Q: Answer with true or false to the following sentences:

1. The range is sensitive to extreme values.
2. Two events *A* and *B* are independent if $P(A \cup B) = P(A) + P(B)$.
3. Two events *A* and *B* are independent if $P(A \cap B) = P(A) \cdot P(B)$.
4. If $\mathcal{A}$ is an algebra on Ω, then $\emptyset \in \mathcal{A}$.
5. The interquartile range is the best measure for dispersion.
6. Two events *A* and *B* are mutually exclusive if $P(A \cap B) = P(A) \cdot P(B)$.

Q: Put the right word or symbol in its proper position:

subset	**table**	**sample**	**numerical**	**mean**	**statistic**	**mode**
highest	**lowest**	**parameter**	**continuous**	$\boldsymbol{x_s - x_l}$	$\boldsymbol{x_l - x_s}$	**data**
Discrete space	**Continuous space**	**permutation**	**combination**	**Mutually independent**	**Mutually exclusive**	$\boldsymbol{\Omega \subseteq \mathcal{A}}$
$\boldsymbol{\emptyset \in \mathcal{A}}$	**independent**	**exclusive**	$\boldsymbol{\mathcal{A} \in \Omega}$	$\boldsymbol{\Omega \in \mathcal{A}}$	$\boldsymbol{A \cap B = \emptyset}$	
$\boldsymbol{P(A \cap B) = P(A) \cdot P(B)}$		$\boldsymbol{P(A \cup B) = P(A) + P(B)}$		$\boldsymbol{A \cup B = \emptyset}$		

1. Two events *A* and *B* are --------------------- if they cannot occur at the same time.
2. Any arrangement of *r* distinct objects from a set of *n* different objects, is called a ----------------------
3. If a space Ω consists uncountable number of outcomes, then Ω is called a ------------------------------
4. Two events *A* and *B* are ------------------------------- if they do not affect each other.
5. Selection *r* distinct objects at the same time from a set of *n* different objects, is a ---------------------------------
6. If $\mathcal{A}$ is an algebra on Ω, then --------------------------------
7. Two events *A* and *B* are --------------------- if they have not common elementary events.
8. If $\mathcal{A}$ is an algebra on Ω, then --------------------------------
9. Two events *A* and *B* are mutual exclusive if --------------------------------.
10. For two events *A* and *B*, if --------------------------------. Then *A* and *B* are independent events.

Q: Consider the data: 3, 7, 4, 6, 5, 12, 5, 6. Then:

a) Calculate Q_1, D_6, P_{85} for given data.

- **For** Q_1: --
- **For** D_6: --
- **For** P_{85}: --

b) If the variance of the given data is $S^2 = 8.6436$, then calculate the standard score for the value 7.

Q: Consider the data: 7, 5, 3, 1, 5, 4, 5, 9, 6, 26, 9, 3, 8 Then:

a) If the standard deviation of the given data is $S = 6.19$, then calculate the standard score for the value 7.

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b) Calculate $\boldsymbol{Q_1}$, $\boldsymbol{Q_3}$, $\boldsymbol{HF}$ for given data.

- **For $\boldsymbol{Q_1}$**: ---

- **For $\boldsymbol{Q_3}$**: ---

- **For $\boldsymbol{HF}$**: ---
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c) Construct the box plot for given data.

Q: Consider the data: 9, 5, 3, 9, 5, 7, 1, 7, 6, 16, 9. Then:

a) If the standard deviation of the given data is $S = 3.92$, then calculate the standard score for the value 6.

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b) Calculate the coefficient of variation for given data.

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c) Calculate $\boldsymbol{Q_1}$, $\boldsymbol{Q_3}$, $\boldsymbol{LF}$, and $\boldsymbol{HF}$ for given data.

- **For $\boldsymbol{Q_1}$**: ---

- **For Q_3**: --

- **For *LF*:** --

- **For *HF***: --
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d) Check if given data have outliers.

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e) Construct the box plot for given data and determinate the five numbers on the graph.

Q: If we have Ω a space of elementary events, A and $B \in 2^{\Omega}$ with:

$P(A \cup B) = 0.75, P(A \cap B) = 0.20, P(\bar{B}) = 0.65$, then calculate the following probabilities:

a) $P(A) =$ --
b) $P(A \backslash B) =$ ---
c) $P(\bar{A} \cup \bar{B}) =$ ---
d) $P(A|B) =$ ---
e) Are the events A and B independent, and why?

Q: If we have Ω a space of elementary events, A and $B \in 2^{\Omega}$ with:

$P(A \backslash B) = 0.25, P(B \backslash A) = 0.30, P(A \cap B) = 0.15$, then calculate the following probabilities:

a) $P(A) =$ --
b) $P(B) =$ --
c) $P(A \cup B) =$ ---
d) $P(\bar{A} \cap \bar{B}) =$ ---
e) $P(A|B) =$ ---
f) Are the events A and B independent, and why?

Q: If $[\Omega, \mathcal{A}, P]$ is a probability space of tossing a fair coin three times, then:

a) Determine $\Omega, \mathcal{A},$ and P for this random experiment.

b) Calculate the probability of getting at most one tails.

c) Calculate the probability of getting three heads or three tails.

Q: A factory has four machines M_1, M_2, M_3, M_4. If these machines have the same capacity to produce. Furthermore, we know that, the defective items from these machines are 7%, 5%, 3% and 2%, respectively. Now, if an item selected at random, then:

a) Calculate the probability that the selected item is defective.
b) If we find that the selected item is defective, what is the probability that this item was made by machine M_2?

Q: In a particular population, 30% of people drive Korean cars, 15% of people drive Japanese cars and the rest (55%) of people drive cars made in other countries. It is known that 10% of people driving Korean cars have accidents, 07% of people driving Japanese cars have accidents, and 12% of people driving cars made other countries have accidents. If we selected randomly a person of this population, and we find that he had an accident, what is the probability that this person driving a Korean car?

Q: We selected three balls randomly and at the same time of a box contains 4 black and 3 green balls. If all balls have the same chance of selecting. Now:

a) If A is the event that the selected balls are black, then calculate $P(A)$.

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b) If B is the event that the selected balls have the same colors, then calculate $P(B)$.

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c) What is the probability that the selected balls have different colors?

Q: If we have Ω a space of elementary events, A and $B \in 2^{\Omega}$ with:

$P(A \cap B) = 0.10, P(A \cup B) = 0.75, P(\bar{A}) = 0.65$, then calculate the following probabilities:

a) $P(B) =$ --
b) $P(A \backslash B) =$ ---
c) $P(\bar{A} \cap \bar{B}) =$ ---
d) $P(A|B) =$ ---
e) Are the events A and B independent, and why?

Q: If we have Ω a space of elementary events, A and $B \in 2^{\Omega}$ with:

$P(A \cap B) = 0.15, P(A \backslash B) = 0.25, P(B \backslash A) = 0.35$, then calculate the following probabilities:

a) $P(A) =$ --
b) $P(B) =$ --
c) $P(A \cup B) =$ ---
d) $P(\bar{A} \cap \bar{B}) =$ ---
e) Are the events A and B independent, and why?

Q: In a hospital, there are 8 nurses and 3 doctors. Then:

a) If a committee of 3 nurses and 2 doctors is to be chosen. How many different possibilities are there?

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b) What is the probability that two doctors in this committee?

