Name : Aniruddh Kulkarni
Roll No: I081

14-12-21

14/12/2021

Practical 2 | Lab Exercise 2

Q1. $\bar{x_i} = 6, 7, 10, 12, 13, 4, 8, 12$

$$\Sigma(\bar{x_i}) = 6+7+10+12+13+4+8+12$$
$$= 13+10+25+24$$
$$= 37+25$$
$$= 72$$

$$\text{Mean} = \frac{\Sigma(\bar{x_i})}{N} = \frac{72}{8} = 9$$

$$|x_i - \bar{x}| = 2, 3, 1, 3, 4, 5, 1, 3$$

$$(\bar{x} - x_i)^2 = 4, 9, 1, 9, 16, 25, 1, 9$$

$$\text{Variance} = \frac{\Sigma(\bar{x} - x_i)^2}{N}$$

$$= \frac{\Sigma(x_i - \bar{x_i})^2}{N} = \frac{74}{8} = 9.25$$

$$\sigma^2 = 9.25$$

Q4.

x_i	f_i	$x_i f_i$	$\lvert x_i - \bar{x} \rvert$	$\lvert x_i - \bar{x} \rvert^2$	$\lvert x_i - \bar{x} \rvert^2$
6	2	12	$\lvert 6-19 \rvert = -13$	169	338
10	4	40	9	81	324
14	7	98	5	25	175
18	12	216	1	1	12
24	8	192	5	25	200
28	4	112	9	81	324
30	3	90	11	121	363
		$\Sigma x_i f_i = 760$			$\Sigma 1736$

$$\sum x_i f_i = 760$$

$$\bar{x} = \frac{x_i f_i}{\Sigma f} = \frac{760}{140} = 19$$

$$\sigma^2 = \frac{\Sigma f (x_i - \bar{x})}{\Sigma f}$$

$$= \frac{1736}{40}$$

$$= 43.4$$

A = 64

Q6)

x_i	f_i	$y = x_i - A$	y_i^2	$f_i y_i$	$f_i y_i^2$
60	2	-4	16	-8	32
61	1	-3	9	-3	9
62	12	-2	4	-24	48
63	29	-1	1	-29	29
64	25	0	0	0	0
65	12	1	1	12	12
66	10	2	4	20	40
67	4	3	9	12	36
68	5	4	16	20	80
					$\Sigma = 286$

$h = 1$

$$\text{Mean} = a + \frac{\Sigma f_i y_i}{\Sigma f_i} \times h$$

$$= 64 + 0$$

Mean = 64

$$\text{Std deviation} = \frac{h}{N} \sqrt{N \Sigma f_i y_i^2 - \Sigma (f_i y_i)^2}$$

$$= \frac{1}{100} \sqrt{28600}$$

$$= 1.69$$

8)

Classes	frequencies	mid	$f_i x_i$	$x_i - \bar{x}$
0-10	5	5	25	466
10-20	8	15	120	144
20-30	15	25	375	4
30-40	16	35	560	64
40-50	6	45	270	324
			1350	$\Sigma x_i - \bar{x} = 6600$

$$\bar{x} = \frac{1350}{50} = 27$$

$$\text{Var} = \frac{6600}{50} = 132$$

10)

Class	f	mid	$y_1 = \frac{x_1 - \bar{x}}{h}$	y_i^2	$f(y_1)$	$f(y_i) y_i$
32.5-36.5	15	34.5	-2	4	-30	60
36.5-40.5	14	38.5	-1	1	-17	17
40.5-44.5	21	42.5	0	0	0	0
44.5-48.5	22	46.5	1	1	22	22
48.5-52.5	25	50.5	2	4	50	100
	100					199

$h = 4$, $A = 92.5$

Mean $= 43.5$

$$\text{Var} = \frac{4^2}{100^2} (100 \times 199 - 25^2)$$

$$= \frac{16}{10,000} (19900 - 625)$$

$\sigma^2 = 30.84$

$\sigma = \sqrt{30.84} = 3.55$