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Probability & Statistics
Surprise Test

Q3. Ans.

x	f	x_i	fx_i
0-10	12	5	60
10-20	18	15	270
20-30	20	25	500
30-40	25	35	875
40-50	23	45	1035
	$\Sigma f = 98$		$\Sigma fx_i = 2740$

$$\text{Mean} = \frac{\Sigma fx_i}{\Sigma f} = \frac{2740}{98} = 27.95$$

x_i	f	cf
5	12	12
15	18	30
25	20	50
35	25	75
45	23	98
	$\Sigma f = 98$	

$$N = 98 \Rightarrow \frac{N}{2} \Rightarrow \frac{98}{2} \Rightarrow 49$$

The cumulative frequency is greater than 49 is 50 and the corresponding class is 20-30

$I = 10$, $h = 18$, $F = 18$, $CF = 30$

Now, $\text{Median} = l + \left(\frac{N/2 - CF}{F}\right) \times h$

$$= 10 + \left(\frac{49 - 30}{18}\right) \times 18$$

$$= 10 + \frac{19}{18} \times 18 = 29$$

Median = 19

Q4. Ans:-

x	f	xf
0	28	0
1	62	62
3	10	30
4	4	16
	$\Sigma f = 104$	$\Sigma xf = 108$

$$\text{Mean} = \frac{\Sigma xf}{\Sigma f} = \frac{108}{104}$$

$$= 1.03$$

~~and here is 4, 20~~

Mean of binomial dist. $= np = 1.03$

$$p = \frac{1.03}{n=4} = 0.25$$

$$q = 1 - 0.25 = 0.75$$

$r = 0, 1, 3, 4$

$P(r=0) = {}^4C_0 (0.25)^0 (0.75)^4 = 0.316$

$P(r=1) = {}^4C_1 (0.25)^1 (0.75)^3 = 0.421$

$P(r=3) = {}^4C_3 (0.25)^3 (0.75)^1 = 0.468$

$P(r=4) = {}^4C_4 (0.25)^4 (0.75)^0 = 0.0039$

r	P(r)	Expected freq. $(N \times P(r))$
		$N = 104$
0	0.316	$32.86 \sim 33$
1	0.421	$43.78 \sim 44$

3	0.468	$48.67 \sim 49$
4	0.0039	$0.4056 \sim 0$
		126

Answer = 126