MATH 244 Applied Statistics

Quiz 1

Name _____ Student ID _____ Tutorial section ____

Time allowed : 45 minutes

The following data are the numbers of passengers on flights of Delta Air Lines between San Francisco and Seattle over 33 days in April and early May.

101, 102, 110, 114, 116, 118, 119, 120, 121, 121, 123, 123, 125, 125, 127, 128, 128, 128, 128, 129, 129, 130, 131, 132, 132, 133, 134, 134, 134, 136, 136, 136, 136

(a) Construct a stem-and-leaf display for the data. Is the distribution symmetric, positively skewed, or negatively skewed?

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10+|12
10*|
11+|04                    n = 33
11*|689                   leaf unit = 1
12+|01133                 + = 0-4
12*|557888899             * = 5-9
13+|01223444
13*|6666
```

The distribution of the data is negatively skewed.

(b) Find the five number summary for the data.

Min = 101

$$Q_L = X_{(8.5)} = X_{(8)} + 0.5\left(X_{(9)} - X_{(8)}\right) = 120 + 0.5(121-120) = 120.5$$

$$\text{Median} = \frac{1}{2}\left(X_{(17)} + X_{(18)}\right) = \frac{1}{2}(128+128) = 128$$

$$Q_U = X_{(25.5)} = X_{(25)} + 0.5\left(X_{(26)} - X_{(25)}\right) = 132 + 0.5(133-132) = 132.5$$

Max = 136

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(c) We define the **upper inner fence** as a point at a distance of 1.5 times the interquartile range (IQR) above the upper quartile, the **lower inner fence** as a point at a distance of 1.5 times IQR below the lower quartile. Any number beyond these fences would be regarded as suspected outliers. What would be the suspected outliers (if any) in the numbers of passengers?

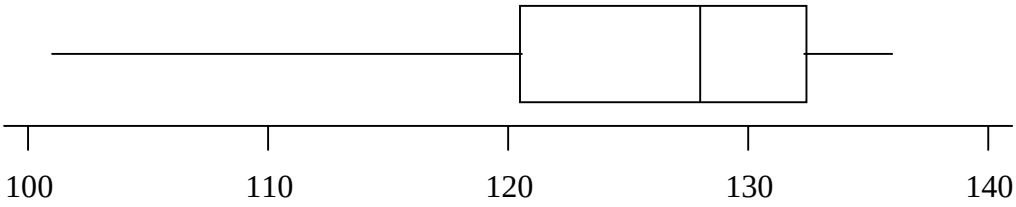
$IQR = Q_U - Q_L = 132.5 - 120.5 = 12$

Upper inner fence = $132.5 + 12 \times 1.5 = 150.5$

Lower inner fence = $120.5 - 12 \times 1.5 = 102.5$

Suspected outlier : 101, 102

(d) Sketch the boxplot for the data.



(e) Find the mean and standard deviation of the numbers of passengers.

$$\bar{X} = \frac{1}{33}\sum_{i=1}^{33} X_i = \frac{4139}{33} = 125.424$$

$$SD = \sqrt{\frac{1}{33}\sum_{i=1}^{33}\left(X_i - \bar{X}\right)^2} = \sqrt{\frac{2698.061}{33}} = \sqrt{81.759} = 9.042$$

OR $$s = \sqrt{\frac{1}{32}\sum_{i=1}^{33}\left(X_i - \bar{X}\right)^2} = \sqrt{\frac{2698.061}{32}} = \sqrt{84.314} = 9.182$$

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