Sample standard deviation

6 questions | 13 marks

Equivalent correct methods earn the corresponding marks.

1. Find s for 1,3,5. [2 marks]

Mean 3; squared deviations sum 8; sample variance $\frac{8}{2}=4$.

Answer: 2.

2. Find the sample variance and s for 3,3,7,7. [2 marks]

Mean 5; squared deviations $4+4+4+4=16$.

Divide by 3, then take the square root.

Answer: Variance $\frac{16}{3}$; $s\approx 2.309$.

3. A sample has $s=5$. Every value increases by 20. Find the new s. [2 marks]

Shifting does not change deviations from the mean.

Answer: 5.

4. A sample has $s=3$. Values are multiplied by -2. Find the new s. [2 marks]

Standard deviation scales by the absolute multiplier: $|-2|\times 3=6$.

Answer: 6.

5. A calculator returns $S_x=4.20$ and $\sigma_x=3.76$ for a survey sample. Which should be reported as an estimate of population spread? [2 marks]

The survey observations are a sample, so use the $n-1$ calculation.

Answer: $S_x=4.20$, with the original unit.

6. For sample values 4,6,8,10, calculate the mean and s to 3 decimal places. [3 marks]

Squared deviations $9+1+1+9=20$.

$s=\sqrt{\frac{20}{3}}\approx 2.581988897$.

Answer: Mean 7; $s\approx 2.582$.