

## Mean and Standard Deviation

Ex A class of 30 students take an exam. The mean mark is 48.2 and the s.d is 5.6

There are 12 girls in the class

Their mean score is 53.4 and their s.d is = 3.2

Find the mean score and s.d for the boys

Solution

$$12 G \Rightarrow 18 B$$

$$sd_{class} = \sqrt{\frac{\sum x^2 + \sum y^2}{30} - \text{class mean}^2} = 5.6$$

$$= \sqrt{\frac{\sum x^2 + \sum y^2}{30} - 48.2^2} = 5.6$$

$$\text{Girls} \quad s.d = \sqrt{\frac{\sum y^2}{12} - \bar{y}^2} = 3.2$$

$$\sqrt{\frac{\sum y^2}{12} - 53.4^2} = 3.2$$

$$\frac{\sum y^2}{12} = 3.2^2 + 53.4^2$$

$$\sum y^2 = 12(3 \cdot 2^2 + 53 \cdot 4^2)$$

$$\sum y^2 = 34341.6$$

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$$\text{Class} \quad \sqrt{\frac{\sum x^2 + 34341.6}{30} - 48.2^2} = 5.6$$

$$\sum x^2 + 34341.6 = 30(5.6^2 + 48.2^2)$$

$$\sum x^2 = 30(5.6^2 + 48.2^2) - 34341.6$$

$$\sum x^2 = 36296.4$$

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Find mean for boys

$$\text{Class total marks} = 48.2 \times 30 = 1446$$

$$\text{Girls total} = 53.4 \times 12 = 640.8$$

$$\text{Boys total} = 805.2$$

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$$\text{Boys mean} = \frac{805.2}{18} = 44.73$$

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$$\text{Boys sd} = \sqrt{\frac{\sum x^2}{18} - \text{boys mean}^2}$$

$$= \sqrt{\frac{36296.4}{18} - 44.73^2} = 3.96$$

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Exercise 2E

Q2, 4, 6, 8

Hwk Exercise 2D

Q2, 4, 6