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Stat 203

⑤ MU → Identify 4 differences in the final histogram using different Class ~~boundaries~~ intervals

Standard deviation

$$S = +\sqrt{S^2}$$

$$= \sqrt{\frac{1}{n-1}\sum(x_i - \bar{x})^2}$$

Working Formula For variance

$$\frac{1}{n-1}\left(\sum_{i=1}^{n} x_i^2 - n\bar{x}^2\right)$$

Class intervals for MU:

0 - 3
3 - 6
6 - 9
9 - 12
12 - 15

Draw Histogram of Relative Frequency & Relative frequency and Class intervals

Sample Mean Equation

$$\bar{X} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

$$\bar{X} = \left(\sum_{i=1}^{n} x_i\right) / n$$

Mean Deviation About Median

$$\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})$$

Mean Absolute Deviation About Mean

$$\frac{1}{n}\sum_{i=1}^{n}|x_i - \bar{x}|$$

Sample Median = $\tilde{x}$

If n is odd → $\tilde{x} = \left(\frac{n+1}{2}\right)^{th}$ value

$= \left(\frac{n}{2}\right)^{th}$ value + $\left(\frac{n}{2}+1\right)^{th}$ value

Put the above the parenthesis are not exponents

Sample Mode = X_{max}

If n is even → $\tilde{x} = \left(\frac{n+1}{2}\right) + \left(\frac{n}{2}\right)$

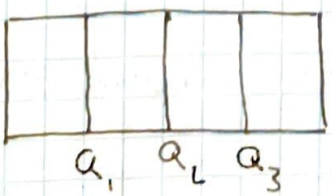
Mean Square deviation

$$\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2$$

Sample Variance

$$\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2$$

Quartiles



% of data left	Quartile	% data right
25%	Q_1	75%
50%	Q_2	50%
75%	Q_3	25%

⑥ a) Sample Mean

$$\bar{x} = \left(\sum_{i=1}^{n} x_i\right) / n \rightarrow \frac{6405}{10} = 640.5$$

Sample Median

350, 408, 540, 555, 575, 590, 608, 679, 815, 1285

$n = 10$

$$\tilde{x} = \frac{((n+1)/2) + (n/2)}{2}$$

$$\frac{575 + 590}{2} \rightarrow 582.5$$

b) $\bar{x}$ decrease by $300/10 = 30$

$\bar{x} = \sum x_i / n = 6105/10 = 610.5$

No change in Median

c) Trim 2 smallest & largest from n (20%)

$$\bar{x}_{20\%} = \frac{540 + 555 + 575 + 590 + 608 + 679}{2}$$ 610.5

d) Calculate $\bar{x}_{20\%}$ & $\bar{x}_{10\%}$ then average $\bar{x}_{20\%}$ & $\bar{x}_{10\%}$

$\bar{x}_{10\%} = 596.25$

$$\frac{\bar{x}_{20\%} + \bar{x}_{10\%}}{2} \rightarrow 591.167$$

⑦ b) Refer to problem 3's Stem & leaf plot

$\bar{x} = (\sum x_i)/n = 3131/40 = 78.275$

$$\tilde{x} = \left(\frac{n+1}{2} + \frac{n}{2}\right) / 2 = \frac{81 + 81}{2} = 81$$

a) Shape was roughly symmetrical so $\bar{x}$ & $\tilde{x}$ are expected to be similar

c) Can increase arbitrarily
Cannot decrease arbitrarily beyond 81. After 81 the order changes