Central Tendencies Assignments

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

Ans) a) $\mu = \frac{9+7+11+13+2+4+5+5}{8} = \frac{56}{8} = 7$

b) $\mu = \frac{2.2+10.2+14.7+5.9+4.9+11.1+10.5}{7} = 8.5$

c) $\mu = \frac{\frac{11}{4}+\frac{21}{2}+\frac{51}{2}+\frac{31}{4}+\frac{21}{4}}{5} = \frac{11+42+102+31+21}{5\times 4}$

$= \frac{207}{20} = 10.35$

2) Find the mean and median of first 5 prime numbers

Ans) 1, 2, 3, 5, 7

$\mu = \frac{1+2+3+5+7}{5} = \frac{18}{5} = 3.6$

Median = $\frac{n+1}{2}$ th element $= \frac{5+1}{2} = 3^{rd}$ element i.e. 3

(n is odd)

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

A)

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

$$\Rightarrow \quad x + 52 = 66 \times 6$$

$$x = 396 - 52$$

$$\boxed{x = 344}$$

5. The mean of 6, 8, x+2, 10, 2x-1 and 2 is 9. Find x.

A)

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

$$\Rightarrow \quad 3x + 27 = 6 \times 9$$

$$3x = 54 - 27$$

$$3x = 27$$

$$\boxed{x = \frac{27}{3} = 9}$$

6. Find mean of following distribution

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

Age (yrs)	12	10	15	14	8
No. of Boys	5	3	2	6	4

A)

$$\mu = \frac{(12\times5)+(10\times3)+(15\times2)+(14\times6)+(8\times4)}{5+3+2+6+4}$$

$$= \frac{60+30+30+84+32}{20} = \frac{236}{20}$$

$$\boxed{\mu = 11.8 \text{ yrs}.}$$

b, Marks obtained by 40 students in exam are given below

Marks	25	30	15	20	24
No. of Students	8	12	10	6	4

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

$$= \frac{200+360+150+120+96}{40} = \frac{926}{40}$$

$$\boxed{\mu = 23.15}$$

7, Find the mode of the following data

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

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

Mode = 8 high frequency

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

A) Arranging in ascending order

15, 15, 17, 17, 17, 19, 22, 22, 24, 29

Mode = 17

f, 0, 3, 2, 1, 3, 5, 4, 3, 42, 1, 20

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

Mode = 3

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

A) 1, 2, 3, 4, 5, 7, 8, 9.

There is no mode in the list as there is no number is repeated (i.e. most often).

8, Following observations are arranged in ascending order. the median of the data is 25. Find X.

a) 17, X, 24, X+7, 35, 36, 46

Median (odd n) $= \frac{n+1}{2}$ th position $= \frac{7+1}{2} = 4^{th}$ pos.

$X + 7 = 25$

$x = 18$

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

9, If above problem, what is the approach if numbers are not in ascending order. what are the possible values of x then.

A) If we assume x itself is median then $x = 25$

$x+7$ is median then $x = 18$.

In rest of the cases, we can't calculate x.

10,

Q, ~~Julia records temperature => Mean/Mode/Median can be.~~

10, a, Sam asks the students in her class to identify their fav. color and wants to know which color is most common. For other 2, we can use all three measures.