

113-1 Statistics (I)

Quiz 1 Solution

October 2024

1 Multiple Choice

1. (D) 2. (B) 3. (D) 4. (A)

1.1 Fill-in-the-Blank

5. 3.616%

6. standardized , $z_i = \frac{x_i - \bar{x}}{s}$

2 Short Answer

7. At least $(1 - \frac{1}{z^2})$ of the data values must be within z standard deviations of mean, where z is any value greater than 1.

8. (1) The covariance is a measure of the linear association between two variables.

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

(3) Interpretation : Positive (Negative) values of the covariance indicate a positive (negative) relationship. Zero of covariance indicates no linear association between x and y .

3 Calculation

9.

(a) The first quartile is also the 25th percentile. Therefore, we must first find the position in the data of the 25th percentile.

$$L_{25} = \frac{p}{100}(n+1) = \frac{25}{100}(18+1) = 4.75$$

The first quartile or 25th percentile is 75% of the way between values in positions 4 and 5.

$$L_{25} = 18 + 0.75 \times (18 - 18) = 18$$

The third quartile is also the 75th percentile. Therefore, we must first find the position in the data of the 75th percentile.

$$L_{75} = \frac{p}{100}(n + 1) = \frac{75}{100}(18 + 1) = 14.25$$

The third quartile or 75th percentile is 25% of the way between values in positions 14 and 15.

$$L_{75} = 26 + 0.25 \times (27 - 26) = 26.25$$

(b) **Lower limit** = $Q_1 - 1.5 \times \text{IQR} = 18 - 1.5 \times 8.25 = 5.625$

Upper limit = $Q_3 + 1.5 \times \text{IQR} = 26.25 + 1.5 \times 8.25 = 38.625$

There are no data values smaller than the lower limit, but there are two data values larger than the upper limit: 42 and 64. These values would be considered outliers.

4 Calculation

10.

Grade	Value (x_i)	Weight (w_i)
A	4	5
B	3	2
C	2	5
D	1	3
F	0	0

Total Credit Hours = 15

$$GPA = \frac{\sum w_i x_i}{\sum w_i} = \frac{5 \times 4 + 2 \times 3 + 5 \times 2 + 3 \times 1}{5 + 2 + 5 + 3} = \frac{39}{15} = 2.6$$