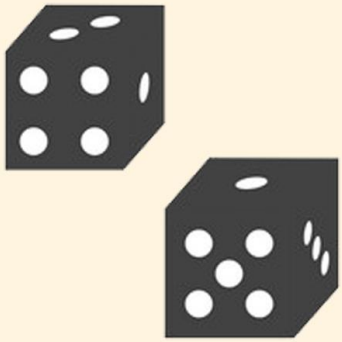
Biostatistics

Doctor 2017 | Medicine | JU



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this sheet was written from section one.

Last week we have discussed three of the descriptive statistics measures , we had talked about :

1- mean

2- median

3- mode

* The common thing between these three measures is that they all describe the tendency toward the center **(toward the middle of the distribution).**

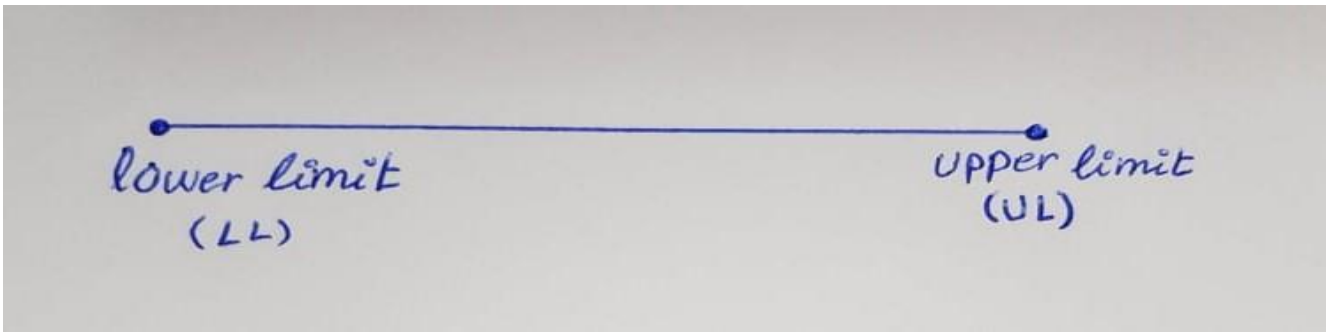
* Those three, only measure one location in the distribution line which is the center **(the middle)** , but we also interested in other location in the distribution line but before going to discus them lets review what is the function for each one of the three measures from the previous lecture.

* the median is used for describing who is exactly in the middle **(we call that person the median of the sample)** which means that half the people are located to that person's left and the other half are located to that person's right .

Note :

The median slip up the distribution line in to two equals half , 50% to the right and 50% to the left

* before going to our main topic in this lecture , there are some pictures that you have to understand them very well **(the description is below each one)**:



* The individual who has the lowest value of (X) is located to the farthest left which is called the **lower limit**.

* The individual who has the highest value of (X) is located to the farthest right which is called **upper limit** or the **higher limit**.

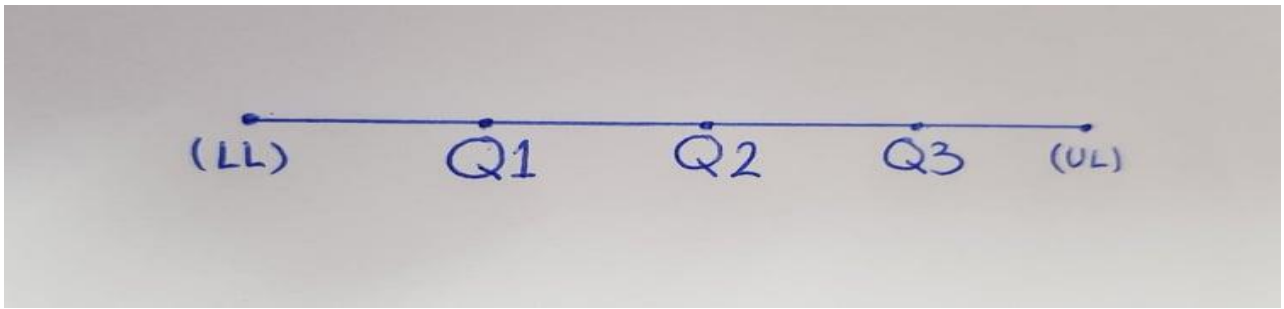
Quantiles

* Measures of non-central location used to summarize a set of data

* there are 4 other way to split up our distribution line further than just half on the left and half on the right and here they are :

1- **Quartiles** : is a way to split up the line of distribution in to 4 equal quarters

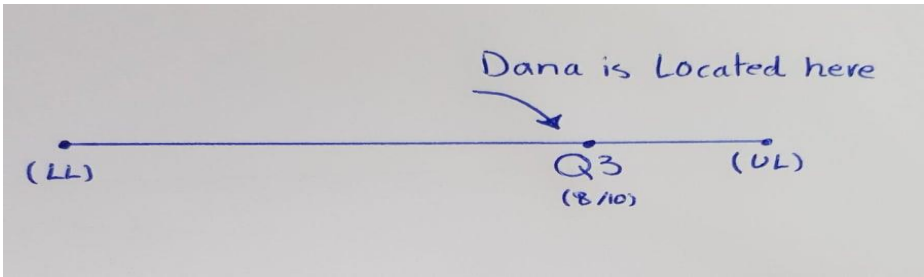
(the explanation is below the pic)



***Q1** : the first quartile , is the value of (X) for the person who is located on the first quarter of the distribution .
_ 25% of people are located to his left **(lower than him)** and the remaining 75% of people are located to his right **(higher than him).**

***Q2** : is the value of (X) for the person who has 50% of people are located to his right and 50% of people are located to his left **(he is exactly in the middle)**
_ Q2 = the **median** , because it is the actual center of the distribution line .
_ how is this useful ?

Lets say that there is a sample of students , their size is 100 and they took an exam from 10 , dana got (8/10) and she was located exactly in Q3 in the distribution line while khaled got (2/10) and he is located exactly in Q1 :

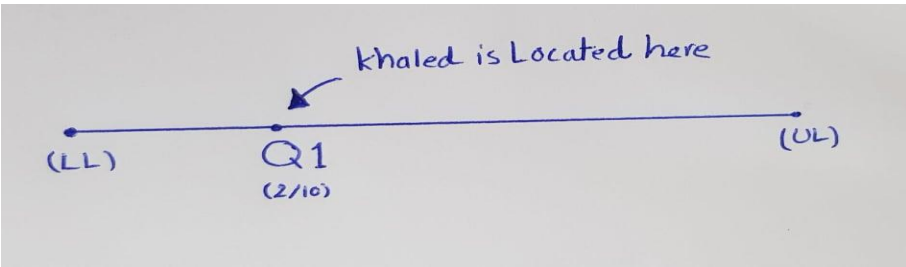


A) how many students whose mark was higher than dana ?

(25% of students got 8/10 or higher, so in this sample there are 25 students who got above 8).

B) how many students got lower mark than dana ?

(75% which means that in this sample there are 75 students whose mark is lower than dana)

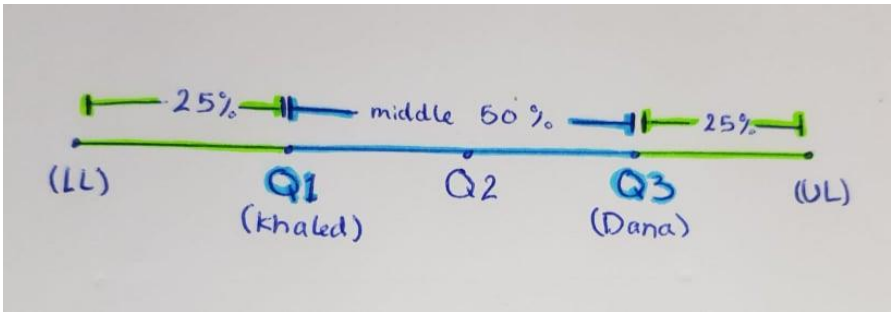


C) how many students got the same mark as Khaled or higher ?

(75%)

D) how many students got lower mark than Khaled ?

(25%)



E) how many students are located in the middle 50% (located between Q1 and Q3)?

Their percentage is 50% which means that 50 people are located between Q1 & Q3 , **why?**

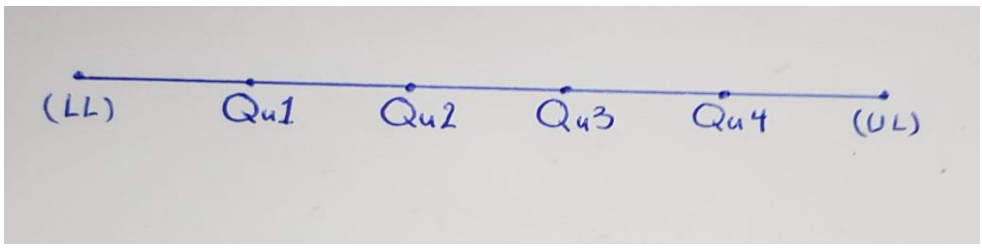
_ we know that all people located to the right of Q3 are quarter and all people located to the left of Q1 are quarter .

_ the remaining people who are **located between Q1 and Q3 = 100%- 25%- 25% = 50%**

***Q3** : the third quartile , is the value of (X) for the person who has 75% of people are located to his left and only the highest 25% of people are located to his right.

_____"the end of quartiles"_____

2- **Quintiles** : is a way to split the line of distribution in to **five** equal quintiles



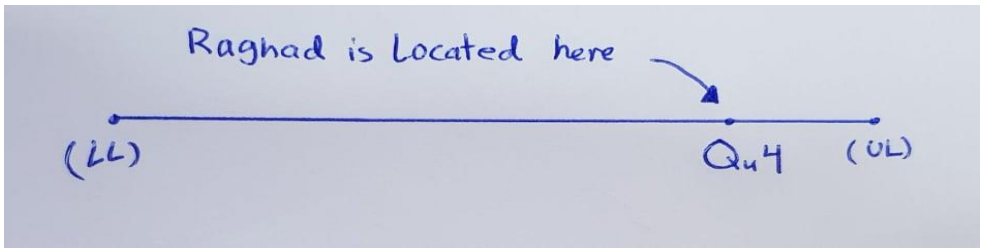
* Qu1 : the first quintile , is the value of (X) for the person who has 20% of people are located to his left **(lower than him)** while the remaining 80% are located to his right **(higher or equal to him).**

*Qu2 : the second quintile , is the value of (X) for the person who has 40% of people lower than him and 60% higher or equal to him

*Qu3 : the third quintile , is the value of (X) for the person who has 60% of people lower than him and 40% higher or equal to him

*Qu4 : the fourth quintile , is the value of (X) for the person who has 80% of people lower than him and 20% higher or equal to him

_ lets say that our class took an exam from 10 we are 100 student , raghad got (9/10) and she is located in the quintile number 4 (Qu4) :

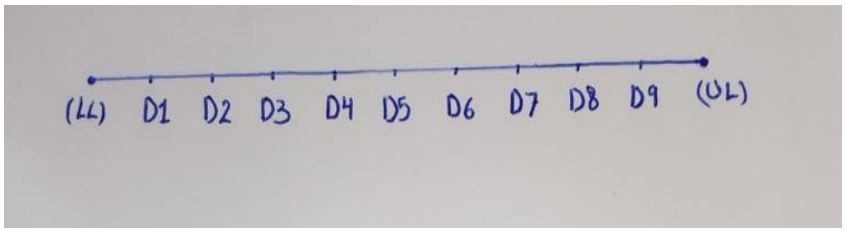


***how many students who got 9/10 or full mark?**

20 students including herself

_____"the end of quintiles"_____

3- **deciles** : is a way to split the line of distribution in to equal 10 deciles.



*D1 : is the value of (X) for the person who has 10% of people lower than him and 90% higher or equal to him

***D2** : is the value of (X) for the person who has 20% of people lower than him and 80% higher or equal to him

***D3** : is the value of (X) for the person who has 30% of people lower than him and 70% higher or equal to him

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***D9** : is the value of (X) for the person who has 90 % of people are located to his left while the remaining 10% of people are located to his right.

Important note :

The fifth decile is located exactly on the center which is exactly location of the median and Q2 .

_ if we know that one of the universities mark to pass is 40% (<40 means the student failed) , the size of the sample was 1000 student , ahmad got (40 / 100) so he passed , and he is located in the second decile (D2) :

A) how many students failed in the exam ?

20% failed , and that means 200 of 1000 of the students in that year didn't pass the exam .

B) salsabeel got 80 and she was located in the D9 , how many excellent student in that university in that year ?

Note : any one who get more than 80 (تقديره امتياز)

10% of the student , that means 100 of 1000 students only .

_____"the end of deciles"_____

4- **percentiles** : is a way to split the line of distribution in to equal 100 parts (percentile).

_how is this important ?

***P1** : the first percentile is the value of (X) for the person who has 1 % of people are located to his left while the remaining 99% of people are located to his right.

***P2** : is the value of (X) for the person who has 2 % of people are located to his left while the remaining 98% of people are located to his right.

***P50** : is the value of (X) for the person who has 50 % of people are located to his left while the remaining 50% of people are located to his right **(the same as the median , Q2 and D5)**

***P25** : is the value of (X) for the person who has 25 % of people are located to his left while the remaining 75% of people are located to his right **(the same as Q1)**

***P20** : is the value of (X) for the person who has 20 % of people are located to his left while the remaining 80% of people are located to his right **(the same as Qu1 and D2)**

An exam question :

_The number of M.A students is 500 students , to pass the master exam you have to get 65% , mustafa got exactly (65/100) and he was located in the (P15) :

A) how many students failed ?

15% * 500 = 75

B) how many students passed ?

425 including Mustafa

_ in 2017 , 100000 students took tawjihi exams , hala got 97% **(this is her mean , her percentage)** And she was located in P95 , abd alwadood got 50% and he was located in P22 while hasan got 65% and he is located in P45 :

A) how many students who got 97 or higher in that year ?

5% * 100000 = 5000

B) how many students who failed in tawjihi that year ?

22% * 100000 = 22000

C) how many students who passed tawjihi exams ?

78% * 100000 = 78000

D) hasan can enroll the gavermental universities while abd alwadood cant ,
Who many students in that year who can enroll the governmental universities ?

55000

E) how many students that can compete in private universities

Who passed the exam are 78% and the students who can enroll and compete in private universities got below than 65 which means that <P45 and >P22 (45-22=23)

100000 * 23% = 23000

Good luck ☺