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P#1

NO : 1

The lowest value is 363 and the hight value is 431
By using given data
A class interval of 10.
The interval for the first class is 360 to 369 and include 363.

The distribution table is.

observation	Tally	frequ—
360 - 369	//	2
370 - 379	///	3
380 - 89	////	5
390 - 399	//////	7
400 - 409	/////	5
410 - 419.	////	4
420 - 429	///	3
430 - 439	/	1

Total freq = 30

Calculate Mean.

$$\text{Mean} = \frac{\text{Sum of all number}}{\text{Total number.}}$$

Sum = 423 + 369 + 387 + 411 + 493 + 394 + 374
+ 377 + 389 + 409 + 392 + 405 + 431 + 404
+ 363 + 391 + 405 + 382 + 400 + 381 + 399
+ 415 + 425 + 422 + 396 + 372 + 410 + 419
+ 380 + 390 = 11914

Sum = 11914 Put the values

$$\text{Mean} = \frac{11914}{30} = 397.1$$

Mean = 397.

- Mode: $L + \frac{fm - fm-1}{(fm - fm-1) + (fm - fm+1)} \times w$

L is Lower ~~call~~ class boundary -
-fm-1 freq- of group before model group
-fm freq- of group ~~after~~ model group
-fm+1 group after model group
w group with.

$M = 389.5 + 8-3/2(8)-3-5(395.5-389.5)$

$= 389.5 + 5/16-8(11)$

$= 389.5/1+55/8$

$= 3131/8$

$= 3918$

Medium.

$L = 389.5$

$n = 30$

$B = 2+3+5 = 10$

$IN = 10$

$G = 7$

$$= 389.5 + \frac{(30/2)-10}{7} \times 10$$

$$= \frac{389.5+(15)-10}{7} \times 10$$

$$= 389.5 + 0.7143$$

$$= 390.21$$

Quartile:

$$l + h(f(q - c)$$

$$q = n/4 = 30/4$$

$$q = 7.5$$

$$Q_1 = 389.5 + 11(3(7.5 - 7)$$
$$Q_1 = 389.5 + 5.5/3$$

$$Q_2 = 11535 - 55/3 + 5.5/3$$
$$= 1148/3 = 382.66$$

$$Q3 = 3n/4 = 3 \times 30/4$$
$$= 90/4$$
$$= 22.4$$

$$Q3 = 406.5 + 11/5\ (22.5 - 20)$$
$$Q3 = 406.5 + 11/5\ (2.5)$$
$$Q3 = 406.5 + 27.5/5$$
$$= 2060/5$$
$$= 412.$$

QNO2:

$$\text{Mean} = \frac{\text{Sum of all number}}{\text{Total number.}}$$

$$\text{Mean} = \frac{3+6+2+1+7+5}{6} = \frac{24}{6} = 4$$

$x = 4$

x_i	$x_i - x$	$(x_i - x)^2$	x_i^2
3	$3-4=-1$	1	9
6	$6-4=2$	4	36
2	$2-4=-2$	4	4
1	$1-4=-3$	9	1
7	$7-4=3$	9	49
5	$5-4=1$	1	25

$$S = \sqrt{\Sigma(x_i - x)^2/n}$$

$$= \frac{\sqrt{28}}{6}$$

$$= \sqrt{4.66}$$

$$= 2.16$$

Mean: $\dfrac{11+7+9+\cancel{17}-19+15}{6}$

$= 78/6$

$= 13$

X_i	$x_1 - x$	$(x_1 - x)^2$
11	$11-13 = -2$	4
17	$17-13 = 4$	16
9	$9-13 = -4$	16
7	$7-13 = -6$	36
19	$19-13 = 6$	36
15	$15-13 = 2$	4

$S = \sqrt{\Sigma(x_1-x)^2/n}$

$= \sqrt{112/6}$

$= 4.32.$

QNO 3:

class	frequency	xi	Fxi	xi^2	$F_1 x^2$
64-84	15	74	1110	5476	82140
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	947	23870.25	143221.5
165-184	5	174.5	872.5	30450.25	152251.25
185-204	13	194.5	2528051	37830.25	491793.25

$\Sigma s = 94$

$\Sigma(fx_i) = 11575.5$

$\Sigma(F_1 x^2) = 1565029.75$

$S^2 = \Sigma f x^2 / n - (\Sigma fx / n)^2$

$S^2 = 1565029.75/60 - (11575.5/60)^2$

$= 26083.82 - 3720.05$

Variance $= S^2 = 22363.77$

Standard Deviation $= \sqrt{22363.77}$

$= 149.54$

QN04:

When two dice are thrown Simultaneously, thus number of event Can be $6^2 = 36$ because each die has 1 to 6 number on its faces Then the possible outcomes are Show in the below table.

Probability - Sample space for two dice (outcomes).

	1	2	3	4	5	6
1	(1,1)	(1,2)	(1,3)	(1,4)	(1,5	(1,6)
2	(2,1)	(2,2)	(2,3)	(2,4	(2,5)	(2,6)
3	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
4	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
5	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
6	(6,1)	(6,2)	(6,3)	(6,4)	(6,5	(6,6)

Note:

(i) The outcomes (1,1), (2,2), (3,3), (4,4) (5,5), and (6,6) are Called doublets.

(ii) The pair (1,2) and (2,1) are different outcomes.

Sum of 8.

Let $\mathcal{E}_5$ = event of getting a sum of 8. The number which is a Sum of 8 will be $\mathcal{E}_5 = [(2,6),(3,5),(4,4),(5,3),(6,2)] = 5$

Therefore, probability of getting a Sum of 8'

$$P(\mathcal{E}_5) = \frac{\text{Number of favorable outcomes}}{\text{Total number of possible outcomes}}$$

$= 5/36.$

* ——— * ——— *

If It is a double six, then only one occurence has this Condition out of the 36 possibilites for a roll.

Therefore the frequentist probability is $1/36$

QNO5: Let $C_1, C_2, \dots C_m$ be a partition of the Sample Space S and A and B be two event. Suppose we know that.

* A and B are Conditionally independent given C_i for all $i \in (1, 2, \dots M)$

Prove that A and B are independent.

Solution.

Since the C_i's form a partition of the Sample space, we can apply the law of total probability for $A \cap B$

$$P(A \cap B) = \sum_{i=1}^{M} P(A \cap B | C_i) P(C_i)$$

$$= \sum_{i=1}^{M} P(A/C_i) P(B/C_i) . P(C_i)$$

A and B are Conditionlly independent

$$\sum_{i=1}^{m} P(A/C_i)\ P(B)\ P(C_i) \quad (B \text{ is independent of } C_i$$

$$= P(B) \sum_{i=1}^{m} P(A/C_i)\ P(C_i)$$

$$= P(B)\ P(A)$$

law of total probability.