

Statistics, lecture 2:- Measures of central tendency

1- The Mean: \bar{x}

i) for raw data and stem and leaf diagram.

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

e.g: find the mean of:-

2, 7, 5, 11, 5

$$\bar{x} = \frac{2+7+5+11+5}{5} = \frac{30}{5} = 6$$

e.g: If the mean of a, a, 7, 11, 2 is 6, find a?

$$\frac{a+a+7+11+2}{5} = 6$$

$$2a + 20 = 30$$

$$2a = 10$$

$$a = 5$$

e.g: If the mean of x, y, 12 is 10, then find the mean x and y?

The mean of x and y is $\frac{x+y}{2}$

$$\text{Now, } \frac{x+y+12}{3} = 10$$

$$x+y+12 = 30$$

$$x+y = 18 \Rightarrow \frac{x+y}{2} = 9$$

e.g:

S	L
1	1 1 2
2	1 2 3
3	1 1 2

Key: 1|2 represents 12

$$\bar{x} = \frac{11+11+12+21+22+23+31+31+32}{9} = \frac{194}{9}$$

$$\approx 21,5$$

e.g: If the mean of 9 students is 15, Ahmad with mark 20 joined the class, find the new mean.

sol) $n=9, \bar{x}=15$

$$\sum x = n \cdot \bar{x}$$

$$\sum x = 9 \times 15 = 135$$

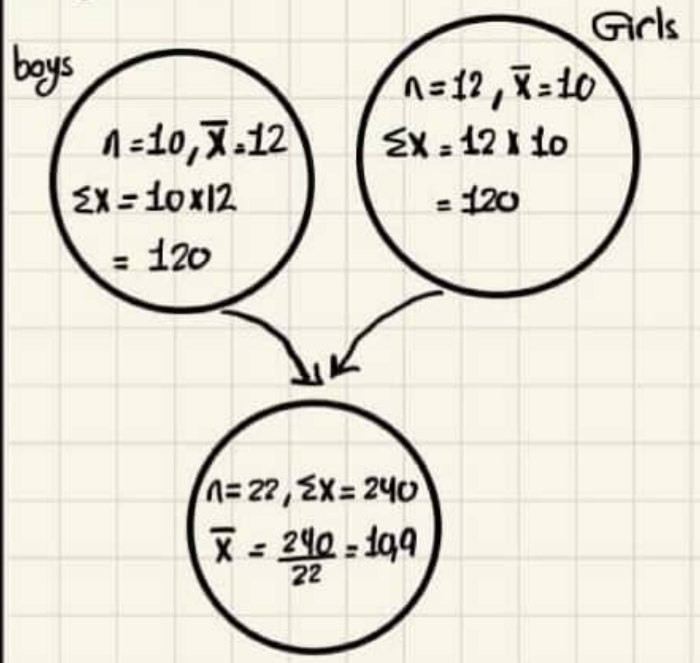
$$\text{new } \sum x = 135 + 20 = 155$$

$$\text{new } n = 10$$

$$\text{new } \bar{x} = \frac{155}{10} = 15,5$$

ملاحظة: لو اطلبك نفس السؤال لكن بدل Joined كتب left ، نتبه طريقة الال لكن بدل ما اصح نطو ودر القيم الكلية يصح 8

e.g: If the mean mark of 10 boys is 12 and " " " " 12 girls is 10 find " " " " the students all together.



ii) For frequency distribution:

$$\bar{x} = \frac{\sum fx}{\sum f}$$

e.g:

X	1	2	3	4	5	Sum
f	3	8	7	2	4	24

يتوي البيانات الطلاب في امتحان قصير، بحيث
وضعت الامتحانات مع عدد مرات تكرارها

Sol)

X	1	2	3	4	5	Sum
f	3	8	7	2	4	24
fx	3	16	21	8	20	68

$$\bar{X} = \frac{\sum x f}{\sum f} = \frac{68}{24} \approx 2,8$$

e.g) If $\bar{X} = 3$, find k

X	1	2	3	4	5	Sum
f	3	8	7	k	5	24

Sol)

X	1	2	3	4	5	Sum
f	3	8	7	k	5	23+k
fx	3	16	21	4k	25	

$$\bar{X} = \frac{65+4k}{23+k} = 3$$

$$3k+69 = 65+4k$$

$$k = 4$$

iii) For grouped frequency distribution:-

e.g)

I	0-4	5-9	10-14	15-19	sum
f	3	8	7	2	20

$$\bar{X} = \frac{\sum f \cdot x}{\sum f} \text{ where } x \text{ is the mid-interval value } (x = \frac{a+b}{2})$$

a, b: طرف الفترة

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I	0-4	5-9	10-14	15-19	sum
f	3	8	7	2	20
X	2	7	12	17	
fx	6	56	84	34	180

$$\bar{X} = \frac{180}{20} = 9$$

explain: why 9 is just an estimate for mean?

Because X is unknown, it's estimated

e.g) If $\bar{X} = 9$, then find k

I	0-4	5-9	10-14	15-19	sum
f	3	8	k	2	13+k
X	2	7	12	17	
fx	6	56	12k	34	96+12k

هذه هي اكل لبيت
عنه الوال

$$9 = \frac{96+12k}{13+k}$$

$$96+12k = 117+9k$$

$$3k = 21$$

$$k = 7$$

لا تبك: جميع الاسئلة قد تكون مباشرة او غير

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