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BSIT-3B

Descriptive Statistics — Mean, Variance, and Standard Deviation

A. Population and Sample Definition

Definition:

Population: The entire set of individuals or items that share a common characteristic being studied.

Sample: A smaller group selected from the population that represents it for analysis.

What is the population and what is the sample in this dataset?

The **Population** on this data was the **whole class** who took the exam, and as for the **Sample** is the Exam Scores the group of **20 students** of that class.

B. Step-by-step computation of mean, variance, and standard deviation

Mean (Average)

Formula: $\text{Mean}=\frac{\text{Sum of all scores}}{number\ of\ student}$

$\text{Mean}=\frac{1651}{20}= 82.55$

Sum of scores:

78 + 85 + 92 + 67 + 74 + 88 + 90 + 73 + 84 + 95 + 81 + 76 + 89 + 91 + 72 + 80 + 86 + 94 + 69 + 87 = **1651**

MEANS: 82.55

Deviations from the Mean (rounded into 2 decimal places)

x	x − 82.55	(x − 82.55)²
78	-4.55	20.70
85	2.45	6.00
92	9.45	89.30
67	-15.55	241.80
74	-8.55	73.10
88	5.45	29.70
90	7.45	55.50
73	-9.55	91.20
84	1.45	2.10
95	12.45	155.00
81	-1.55	2.40
76	-6.55	42.90
89	6.45	41.60
91	8.45	71.40
72	-10.55	111.30
80	-2.55	6.50
86	3.45	11.90
94	11.45	131.10
69	-13.55	183.60
87	4.45	19.80

Sum of squared deviations= 1386.90

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A. Population (Variance and Standard Deviation)

Formula for variance: $\sigma^2 = \frac{\sum(x-\mu)2}{n}$ answer: $\sigma^2 = \frac{\sum(1386.90)2}{20}$ = 69.35

Population Variance: 69.35

Formula for standard deviation: $\sigma = \sqrt{\sigma 2}$ answer: $\sigma = \sqrt{69.35}$ = 8.33

Population Standard Deviation: 8.33

B. Sample (Variance and Standard Deviation)

Formula of variance: $S^2 = \frac{\sum(xi-\bar{x})2}{n-1}$ answer: $S^2 = \frac{1386.90}{19}$ =72.99

Sample Variance: 72.99

Formula for standard deviation: $s = \sqrt{S^2}$ answer: $s = \sqrt{72.99}$ = 8.54

Sample Standard Deviation:8.54

C. Final values (rounded to 2 decimal places)

	Population	Sample
Mean	82.55	82.55
variance	69.35	72.99
standard deviation	8.33	8.54

D. Brief interpretation

The average score of **82.55** shows that the class performed quite well overall, with most students scoring above average.

The variance (**69.35**) and standard deviation (**8.33**) mean that students' scores are fairly close to each other, with only small differences in performance. There aren't any large gaps between the highest and lowest scores.

If this dataset is just a **sample**, the actual results for the whole population might be slightly different. Still, these values give a good estimate of how the class performed as a group.