Name: _____

Valencia College
Division of Architecture, Engineering, and Technology
EGN 2025 Probability and Statistics for Engineers
Spring 2015
Instructor: Dr. Kwabena Ofosu, P.E.

Quiz 2A

You will receive credit for showing your steps even if your final answers are incorrect.

Data: 40 intermediate-size vehicles were tested for their highway gas mileage (mpg). The data obtained is as follows

19.6	28.8	21.4	25.2	22.4	21.4	22.2	20.8	22.6	19.4
27.8	22.0	20.5	23.0	19.2	26.0	19.4	27.8	21.6	23.0
32.0	16.6	27.8	24.0	17.6	12.2	14.8	15.8	39.4	18.2
16.6	23.0	11.8	26.2	31.0	26.8	36.4	19.4	27.8	31.4

1. Construct a dotplot for this data. (You may use the ruled sheet on page 2 of this Quiz) (4 points)

2. What is the mode of this data? (1 point)

$$mode = 27.8 \quad \text{with freq. of } 4$$

3. What is the median of this data? (1 points)

median $\rightarrow \frac{40}{2} = 20^{th}$ position $= 22.0$

21st position $= 22.4$

$\tilde{x} = \dfrac{22 + 22.4}{2}$

$= 22.2$

4. What is the 90th percentile gas mileage in this data? (2 points)

$P_{90} \rightarrow 0.9(40) = 36$ position

$P_{90} = 31.0$

5. Conduct an outlier test for the high and low values in this data. Does this data contain outliers? (2 points)

$Q_1 \rightarrow 0.25(40) = 10^{th}$ position, $Q_1 = 19.4$
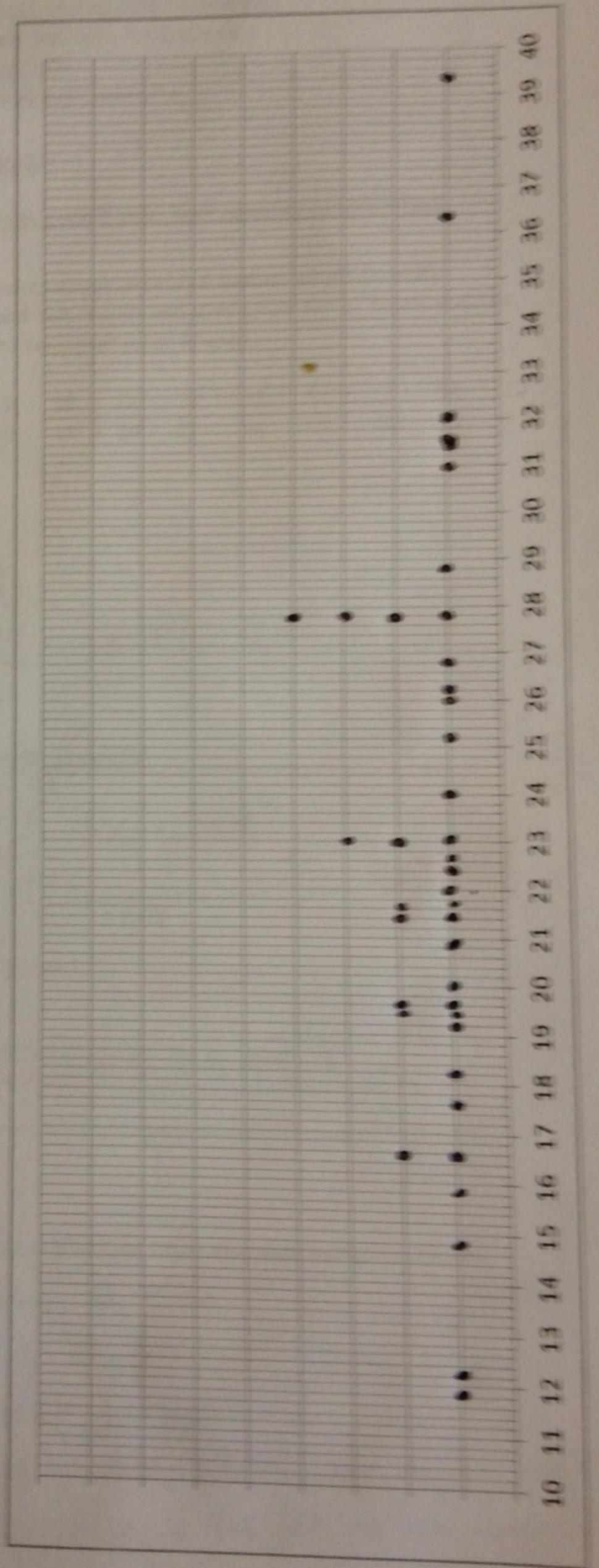
$Q_3 \rightarrow 0.75(40) = 30^{th}$ position, $Q_3 = 26.8$

$IR = 26.8 - 19.4 = 7.4$, $1.5 IR = 11.1$

$Q_3 + 1.5 IR = 26.8 + 11.1 = 37.9$

$Q_1 - 1.5 IR = 19.4 - 11.1 = 8.3$

if $x_i > 37.9$ or $x_i < 8.3$, it is an outlier

$x_i = 39.4$ is an outlier

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Quiz 2B

You will receive credit for showing your steps even if your final answers are incorrect.

An airport security operator is responding to complaints about excessive queues at the security screening checkpoints for passengers. One checkpoint was monitored over a number of hours and the queue (number of passengers in line) observed were documented as follows:

26	18	12	15	5	21	19	18	13	18	22	17	11	17	12	18	22
20	10	14	21	16	21	21	21	19	39	15	23	14	17	19	20	8
13	16	14	26	11	19											

1. Calculate the mean queue length. (2 points)

$$\bar{x} = \frac{\sum x_i}{n} = \frac{\sum_{i=1}^{40} x_i}{40} = 17.525$$

2. Calculate the standard deviation of the queue length. (2 points)

$$S = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{\sum_{i=1}^{40} (x_i - 17.525)^2}{39}} = 5.78$$

3. Draw the **stem and leaf diagram** for this data. (4 points)

0	5 8
1	0 1 1 2 2 3 3 4 4 4 5 5 6 6 7 7 7 8 8 8 8 9 9 9 9
2	0 0 1 1 1 1 1 2 2 3 6 6
3	9

4. Conduct an outlier test for the high and low values in this data. Does this data contain outliers? (2 points)

$Q_1 \rightarrow 0.25(40) = 10^{th}$ position, $Q_1 = 14$

$Q_3 \rightarrow 0.75(40) = 30^{th}$ position, $Q_3 = 21$

$IR = 21 - 14 = 7$, $1.5 \times IR = 1.5(7) = 10.5$

$Q_3 + 1.5 IR = 21 + 10.5 = 31.5$, If $x_i > 31.5$ it is an outlier

$Q_1 - 1.5 IR = 14 - 10.5 = 3.5$. If $x_i < 3.5$ it is an outlier

$x_i = 39$ is an outlier.