



Answer the following questions

Question # 1:

- Choose the correct answer with the explanation:
1. If $A \subset B$, Then $P(A|B) =$
a) $P(B|A)$ b) $P(A)$ c) $P(B)$ d) None of them
 2. If the knowledge that an event A has occurred implies that a second event B cannot occur, the events A and B are said to be
a) Independent b) Mutually exclusive c) $A \subset B$ d) $B \subset A$
 3. If A and B be independent events in a sample space S, then which of the following statement(s) are true
a) A and B^c are independent b) B and A^c are independent
c) A^c and B^c are independent d) All of preceding
 4. A code consists of a digit chosen from 0 to 5 followed by a letter of the alphabet.
What is the probability the code is 6Z?
a) $\frac{1}{260}$ b) $\frac{1}{156}$ c) $\frac{1}{182}$ d) None of them

5. For a continuous random variable X with a probability density function

$$f(x) = \begin{cases} kx^3, & 0 \leq x \leq 2 \\ 0, & \text{o.w.} \end{cases}, \text{ then the value of } k \text{ is}$$

- a) $\frac{1}{2}$ b) $\frac{1}{4}$ c) $\frac{1}{3}$ d) $\frac{1}{16}$
6. The value of k when the probability mass function is given by, is
$$P(x) = \begin{cases} \frac{x}{k}, & x = 1, 2, 3, 4 \\ 0, & \text{o.w.} \end{cases}$$

a) 15 b) 10 c) $\frac{1}{10}$ d) $\frac{1}{15}$
7. The cumulative distribution function for the random variable X for

$$f(x) = \begin{cases} 2x, & 0 \leq x < 1 \\ 0, & \text{o.w.} \end{cases} \text{ is given by}$$

- a) $1 - x$ b) $x - 1$ c) x^2 d) None of them
8. If the variance of x $v(x) = 3$, then $v(3x - 5) =$
a) $\frac{1}{3}$ b) 3 c) 27 d) $\frac{1}{27}$
9. $E(ax + b) =$
a) $a^2 E(x + b)$ b) $aE(x)$ c) $aE(x) + b$ d) None of them

Question #2: If $P(A) = 0.2$, $P(B) = 0.3$ and $P(A \cup B) = 0.4$, Determine the following probabilities:

- | | |
|---------------------|---------------------|
| (a) $P(A^c)$ | (b) $P(A \cap B)$ |
| (c) $P(A^c \cap B)$ | (d) $P(A \cap B^c)$ |
| (e) $P(A \cup B)^c$ | (f) $P(A^c \cup B)$ |