

Practice Set 6 Measuring Dispersion of Grouped Data

I. Label this chart of the page 24 frequency distribution and calculate the following measurements.

Darin's Music Emporium Walkman Sales Data					
Stated Class Limits	Frequency (f)	x	fx	x ²	fx ²
5 - 9	1	7	7	49	49
10 - 14	2	12	24	144	288
15 - 19	5	17	85	289	1,445
20 - 24	2	22	44	484	968
25 - 29	1	27	27	729	729
Totals		11	187		3,479

A. Range

$$H - L = 29.5 - 4.5 = 25$$

B. Sample variance

$$\frac{\sum fx^2 - \frac{(\sum fx)^2}{n}}{n-1} = \frac{3,479 - \frac{(187)^2}{11}}{11-1} = \frac{3,479 - 3,179}{10} = 30$$

C. Sample standard deviation

$$S = \sqrt{S^2} = \sqrt{30} = 5.5$$

D. Quartiles

1. First $\frac{n}{4}$

$$\begin{aligned} Q_1 &= L + \frac{\frac{n}{4} - CF_b}{f}(i) \\ &= 9.5 + \frac{\frac{11}{4} - 1}{2}(5) \\ &= 9.5 + \frac{1.75}{2}(5) \\ Q_1 &= 13.9 \end{aligned}$$

2. Second $\frac{n}{2}$

$$\begin{aligned} Q_2 &= L + \frac{\frac{n}{2} - CF_b}{f}(i) \\ &= 14.5 + \frac{\frac{11}{2} - 3}{5}(5) \\ &= 14.5 + \frac{2.5}{5}(5) \\ Q_2 &= 17.0 \end{aligned}$$

3. Third $\frac{3n}{4}$

$$\begin{aligned} Q_3 &= L + \frac{\frac{3n}{4} - CF_b}{f}(i) \\ &= 19.5 + \frac{\frac{33}{4} - 8}{2}(5) \\ &= 19.5 + \frac{2.25}{2}(5) \\ Q_3 &= 20.1 \end{aligned}$$

E. Interquartile range

$$Q_3 - Q_1 = 20.1 - 13.9 = 6.2$$

F. 80th percentile

$$P_x = L + \frac{\frac{xn}{100} - CF_b}{f}(i)$$

$$P_{80} = 19.5 + \frac{\frac{80(11)}{100} - 8}{2}(5) = 19.5 + \frac{8}{2}(5) = 19.5 + 2 = 21.5$$

$$\frac{xn}{100} = \frac{80(11)}{100} = 8.8$$

II. Locate the three quartile measures calculated above on this number line.

