SOLUTION **WORKSHEET No: 2** (STATS) ①

Ques-1 Given. $n = 8$

Mean = 9 & Variance = 9.25

Let the remaining two observations are x & y

$\therefore$ data : 6, 7, 10, 12, 12, 13, x, y

Now Mean $= \frac{\Sigma x}{n}$

$\Rightarrow 9 = \frac{6+7+10+12+12+13+x+y}{8}$

$\Rightarrow 72 = 60 + x + y$

$\Rightarrow \boxed{x+y=12}$ ---(1)

Now, Variance $= \frac{1}{n}\Sigma x^2 - (\text{Mean})^2$

$9.25 = \frac{1}{8}(36+49+100+144+144+169+x^2+y^2) - 81$

$\Rightarrow 9.25 + 81 = \frac{1}{8}(642 + x^2+y^2)$

$\Rightarrow (90.25) \times 8 = 642 + x^2+y2$

$\Rightarrow 722 = 642 + x^2+y^2$

$\Rightarrow \boxed{x^2+y^2=80}$ ---(2)

Solving (1) & (2)

$x = 8$ & $y = 4$

$\therefore$ other two observations are 8 & 4 Ans

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Q No: 2 ⇒ **Given** $n = 6$

$$\text{Mean} = 8 \quad \& \quad S.D = 4$$

$$\text{variance} = (S.D)^2 = (4)^2 = 16$$

$\therefore$ Old Mean $= 8 \Rightarrow 8 = \frac{\Sigma x}{6}$

and $SD = 4$

and variance $= 16 \Rightarrow 16 = \frac{1}{6}\Sigma (x-8)^2$

old observations: $x = x_1, x_2, x_3 ; x_4, x_5, x_6$

New observation $y = y_1, y_2, \dots y_6$

$y = 3x_1, 3x_2, 3x_3 \dots 3x_6$

New Mean $\bar{Y} = \frac{\Sigma y}{n}$

$$\bar{Y} = \frac{\Sigma(3x)}{6}$$

$$\Rightarrow \bar{Y} = 3\frac{\Sigma x}{6}$$

$$\Rightarrow \bar{Y} = 3 \times 8 \quad \text{---} \{ \because \text{old Mean } \frac{\Sigma x}{6} = 8 \}$$

New Mean $\boxed{\bar{Y} = 24}$

New variance $= \frac{1}{n}\Sigma (y - \bar{Y})^2$

take 3 common $= \frac{1}{6}\Sigma (3x - 24)^2$

$$= \frac{1}{6} \times 9 \Sigma (x-8)^2$$

$$= 9 \times \frac{1}{6}\Sigma (x-8)^2$$

$$= 9 \times 16 \quad \dots \{ \text{old variance} = \frac{1}{6}\Sigma (x-8)^2 = 16 \}$$

$$= 144$$

$\therefore$ **New S.D** $= \sqrt{144} = 12$ Ans

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Qn 3 → Given

$C.V_1 = 60$ $\quad$ $C.V_2 = 70$

$S.D_1 (\sigma_1) = 21$ $\quad$ $S.D_2 (\sigma_2) = 16$

to find: $\overline{x_1}$ & $\overline{x_2}$

$$C.V_1 = \frac{\sigma_1}{\overline{x_1}} \times 100$$

$$60 = \frac{21}{\overline{x_1}} \times 100$$

$$\overline{x_1} = \frac{2100}{60}$$

$$\boxed{\overline{x_1} = 35}$$ Ans

$$C.V_2 = \frac{\sigma_2}{\overline{x_2}} \times 100$$

$$70 = \frac{16}{\overline{x_2}} \times 100$$

$$\overline{x_2} = \frac{1600}{70}$$

$$\boxed{\overline{x_2} = 22.85}$$ Ans

Qn 4 →

(A)

$n_1 = 586$

$\overline{x_1} = 5253$

Variance = 100

$\therefore \sigma_1 = \sqrt{100} = 10$

(B)

$n_2 = 648$

$\overline{x_2} = 5253$

Variance = 121

$\sigma_2 = \sqrt{121} = 11$

(i) From A pays = Rs 586×5253 as monthly wages

From B pays = Rs 648×5253 as monthly wages

Clearly from B pays larger amount as monthly wages

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(2) $C.V_A = \frac{\sigma_1}{\bar{x}_1} \times 100$

$C.V_A = \frac{10}{5253} \times 100$

$C.V_A = 0.19$

$C.V_B = \frac{\sigma_2}{\bar{x}_2} \times 100$

$C.V_B = \frac{11}{5253} \times 100$

$C.V_B = 0.209$

Clearly $C.V_B > C.V_A$

∴ firm B shows greater variability Ans

—x—

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