Class : Date :

Digital assignment-2 !

NAME: Nithish.G

RegNo: 19BCS0012

Grade 0-10 10-20 20-30 30-40 40-50 50-60 60-70 70-80

No. of Studs 15 20 25 24 10 33 71 51

Class	mid value(x)	Frequency	$d = \frac{x-a}{c}$	Fd
0-10	5	15	-3	-45
10-20	15	20	-2	-40
20-30	25	25	-1	-25
30-40	35	24	0	0
40-50	45	10	1	10
50-60	55	33	2	66
60-70	65	71	3	213
70-80	75	51	4	204

$\Sigma F = 249$

$d = x - A/c \Rightarrow c = 10 \quad A = 35$

$$\text{mean}(\bar{y}) = A + \left(\frac{\Sigma Fd}{\Sigma F}\right) \times c$$

$$\Rightarrow 35 + (1.53) \times 10$$

$$\text{mean}(\bar{x}) = 50.381$$

iii) Median

class	Frequency	C.F	
0-10	15	15	
10-20	20	35	
20-30	25	60	
30-40	24	84	
40-50	10	94	
50-60	33	127	median class
60-70	71	198	
70-80	51	249	

$\Sigma F = 249$

① $N = 249$ ② $N/2 = 249/2 = 124.5$

③ 124.5 lies under CF of 127

④ Frequency of median class 33

⑤ Lower limit of median class $l = 50$

⑥ C.F of Pre median class $m = 94$

⑦ $c = 10$

$$\text{median} = l + \left[N/2 - m/f \right] \times c$$

$$\Rightarrow 50 + \left[\frac{124.5 - 94}{33} \right] \times 10$$

$$\Rightarrow 59.242$$

(iii) Mode $F_0=33$; $F_1=71$ $F2=51$

~~Grade 0-10~~ mode $= L + \left[\frac{F_1 - F_0}{2F_1-(F_0+F_2)}\right] \times c$

~~Student- 15~~

$\Rightarrow 60 + \left[\frac{71-33}{2(71)-(33-51)}\right] \times 10$

$\Rightarrow 60 + 6.5$

mode $= 66.5$

(iv) Quartile ⊕

Lower quartile $Q_1 = L + \left[\frac{N/4 - m_1}{F}\right] \times c$

$\Rightarrow 30 + \left[\frac{62.5 - 60}{24}\right] \times 10$

$\Rightarrow 30 \left[\frac{2.25}{21}\right] \times 10$

$\Rightarrow 30.09$

$\boxed{Q_1 = 30.9}$

Upper quartile (Q_3)

$Q_3 \Rightarrow l_3 + \left[\frac{3N/4 - m_3}{F_3}\right] \times c$

$3N/4 = 186.75$

$\Rightarrow 60 + \left[\frac{180.75 - 127}{71}\right] \times 10$

$\Rightarrow 60 + 0.84 \times 10$

$\Rightarrow 68.4$

(d)

Quartile deviation $\Rightarrow \frac{Q_3 - Q_1}{2}$

$\Rightarrow \frac{68.4 - 30.9}{2}$

Quartile deviation $\Rightarrow 18.74$

(2) Find the mean, median, mode, quartile deviation :-

Class	mid value(x)	frequency f	fx
110-120	115	6	690
120-130	125	25	3,125
130-140	135	48	6480
140-150	145	72	10,440
150-160	155	116	17980
160-170	165	60	9900
170-180	175	38	6650
180-190	185	22	4070
190-200	195	3	585
		$\Sigma F = 390$	$\Sigma Fx = 59920$

$$\text{mean } (\bar{x}) = \frac{\Sigma Fx}{N} = \frac{\Sigma Fx}{\Sigma F} = \frac{59920}{390}$$

$$\text{mean } (\bar{x}) = 153.6410$$

Quartile deviation

$N = 390 \quad 3 \times N/4 = 292.5$

Upper quartile

$F_3 = 60 \quad l_3 = 160$

$m_3 = 267 \quad C = 10$

$$Q_3 = l_3 + \left[\frac{\frac{3N}{4} - m_3}{F_3}\right] \times c$$

$$\Rightarrow 160 + \left[\frac{292.5 - 267}{60}\right] \times 10$$

$$\Rightarrow 164.25$$

Lower quartile Q_1

$$Q_1 = l_1 + \left[\frac{N/4 - m_1}{F_1}\right] \times c$$

Up

$F_1 = 72 \quad l_1 = 140 \quad m_1 = 79 \quad c = 10 \quad N/4 = 97.5$

$$Q_1 = l_1 + \left[\frac{N/4 - m_3}{[97.5 - 79]}\right] \times c$$

$$\Rightarrow 140 + \left[\frac{97.5 - 79}{72}\right] \times 10$$

$$\Rightarrow 140 + 2.57$$

$$\Rightarrow 142.57$$

Quartile deviation = $\frac{Q_3 - Q_1}{2}$

$\Rightarrow \frac{164.25 - 142.57}{2} \Rightarrow 10.84$

median

(1) N = 390 $N/2 = 390/2 = 195$

(2) 195 lies under CF of 267

(3) Frequency of median class is 116

(4) lower limit of median class is 150

(5) $m = 151$ (6) $C = 10$

$$\text{median} = L + \left[\frac{N/2 - m}{f}\right] \times C$$

$$\Rightarrow 150 + \left[\frac{195 - 115}{116}\right] \times 10$$

$$\Rightarrow 153.8$$

$$\text{mode} = L + \left[\frac{f_1 - f_0}{2f_1 - (f_0 + f_2)}\right] \times C$$

$$\Rightarrow 150 + \left[\frac{116 - 72}{232 - 132}\right] \times 10$$

$$\Rightarrow 150 + \left[\frac{44}{100}\right] \times 10$$

$$\Rightarrow 150 + 0.44 \times 10$$

$$\Rightarrow 150 + 4.4$$

$$\text{mode} = 154.4$$

Class : Date :

(2) Find median for wages and no. of workers.

Wages	60-69	70-79	80-89	90-99	100-109	109-119
worker	5	15	20	30	20	8

Wages :-	worker	CF
59.5-69.5	5	5
69.5-79.5	15	30
79.5-89.5	20	50
89.5-99.5	30	80
99.5-109.5	20	100
109.5-119.5	8	108

$N = \Sigma F = 98$

(1) $N = 98$ (2) $N/2 = 98/2 = 49$

$F = 30$ $L = 89.5$ $m = 40$ $C = 10$

$$\text{median} = L + \left[\frac{N/2 - m}{f}\right] \times c$$

$$\Rightarrow 89.5 + \left(\frac{49-40}{30}\right) \times 10$$

$$\Rightarrow 92.5$$