Practice Set 3 Measuring Central Tendency of Ungrouped Data

I. Darin Jones wants to know more about the sales of Walkman CD recorders/players described on page 6. Calculate the sample mean using this Walkman sales data from the last Practice Set. State the formula for the population mean.

Array of daily Walkman sales: 8, 12, 14, 15, 16, 16, 17, 17, 21, 22, 29

A. Sample mean $\bar{x} = \frac{\sum x}{n} = \frac{187}{11} = 17$

B. Population mean formula $\mu = \frac{\sum x}{N}$

II. Darin sells three different Walkman CD recorders; one for \$149, one for \$159, and a third for \$169. Of the 187 machines sold during this eleven-day period; 43 were the least expensive, 90 were moderately priced, and 54 were the expensive model. Calculate the weighted mean sales price for these machines.

$$\bar{x}_w = \frac{\sum (W_x X_x)}{\sum w_x} = \frac{(43)(\$149) + (90)(\$159) + (54)(\$169)}{43 + 90 + 54} = \frac{\$6{,}407 + \$14{,}310 + \$9{,}126}{187} = \frac{\$29{,}843}{187} = \$159.59$$

III. Using the data from question I, prove that the sum of the deviations from a mean is zero .

x	8	12	14	15	16	16	17	17	21	22	29
μ	17	17	17	17	17	17	17	17	17	17	17
$x - \mu$	-9	-5	-3	-2	-1	-1	0	0	4	5	12

$$\Sigma(x-\mu) = -9 + (-5) + (-3) + (-2) + (-1) + (-1) + 0 + 0 + 4 + 5 + 12 = 0$$

IV. The median number of Walkman units sold is 16 .

$\frac{n}{2} + .5 = \frac{11}{2} + .5 = 5.5 + .5 = 6 \rightarrow 16$

Note: Counting 6 positions from the left or right of the array yields 16 as the 6th number.

V. The mode for this data is 16 and 17 .

VI. This data can be described as bimodal .

VII. Calculate the following measures of position. Those using computer software should use a less-than cumulative relative frequency distribution to answer these questions.

A. Q_1 $\frac{n}{4} + .5 = \frac{11}{4} + .5 = 2.75 + .5 = 3.25 \rightarrow 14.25$

B. Q_3 $\frac{3n}{4} + .5 = \frac{33}{4} + .5 = 8.25 + .5 = 8.75 \rightarrow 20$ **Note:** 17 + .75(21-17) = 20

C. Interquartile range $Q_3 - Q_1 = 20 - 14.25 = 5.75$

D. 6th decile $\frac{xn}{10} + .5 = \frac{6(11)}{10} + .5 = \frac{66}{10} + .5 = 6.6 + .5 \rightarrow 7.1 \rightarrow 17$

E. 95th percentile $\frac{xn}{100} + .5 = \frac{95(11)}{100} + .5 = \frac{1{,}045}{100} + .5 = 10.45 + .5 = 10.95 \rightarrow 28.65$