

Name: ANSAR

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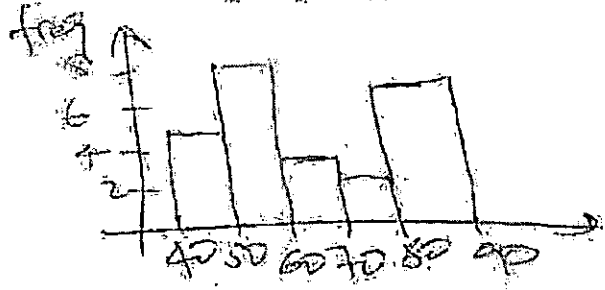
TEST 1

1: Given the following tables of Grades distribution of 25 students:

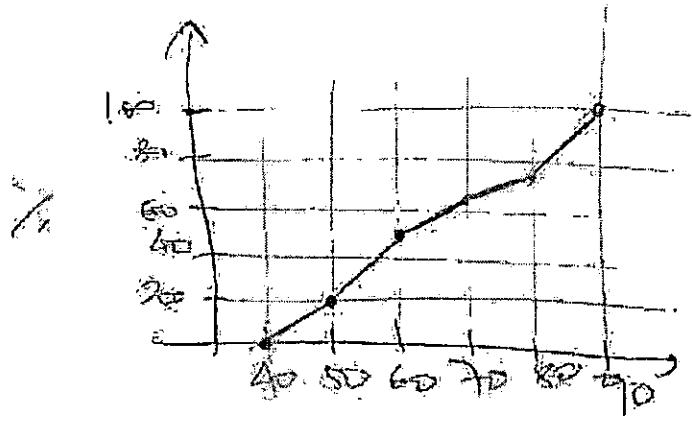
Grades	Frequency	Cumulative Frequency	Percentage	Cumulative percentage
40 but less than 50	5	5	20%	20
50 but less than 60	8	13	32	52
60 but less than 70	3	16	12	84
70 but less than 80	2	18	8	92
80 but less than 90	7	25	28	100%
Total	25		100	

a. (3 pts) Complete the above table.

b. (3 pts) Make a frequency histogram.



c. (3 pts) Make a cumulative percentage polygon.



2. Given the following set of data of nine night temperatures:

4, 6, 9, 12, 14, 16, 17, 18

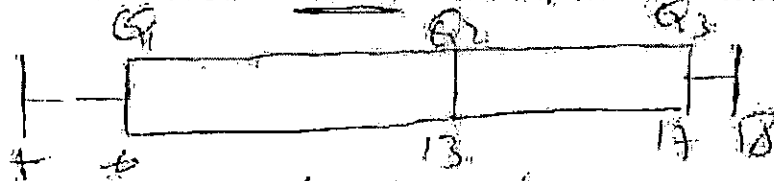
a. (6 pts) Find  $Q_1$ ,  $Q_2$  and  $Q_3$ .

$$Q_1 \text{ position} = \frac{8+1}{4} = 2.25 \rightarrow 2^{\text{nd}} \text{ value } Q_1 = 6$$
$$Q_2 \text{ pos} = \frac{8+1}{2} = 4.5 \quad Q_2 = \frac{12+14}{2} = 13$$
$$Q_3 \text{ pos} = \frac{3(8+1)}{4} = 6.75 \rightarrow 7^{\text{th}} \text{ value } Q_3 = 17$$

b. (1 pts) Find the interquartile range (IQR).

$$IQR = Q_3 - Q_1 = 17 - 6 = 11$$

c. (3 pts) Draw a box-plot and comment on the shape of the distribution.



left skewed

d. (2 pts) Given the mean  $\bar{X} = 12$  and standard deviation  $S = 5.21$ , is 25 an outlier?

$$Z = \frac{X - \bar{X}}{S} = \frac{25 - 12}{5.21} = 2.495 < 3$$

25 not outlier

Course: Math 121

Semester: Fall 2017

Date: October 15<sup>th</sup> 2017

3. Consider the following two variables X and Y:

X	2	5	9	12
Y	5	8	12	15

a. (2 pts) Find the mean of X, and mean of Y

$$\bar{X} = \frac{2+5+9+12}{4} = 7$$

$$\bar{Y} = \frac{5+8+12+15}{4} = 10$$

b. (2 pts) Find the standard deviation of X, and standard deviation of Y

$$S_x = \sqrt{\frac{(2-7)^2 + (5-7)^2 + (9-7)^2 + (12-7)^2}{4-1}} = 4.397$$

$$S_y = \sqrt{\frac{(5-10)^2 + (8-10)^2 + (12-10)^2 + (15-10)^2}{4-1}} = 4.397$$

c. (2 pts) Find the covariance between X and Y.

$$\begin{aligned} \text{cov}(X, Y) &= \frac{(2-7)(5-10) + (5-7)(8-10) + (9-7)(12-10) + (12-7)(15-10)}{4-1} \\ &= \frac{50}{3} = 19.33 \end{aligned}$$

d. (3 pts) Find the correlation between X and Y and comment on your answer.

$$r = \frac{\text{cov}(X, Y)}{S_x S_y} = \frac{19.33}{4.397 \cdot 4.397} = 1$$

very strong linear relationship  
between X and Y