Q. Calculate min-max normalization of the following data:

new Max = 1   nuoMin = 0

marks = 8, 10, 15, 20

$$A = \quad v' = \dfrac{v - Min_A}{Max_A - Min_A}(newMax_A - nuoMin_A) + newMin_A.$$

⟹ $Min_A = 8$ $Max_A = 20$

new $Max_A = 1$ $newMin_A = 0$

⟹ $v' = \dfrac{8-8}{20-8}(1-0) + 0 = \underline{\underline{0}}$

⟹ $v' = \dfrac{10-8}{20-8}(1-0) + 0 = \underline{0.1667}$

⟹ $v' = \dfrac{15-8}{20-8}(1-0) + 0 = \underline{\underline{0.5833}}.$

⟹ $v' = \dfrac{20-8}{20-8}(1-0) + 0 = \underline{\underline{1}}$

Using 2-score

$$v' = \dfrac{v_i - \bar{A}}{\sigma A}$$

A → mean of observation

⟹ $\dfrac{8+10+15+20}{4} = \underline{13.25}$

$SD = \sigma = \sqrt{\sigma^2}$

$\sigma^2 = \left(\dfrac{1}{N}\sum_{i=L}^{N} x_i^2 - \bar{x}^2\right) = \dfrac{1}{4}\left(8^2 + 10^2 + 15^2 + 20^2\right) - (13.25^2)$

$\boxed{N=4}$.

$$= \frac{789}{4} - (13.25)^2 = \underline{\underline{21.6875}}$$

$$\sigma = \sqrt{21.6875} = \underline{\underline{4.657}}$$

$Z_{score} = \dfrac{x - \mu}{\sigma}$

$8 \Rightarrow \dfrac{8 - 13.25}{4.657} = \underline{\underline{-1.127}}$

$10 \Rightarrow \dfrac{10 - 13.25}{4.657} = \underline{\underline{-0.697}}$

$15 \Rightarrow \dfrac{15 - 13.25}{4.657} = \underline{\underline{0.376}}$

$20 \Rightarrow \dfrac{20 - 13.25}{4.657} = \underline{\underline{1.45}}$.