 4$$

$$\text{or} \therefore = 154$$

So the Mode is 154

Example - 5,

Range = 13.67

Largest value = 70.08

Smallest value = ?

Smallest value = Largest value - Range

= 70.08 - 13.67

= 56.41

So, the smallest value of the rang is 56.41

Example - 6,

Mean $\Rightarrow \frac{11.4 + 12.5 + 12.8 + 16.3 + 17.8 + 19.2}{6}$

$\Rightarrow \frac{90}{6} = 15$

x_i	$d_i = x_i - \bar{x}$ $= x - 15$	d_i^2
11.4	-3.6	12.96
12.5	-2.5	6.25
12.8	-2.2	4.84
16.3	1.3	1.69
17.8	2.8	7.84
19.2	4.2	17.64
		$\Sigma d_i^2 = 51.22$

Standard Deviation (σ) = $\sqrt{\frac{\Sigma d_i^2}{n}}$

$= \sqrt{\frac{51.22}{6}}$

$= \sqrt{8.53}$

Hence $\sigma = 2.9$

Example-7, Normal distribution = $Z = \frac{500-527}{112}$

$= 0.24107$

$\mu = 527$

$\sigma = 112$

$P(x > 500) = P(Z > -24)$

$\Rightarrow 1 - 0.4052$

$\Rightarrow 0.5948$

Example-8,

$$Z = \frac{X - \mu}{S}$$

X = Random variable
μ = Mean
S = Stand. deviation.

$\mu = 266$ Days
$S = 16$ Days

$X_1 = 240$ Days ; $X_2 = 270$ Days

$$Z_1 = \frac{X_1 - \mu}{S} = \frac{240 - 266}{16} = -1.625 = -1.63$$

$$Z_2 = \frac{X_2 - \mu}{S} = \frac{270 - 266}{16} = 0.25$$

$P(Z_2) - P(Z_1) = ?$

$P(Z_1 < Z < Z_2) = P(Z_2) - P(Z_1)$

$P(-1.63) = 0.05155$
$P(0.25) = 0.59871$

$P(Z_1 < Z < Z_2) = 0.59871 - 0.05155$
$= 0.54716$

Example-9, 10, 50, 30, 20, 10, 20, 70, 30

(1) Minimum = 10

(2) 1st Quartile = [illegible] = 17.5

(3) Median = 25

(4) 3rd quartile = 35

(5) Maximum = 70

Example-10, Given $P(A) = 0.4$

$P(B) = p$, $P(A \cap B) = 0.6$

So, $P(A \cap B) = P(A) \cdot P(B)$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$\Rightarrow 0.6 = 0.4 \times p - P(A) \cdot P(B)$

$0.6 = 0.4 \times p - 0.4 \times p$

$0.2 = 0.6 \times p$

$p = 0.2/0.6 = 1/3$

Hence $p = 1/3$

Example-11, Let A = Passing the 1st test &
B = Passing the 2nd test

$$P(B|A) = \frac{P(B \cap A)}{P(A)}$$

$$P(B|A) = \frac{0.6}{0.8}$$

$$P(B|A) = 0.75$$

Example-13,

$$P(\text{Selecting Any Number}) = \frac{1}{10} = 0.1$$

$$P\left(\begin{array}{l}\text{Selecting 9, from 1st bin}\\ \text{1 from 2nd bin \&}\\ \text{1 from 3rd bin}\end{array}\right) = 0.1 \times 0.1 \times 0.1$$

$$= 0.001$$

Example-12, Let A = First die is 5
Leb B = total of 2 dice is greater than 9

$$P(A) = \frac{1}{6}$$

Possible outcomes for A And B : $\{(5,5), (5,6)\}$

$$P(A \text{ and } B) = \frac{2}{36} = \frac{1}{18}$$

$$P(B/A) = \frac{P(A \cap B)}{P(A)}$$

$$\Rightarrow \frac{1}{18} \times 6 = \frac{1}{3}$$

Example -14

Let A = Democrate
B = Independent

Sample Space = $(20 + 13 + 6 = 39$

$$P(A \text{ or } B) = \frac{13}{39} + \frac{6}{36} = \frac{19}{39}$$

Thank you...