1.0 Mean and Standard Deviation

Measures of Central Tendency & Measures of Dispersion

A. Formulas and Definitions:

median

sum = 420

1. A student has exam scores of: 50, 55, 65, 80, 80, and 90.

   a) Define, identify symbol if there is one, and calculate the following central tendencies:

$\bar{x}$ μ

Mean – average = add up ÷ number of scores

$\bar{x} = \frac{420}{6} = 70$

Median – middle of the road - middle of sorted scores $\frac{65+80}{2} = 72.5$

Mode – most frequent score, mode = 80

   b) Define and calculate the following measures of dispersion:

Range – LARGE − SMALL = 90 − 50 = 40

σ

Standard Deviation – measure "spreadoutness" from the mean

List of Data	Data value subtract Mean	Difference Squared
50	50 − 70 = −20	400
55	55 − 70 = −15	225
65	65 − 70 = −5	25
80	80 − 70 = 10	100
80	80 − 70 = 10	100
90	90 − 70 = 20	400
	Sum of Squares 420	1250

$(-20)^2$

$(-15)^2$

$$\sigma = \sqrt{\frac{sum\ of\ squares}{number\ of\ data}}$$

$$\sigma = \sqrt{\frac{1250}{6}} = \sqrt{208.33}$$

$$\sigma = 14.4$$

1.0 Mean and Standard Deviation

2. A student has exam scores of: 60, 64, 66, 70, and 72.

sum = 332

a) Calculate the following central tendencies:

Mean – $\bar{x} = \frac{332}{5} = 66.4$

Median – middle = 66

Mode – no repeats ∴ no mode.

b) Calculate the following measures of dispersion:

Range – MAX − MIN = 72 − 60 = 12

Standard Deviation –

LIST	DATA − MEAN	DIFF SQUARED
60	60 − 66.4 = −6.4	40.96
64	64 − 66.4 = −2.4	5.76
66	66 − 66.4 = −0.4	0.16
70	70 − 66.4 = 3.6	12.96
72	72 − 66.4 = 5.6	31.36
	sum =	91.2

$$\sigma = \sqrt{\frac{\text{sum}}{n}} = \sqrt{\frac{91.2}{5}} = \sqrt{18.24}$$

$$\sigma = 4.3$$

1.0 Mean and Standard Deviation

B. Technology:

A student has exam scores of: 50, 55, 65, 80, 80, and 90.

Enter the data into L_1 [STAT] [1. Edit]

STAT → CALC → 1-Var Stats

On your screen… **1-Var Stats L_1** … use L_1 to let the calculator know where your data is.

Copy out the screen… identify what all the values represent.

* $\bar{x} = 70$

$\Sigma x = 420$

Σx^2

Sx

* $\sigma_x = 14.4$
* $n = 6$

$\text{Min } x = 50$

Q_1

$\text{MEDIAN} = 72.5$

Q_3

$\text{MAX} = 90$

1.0 Mean and Standard Deviation

A student has exam scores of: 60, 64, 66, 70, and 72.

Enter the data into **L_1**

STAT → CALC → 1-Var Stats

On your screen… **1-Var Stats L_1** … use **L_1** to let the calculator know where your data is.

Copy out the screen… identify what all the values represent.

mean $\bar{x} = 66.4$

standard deviation $\sigma = 4.3$

number of scores $n = 5$

MIN = 60

MEDIAN = 66

MAX = 72