

## Mid Semester Assignment

Spring 2020

Subject: Probability and Statistics

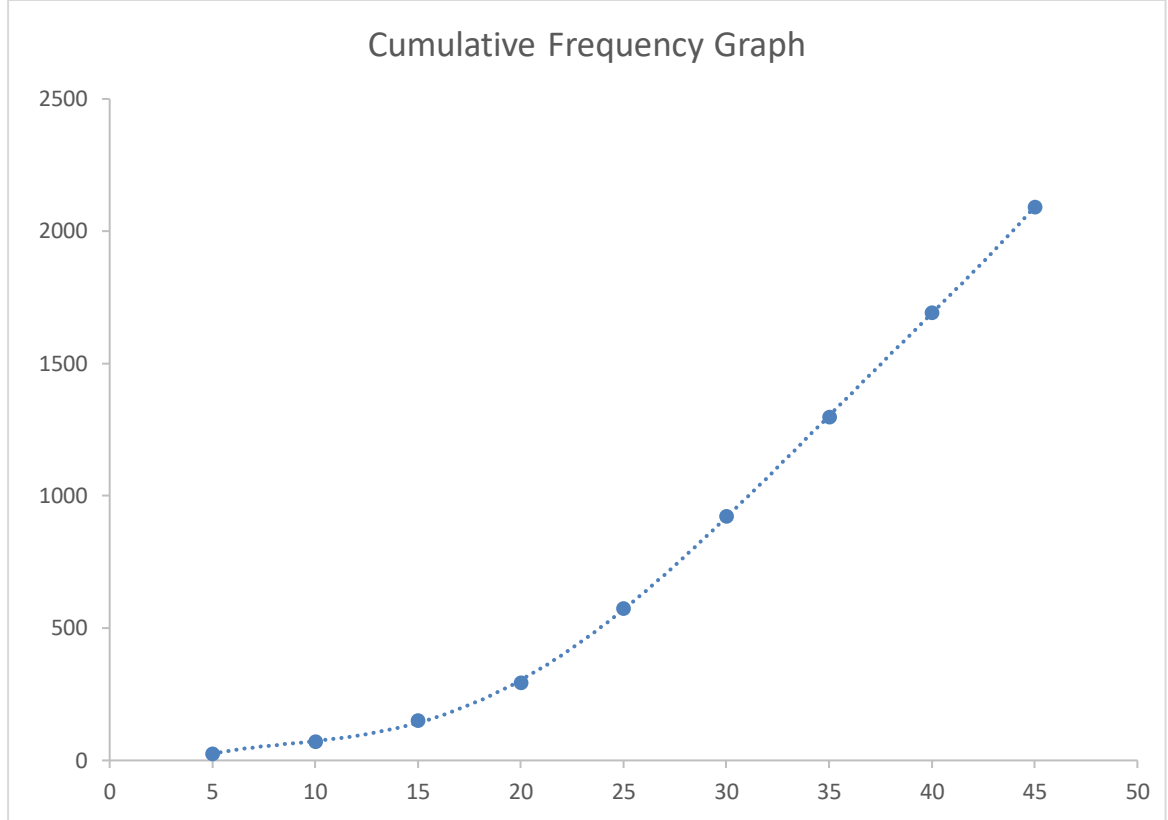
**Q1:** Students were asked how long it took them to walk to school on a particular morning. A cumulative frequency distribution was formed

<b>Time taken(in minutes)</b>	<5	<10	<15	<20	<25	<30	<35	<40	<45
<b>Frequency</b>	25	45	81	143	280	349	374	395	400

- a) Draw a cumulative frequency curve and estimate how many students took less than 18 minutes.

**ANSWER:**

Time Taken	Frequency	Cumulative frequency
5	25	25
10	45	$25+45=70$
15	81	$70+81=151$
20	143	$151+143=294$
25	280	$294+280=574$
30	349	$574+349=923$
35	374	$923+374=1297$
40	395	$1297+395=1692$
45	400	$1692+400=2092$



Only 3 students took less than 18 minutes

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b) Take equal class intervals of 0-, 5-, 10-, etc., construct frequency distribution and draw a histogram.

**ANSWER:**

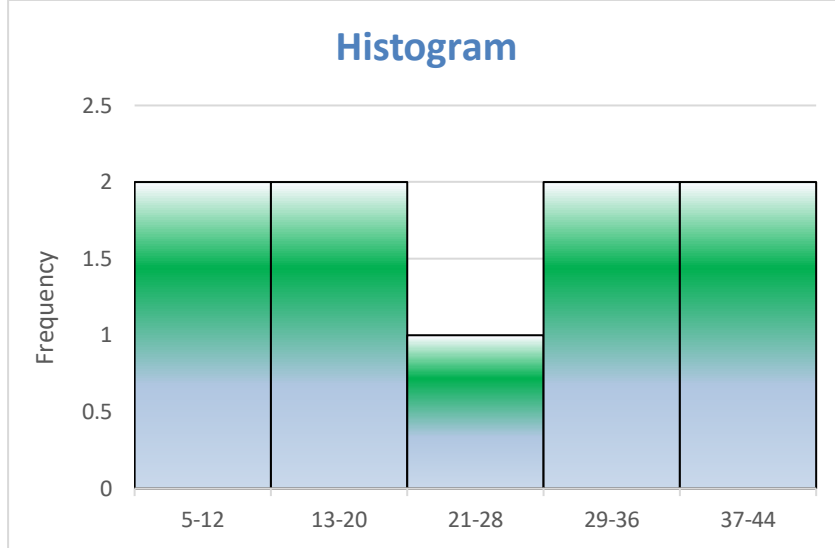
**Data:**

5 10 15 20 25 30 35 40 45

**Classes = 5**

**Width:**  $\frac{45-5}{5} = \frac{40}{5} = 8$

Classes	Frequency
5-12	2
13-20	2
21-28	1
29-36	2
37-44	2



**Q2:** Construct a grouped distribution table for the following data and Calculate Mean, Mode and Quartiles.

423, 369, 387, 411, 393, 394, 371, 377, 389, 409, 392, 408, 431, 401, 363, 391, 405, 382, 400, 381, 399, 415, 428, 422, 396, 372, 410, 419, 386, 390

**ANSWER:**

Mean:

$$= \frac{423+369+387+411+393+394+\dots+419+386+390}{30}$$

$$= 397.1$$

Mode:

**Most repeated Value = 369**

Quartile:

**Arrange them in according to order**

$$= 394 + 0.5 (15-14)$$

$$= 394.5 = 395$$

**Q3:** By multiplying each of the numbers 3,6,2,1,7,5 by 2 and then adding 5, we obtain 11,17,9,7,19,15. What is the relation between the standard deviation and the means of the two sets?

## ANSWER:

The mean of the first Data set is = 4

The Standard Deviation of First data set is =2.3664

The mean of the first Data set is =13

The Standard Deviation of First data set is =7.54983

### Relation between the standard deviation and the mean of two sets:

The standard deviation (SD) measures the amount of variability, or dispersion, for a subject set of data from the mean, There will be a lot of values that will be closer to the mean which makes the distribution less spread out and less details. In contrast a higher standard deviation indicates higher amount of data variability to the data sets, in other words there will be a lot more values which will be far from mean which makes the distribution more spread out.

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**Q4:** For the following grouped distribution table Calculate the Variance and Standard Deviation

Class	64-84	85-104	105-124	125-144	145-164	165-184	185-204
Frequency	15	18	27	10	6	5	13

## ANSWER:

	<b>F</b>	<b>MID-POINT</b>
<b>64-84</b>	15	74
<b>85-104</b>	18	94.5
<b>105-124</b>	27	114.5
<b>125-144</b>	10	134.5
<b>145-164</b>	6	154.5
<b>165-184</b>	5	174.5
<b>185-204</b>	13	194.5

$$S.D = 1484.90$$

$$V = 38.53$$

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**Q5: Comment on the following sentences**

- a) The depth of a river at four different points is 2,7,5,6 feet respectively. The average depth is 5 feet. Therefore all the people with heights 5 feet can cross it
- b) The average marks of one class of students are 30. Therefore every student is hopeless.
- c) The average income of a king and his household servants is £20,000 per month, therefore all the household servants must be fabulously paid.

**ANSWER a)** The average on 5, which means not all bridges have a depth of 5 feet

**ANSWER b)** Not true: Many students would have scored high marks, but the opposing factor i-e students with mediocre marks are also present hence average comes out to be 30.

**ANSWER c)** Not true: King is very rich and his income is combined with all the servants will makes an average of high amount

