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Q.1 Construct a grouped distribution table for following data and calculate mean, Mode Median and Quartiles.

To arrange given data.

363, 368, 371, 372, 377, 381, 386, 387, 389, 391
390, 398, 392, 393, 394, 396, 399, 400, 401, 405, 408
409, 410, 411, 415, 419, 422, 423, 428
431

Class interval	f Frevency	midpoint x -	f.x	CB	cf
363 – 373	4	368.5	1474	362.5–373.5	4
373 – 383	2	378.5	757	372.5–383.5	6
383 – 393	8	388.5	3108	382.5–393.5	14
393 – 403	5	398.5	1992.5	392.5–403.5	19
403 – 413	5	408.5	2042.5	402.5–413.5	24
413 – 423	4	418.5	1674	412.5–423.5	28
423 – 433	2	428.5	1285.5	422.5–433.5	30
	$\Sigma f = 30$	Σ	$\Sigma fx = 12333.5$		

To find Mean?

we know that

$$\bar{x} = \frac{\Sigma fx}{\Sigma f}$$

$$= \frac{12333.5}{30}$$

$$\bar{x} = 411.116$$

To find Mode?

we know that

$$M = L_1 + \frac{f_i - f_0}{2f_i - f_0 - f_2}(L_2 - L_1)$$

$$= 392.5 + \frac{5 - 8}{2(5) - 8 - 5}$$ $403.5 - 392.5$

$$= 392.5 + \frac{(-3)}{10 - 13}$$ (11)

$$= 392.5 + \frac{+33}{+3}$$

$$= 392.5 + 11$$

$$M = 403.5$$

To find Median ?

$$\text{Median} = L + \frac{h}{f}(m - c)$$

$$= 392.5 + \frac{7}{5}(216.5 - 19) \qquad m = \frac{433}{2} = 216.5$$

$$\text{Median} = 392.5 + \frac{7}{5}\,197.5$$

$$= \frac{392.5}{5} \qquad 392.5 + \frac{16.7}{83.5}$$

$$= 392.5 + 16.7$$

Median = 409.2

To find Quartile,

$$Q_1 = \left[\frac{n}{4} + 1\right]^{th}$$

$$= \frac{30}{4} + 1$$

$$= \frac{15}{2} + \frac{1}{1}$$

$$Q.1 = \frac{15 + 2}{2} = \frac{17}{2} = 8.5$$

$$Q.2 = \left[\frac{2n}{4} + 1\right]$$

$$\left[\frac{2(30)}{4} + 1\right] \qquad \frac{60}{4} + 1$$

Q2 = 16

Q.3:- For the following grouped distribution table calculate the variance and standard Deviation

Class	64-84	85-104	105-124	125-144	145-164	165-184	185-204
Frevency	15	18	27	10	6	5	13

Solution:-

Class	fi Frequency	xi	fixi	x^2	fix^2
64-84	15	74.5	1117.5	5550.25	1248806.25
85-104	18	94.5	1701	8930.25	160744.5
105-124	27	114.5	3091.5	13110.25	353976.75
125-144	10	134.5	1345	18090.25	180902.5
145-164	6	154.5	927	23870.25	143221.5
165-184	5	174.5	8725	30450.25	152251.25
185-204	13	194.5	2528.5	37830.25	491793.25
	$\Sigma fi = 94$		$\Sigma fixi = 19435.5$		$\Sigma fix^2 = 4020685.25$

$$s^2 = \frac{\Sigma fx^2}{n} - \left(\frac{\Sigma fx}{n}\right)^2$$

$$s^2 = \frac{4020685.25}{94} - \left(\frac{19435.5}{94}\right)^2$$

$$= \frac{4020685.25}{94} - \frac{377738660.25}{8836}$$

$$= \frac{1133833240.5 - 3550743063.5}{830584}$$

$$s^2 = \frac{2416909823}{830584}$$

$S^2 = 2909.892$

$S = \sqrt{2909.892}$

$S = 53.943$

Q.4;- If two fair dice are thrown, what is the probability of getting

1) A double six

2) A sum of or more dots

Solution;- $\{(1,1),(1,2),(1,3);(1,4),(1,5),(1,6)$
$(2,1),(2,2),(2,3),(2,4),(2,5),(2,6)$
$(3,1),(3,2);(3,3),(3,4),(3,5);(3,6)$
$(4,1)(4,2)(4,3)(4,4)(4,5),(4,6)$
$(5,1)(5,2);(5,3)(5,4)(5,5)(5,6)$
$(6,1)(6,2)(6,3),(6,4),(6,5)(6,6)\}$

1) Let A be the event that double six occurs

$A = \{(6,6)\}$ and thus

$P(A) = 1/36$

2) Let B denotes that a sum of 8 or more dotes occurs

$B = \{(2,6)(3,5);(3,6)(4,4)(4,5)(4,6),(5,3)(5,4)$
$(5,5),(5,6),(6,2)(6,3),(6,4)(6,5)(6,6)\}$

Hence

$$P(B) = \frac{15}{36} = 5/12$$

Q.5) let $C_1, C_2, \ldots C_M$ $C_1, C_2, \ldots C_M$ be a partition of sample space SS_ and AA and BB be two events, suppose we know that

AB are conditionally independent given C_i for all $i \in \{1, 2, \ldots, M\}$
B is independent of all C_is.
Prove that A and B are independent

Solution:- A and B are independent event because occurrence of event A does not affect the occurrence of event B.

i.e If we toss two coin the occurrence doesn't affect of head or tail on the second coin.