Central Tendencies Assignment.

*1. Find the mean of the following data using hand and compare with numpy.mean()

a) 9, 7, 11, 13, 2, 4, 5, 5

b) 2.2, 10.2, 14.7, 5.9, 4.9, 11.1, 10.5

c) 11/4, 21/2, 51/2, 31/4, 21/2

a) Mean = $\mu = \frac{\sum x_i}{n}$

$= \frac{9+7+11+13+2+4+5+5}{8}$

$= 7$

b) $\mu = \frac{2.2+10.2+14.7+5.9+4.9+11.1+10.5}{7}$

$= 8.5$

c) $\mu = \frac{11/4 + 21/2 + 51/2 + 31/4 + 21/2}{5}$

$= \frac{2.75 + 10.5 + 25.5 + 7.75 + 10.5}{5}$

$= 11.4 = 57/5$

*2. Find the mean of first 10 fibonacci numbers (use a for loop to create 10 fibonacci series)

first 10 fibonacci numbers.

0, 1, 1, 2, 3, 5, 8, 13, 21, 34

$$\mu = \frac{0+1+1+2+3+5+8+13+21+34}{10}$$

$$= 8.8$$

*3. Find the mean and median of first 5 prime numbers

first 5 prime numbers

2, 3, 5, 7, 11

$$\mu = \frac{2+3+5+7+11}{5}$$

$$= 5.6$$

Median = 5

*4. The mean of 8, 11, 6, 14, x and 13 is 66. Find the value of observation x.

$$\frac{8+11+6+14+x+13}{6} = 66 \quad (\mu)$$

$$\Rightarrow 52 + x = 396$$

$$\Rightarrow x = 396 - 52 = 344$$

*5. The mean of 6, 8, x+2, 10, 2x-1 and 2 is 9. Find the value of x in the data.

$$\frac{6+8+(x+2)+10+(2x-1)+2}{6} = 9$$

$$\Rightarrow 26 + (x+2) + (2x-1) = 54$$

$$\Rightarrow 3x = 54 - 27$$

$$\Rightarrow x = 9$$

*6. Find the mean of the following distribution.

a) The age of 20 boys in a locality is given below, -

Age in Years	12	10	15	14	8
Number of Boys	5	3	2	6	4

b) Marks obtained by 40 students in an exam are given below

Marks	25	30	15	20	24
Number of students	8	12	10	6	4

a) Mean (μ) $= \frac{12\times5 + 10\times3 + 15\times2 + 14\times6 + 8\times4}{20}$

$= \frac{236}{20} = 11.8$

b) Mean (μ) $= \frac{25\times8 + 30\times12 + 15\times10 + 20\times6 + 24\times4}{40}$

$= \frac{926}{40} = 23.15$ Ans.

X7. Find the mode of the following data

a) 12, 8, 4, 8, 1, 8, 9, 11, 9, 10, 12, 8

b) 15, 22, 17, 19, 22, 17, 29, 24, 17, 15

c) 0, 3, 2, 1, 3, 5, 4, 3, 42, 1, 2, 0

d) 1, 7, 2, 4, 5, 9, 8, 3

a) Mode = 8

b) Mode = 17

c) Mode = 3

d) No Mode

X8. The following observations are arranged in ascending order. The median of the data is 25. Find the value of x.

17, x, 24, x+7, 35, 36, 46

Odd length, hence $\frac{n+1}{2} = \frac{7+1}{2} = 4$ (index)

$x + 7 = 25$

$\Rightarrow x = 18$

17, 18, 24, (25), 35, 36, 46

Q. In the above problem, how would you approach the problem if the numbers are not in ascending order? What are possible value of x then?

First, check the length of observation

Next, if length is odd then $\frac{n+1}{2}$

and if length is even then $\frac{n^2}{2}, \frac{n}{2}+1$ (average)

Then, find out the index of the Median

in this case, since Median is given,

and index is $\frac{7+1}{2} = 4$

So, $x+7 = 25 = 18$

10. In which of these situations would you use the mode to measure the central tendency of the data.

a) Justin records the temperature at noon every day for two weeks and wants to know the temperature of a 'typical' day.

b) Would you use the mean in all of these situations?

c) Juliana measures the height of all the girls on her soccer team and wants to know the typical height of soccer player.

d) Sam asks the students in her class to identify their favourite colours and wants to know which colour is the most common?

a) Mean

b) No

c) Median

d) Mode