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19k-0273 (1)

Q.1)

Stems	Leafs
0	2 → sum of leafs
1	0
2	3
3	4
4	33
5	11
6	6
7	7
8	5
9	7
10	9
11	4
12	4
13	3
14	1

part "a") 69 students

part "b") 0 (N.i.l) observations

part "c") smallest = 1, largest = 145

part "d") 30, 30, 32, 39

part "e") 23 students

part "f") median $= \left(\frac{n+1}{2}\right)^{th} = \left(\frac{69+1}{2}\right)^{th} = 35^{th}$ value

$= (\text{middle value}) = 35^{th}$ value $= 78$

19k-0273 (2)

Q.2

n	A	B	A^2	B^2
1	12	47	144	2209
2	15	12	255	144
3	9	76	81	5776
4	73	48	5329	2304
5	7	4	49	16
6	19	51	361	2601
7	99	37	9801	1369
8	36	48	1296	2304
9	84	13	7056	169
10	29	0	841	0

⇒ direct calculator values can also be used.

$\Sigma A = 483$ ⇒ $\bar{A}$ (mean) $= \Sigma A/n = 483/10 = 48.3$

$\Sigma B = 336$ ⇒ $\bar{B}$ (mean) $= \Sigma B/n = 336/10 = 33.6$

$\Sigma A^2 = 54983$

$\Sigma B^2 = 16892$

$n = 10$

$$\sigma_A = \sqrt{\frac{\Sigma A^2}{n} - (\bar{A})^2}$$

$$= \sqrt{\frac{54983}{10} - (48.3)^2}$$

$\Rightarrow \sigma_A = 56.26198$

$$\sigma_B = \sqrt{\frac{\Sigma B^2}{n} - (\bar{B})^2}$$

$$= \sqrt{\frac{16892}{10} - (33.6)^2}$$

$\Rightarrow \sigma_B = 23.66939$

$$\Rightarrow \text{C.V of A} = \frac{\sigma_A}{\bar{A}\text{(mean)}}$$

$$= \frac{56.26198}{48.3}$$

$= 1.16484$

$$\Rightarrow \text{C.V of B} = \frac{\sigma_B}{\bar{B}\text{(mean)}}$$

$= 23.66939/33.6$

$= 0.70445$

19k-0273 (3)

C.V of A (in percentage) = 1.16484 x 100
= 116.484%

C.V of B (in percentage) = 0.70445 x 100
= 70.445%

part "a") Batsman "A" is better run getter, since "mean" of his scores "$\bar{A}$" is greater than mean of Batsman "B" scores "$\bar{B}$" (i.e. $\bar{A}=48.3 > \bar{B}=33.6$).

part "b") ∵ there is more variation in scores of Batsman "A", hence Batsman "B" is more consistent in scores. (i.e. C.V of "A" = 116.48% > C.V of "B" = 70.45%).

part "c") Not learned & included in mid-I topics.

Q.3)

i) $P_{50} = \text{median} = \left(\frac{n+1}{2}\right)^{th} = \left(\frac{7+1}{2}\right)^{th} = 4^{th} = 41$

ii) $n_1 = 12, \bar{x}_1 = 46, n_2 = 8, \bar{x}_2 = 71, \bar{x} = ?$

$\because n_1 \times \bar{x}_1 = \Sigma x_1, \; n_2 \times \bar{x}_2 = \Sigma x_2$

$\therefore \bar{x} = \frac{(n_1)(\bar{x}_1) + (n_2)(\bar{x}_2)}{n_1 + n_2}$

$\Rightarrow \bar{x} = \frac{(12)(46) + (8)(71)}{12+8} = 56$

~~iii) $x = 30, y = ?, y = 2x+3$~~

iii) $V(x) = 30, V(y) = ?, y = 2x+3$ (Given relation)

$\Rightarrow V(y) = V(2x+3)$

$\Rightarrow V(y) = V(2x) + V(3)$ $\quad [\because V(ax \pm b) = V(ax) \pm V(b)]$

$\Rightarrow V(y) = 2^2 V(x) + 0$ $\quad [\because V(ax) = a^2 V(x), V(b) = 0]$

$\Rightarrow V(y) = 4(30)$

$\Rightarrow V(y) = 120$

iv) $\sigma_x^2 = 9, \bar{x} = 15, C.V = ?$

$\because C.V = \frac{\sqrt{\sigma_x^2}}{\bar{x}} = \frac{\sqrt{3^2}}{15} = \frac{3}{15} = 1/5 = 0.2$

$\Rightarrow C.V \text{ (in percentage)} = 0.2 \times 100 = 20\%$

v) $\sigma_x = 10.82, C.V = 75\%, \bar{x} = ?$

$\because C.V = \frac{\sigma_x}{\bar{x}} \Rightarrow \bar{x} = \frac{\sigma_x}{C.V} \Rightarrow \bar{x} = \frac{10.82}{75\%} \Rightarrow \bar{x} = 14.43$