Summary in Graph

Exam Summary (GO Classes Test Series 2024 | Probability | Test 1)

Qs. Attempted:	**19** 5 + 14	**Correct Marks:**	**27** 5 + 22
Correct Attempts:	**16** 5 + 11	**Penalty Marks:**	**0** 0 + 0
Incorrect Attempts:	**3** 0 + 3	**Resultant Marks:**	**27** 5 + 22

Total Questions:	**20** 5 + 15
Total Marks:	**35** 5 + 30
Exam Duration:	**60 Minutes**
Time Taken:	**60 Minutes**

EXAM RESPONSE   EXAM STATS   FEEDBACK

Technical

Q #1   Multiple Choice Type   Award: 1   Penalty: 0.33   Probability

In the experiment of tossing two dice, let X be the random variable that gives the sum of the top faces. Which of the following gives the probability distribution of X?

A. $x_k = k, p_k = 1/6, k = 1, 2, \cdots, 6.$
B. $x_k = k, p_k = 1/11, k = 2, 3, \cdots, 12.$
C. $x_k = k, p_k = \min[k-1, 13-k]/36, k = 2, 3, \cdots, 12.$
D. $x_k = k, p_k = k/48, k = 2, 3, \cdots, 12.$

Your Answer: C   **Correct Answer: C**   Correct   Discuss

Q #2   Multiple Choice Type   Award: 1   Penalty: 0.33   Probability

Among 35 students in a class, 17 earned "A" on the midterm, 14 earned "A" on final exam, and 11 did not earn "A" on either exam. What is the probability that a randomly selected student from this class earned "A" on both exams?

A. $7/35$
B. $24/35$
C. $17/35$

D. $14/35$

Your Answer: A | **Correct Answer: A** | Correct | Discuss

Q #3 | Numerical Type | Award: 1 | Penalty: 0 | Probability

Let X be a random variable with probability density:

$$f(x) = \begin{cases} c\left(1 - x^2\right), & -1 < x < 1 \\ 0, & \text{otherwise} \end{cases}$$

The value of c is _____

Your Answer: 0.75 | **Correct Answer: 0.75** | Correct | Discuss

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Q #4 | Multiple Choice Type | Award: 1 | Penalty: 0.33 | Probability

Suppose that we toss a coin having a probability p of coming up heads, until the first head appears. Letting N denote the number of flips required, then assuming that the outcome of successive flips are independent, N is a random variable taking on one of the values $1, 2, 3, \ldots$,
Which of the following is correct?

A. $P\{N = n\} = (1 - p)^{n-1}p; n \geq 1$
B. $P\{N = n\} = (1 - p)^n p; n \geq 1$
C. $P\{N = n\} = p^{n-1}(1 - p); n \geq 1$
D. $P\{N = n\} = p^n(1 - p); n \geq 1$

Your Answer: A | **Correct Answer: A** | Correct | Discuss

Q #5 | Multiple Choice Type | Award: 1 | Penalty: 0.33 | Probability

Suppose, two events A and B are independent then which of the following is/are correct?
$P(.)$ stands for probability

1. $P(A \cap B) = P(A)P(B)$
2. $P(A \cup B) = P(A) + P(B) - P(A)P(B)$
3. $P(A \mid B) = 0$
4. $P(A \mid \neg B) = P(A)$

A. $1, 2$
B. $1, 2, 3$
C. $1, 2, 4$
D. $1, 2, 3, 4$

Your Answer: C | **Correct Answer: C** | Correct | Discuss

Q #6 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Probability

Suppose $X = 0$ with probability $\dfrac{1}{2}$, 1 with probability $\dfrac{1}{4}$, 2 with probability $\dfrac{1}{8}$, and more generally n with probability $1/2^{n+1}$. This is an example where X can take infinitely many values (although still countably many values). What is the expectation of X?

    A. $1/2$

    B. 1

    C. 2

    D. $3/2$

Your Answer: B | **Correct Answer: B** | Correct | Discuss

Q #7 | Numerical Type | Award: 2 | Penalty: 0 | Probability

Three people, A, B, and C, are running for the same office, and we assume that one and only one of them wins. The sample space may be taken as the 3-element set $\Omega = \{A, B, C\}$ where each element corresponds to the outcome of that candidate's winning. Suppose that A and B have the same chance of winning, but that C has only $1/2$ the chance of A or B. Let E be the event that either A or C wins. Then $E = \{A, C\}$. Find $P(E)$?

Your Answer: 0.75 | **Correct Answer: 0.6** | Incorrect | Discuss

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Q #8 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Probability

Consider a coin with probability p to be heads. Determine the probability that the first heads will appear on the even-numbered tosses.

    A. $\dfrac{2-p}{1-p}$

    B. $\dfrac{1-p}{2-p}$

    C. $\dfrac{p}{2-p}$

    D. $\dfrac{1}{2-p}$

Your Answer: B | **Correct Answer: B** | Correct | Discuss

Q #9 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Probability

Suppose, two events A and B are mutually exclusive then which of the following is/are correct?
$P(.)$ stands for probability.

    1. $P(A \cap B) = 0$

    2. $P(A \cup B) = P(A) + P(B)$

    3. $P(A \mid B) = 0$

    4. $P(A \mid \neg B) = \dfrac{P(A)}{1-P(B)}$

    A. $1, 2$

    B. $1, 2, 3$

    C. $1, 3, 4$

    D. $1, 2, 3, 4$

Your Answer: D | **Correct Answer: D** | Correct | Discuss

Q #10 Multiple Select Type   Award: 2   Penalty: 0   Probability

Roll a die.

- Let A be the event that the outcome on the die is an even number.
- Let B be the event that the outcome on the die is 4 or smaller.
- Let C be the event that the outcome on the die is 3 or larger.

Choose the correct option(s)?

A. A and B are dependent events
B. A and B are independent events
C. B and C are dependent events
D. B and C are independent events

Your Answer: B;C   Correct Answer: B;C   Correct   Discuss

Q #11 Multiple Choice Type   Award: 2   Penalty: 0.67   Probability

It is estimated that 50% of emails are spam emails. Some software has been applied to filter these spam emails before they reach your inbox. A certain brand of software claims that it can detect 99% of spam emails, and the probability for a false positive (a non-spam email detected as spam) is 5%.

Now if an email is detected as spam, then what is the probability that it is in fact a non-spam email?

A. $1/104$
B. $95/104$
C. $5/104$
D. $99/104$

Your Answer: Correct Answer: C   Not Attempted   Discuss

Q #12 Multiple Select Type   Award: 2   Penalty: 0   Probability

Which of the following is/are true?

A. If $P(A \mid B) = 0.5$ and $P(B) = 0.5$, then the events A and B are necessarily independent.
B. If two events A and B are independent then both $P(A \mid B) = P(A)$ and $P(B \mid A) = P(A)$.
C. If $P(A \cap B) \geq 0.10$ then $P(A) \geq 0.10$.
D. If $P(A) > P(B)$, and $P(C \mid A) > P(C \mid B)$, then $P(A \mid C) > P(B \mid C)$.

Your Answer: C;D   Correct Answer: C;D   Correct   Discuss

Q #13 Multiple Select Type   Award: 2   Penalty: 0   Probability

Which of the following is/are true?

A. The formula for the variance $\mathrm{Var}(X + Y) = \mathrm{Var}(X) + \mathrm{Var}(Y)$ works regardless of whether the RV's X and Y are independent or not.
B. $E(X - Y) = E(X) - E(Y)$ for any R.V.s X and Y, regardless of whether they are independent or not.
C. $\mathrm{Var}(X - Y) = \mathrm{Var}(X) - \mathrm{Var}(Y)$ for any independent R.V.s X and Y.
D. For any R.V X, we have $\mathrm{Var}(aX) = a^2 \, \mathrm{Var}(X)$.

Your Answer: B;D   **Correct Answer: B;D**   Correct   Discuss

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Q #14   Multiple Select Type   Award: 2   Penalty: 0   Probability

Which of the following is/are true?

    A. It is always true that the standard deviation is less than the variance
    B. For any two independent random variables X, Y on the same probability space, if $\mathrm{E}(X) > \mathrm{E}(Y)$ then $\Pr[X > Y] > 0$
    C. Let A and B be events in the same sample space. If $p(A \mid B) = 1/2$, then $p(A \mid B^c) = 1/2$.
    D. For every random variable $X, E\left(X^2\right) \geq E(X)^2$.

Your Answer: B;D   **Correct Answer: B;D**   Correct   Discuss

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Q #15   Multiple Choice Type   Award: 2   Penalty: 0.67   Probability

Suppose that X is a random variable where: $P(X = 1) = 1/2$ $P(X = 2) = 1/4$ $P(X = 4) = 1/4$.
What is the value of $P\left(X^2 - 3X + 2 = 0\right)$?

    A. $3/4$
    B. $1/4$
    C. $1/2$
    D. $1/3$

Your Answer: A   **Correct Answer: A**   Correct   Discuss

Q #16   Multiple Select Type   Award: 2   Penalty: 0   Probability

For each of the following relations, determine which is TRUE for arbitrary events A, B, and C. (Note: to be true "for arbitrary events", it must be true for any such event. Use a Venn diagram if it is helpful.)

    A. $(A \cup B \cup C)^c = A^c \cup B^c \cup C^c$
    B. $(A \cup B) \cap (A^c \cup B^c) = (A \cap B^c) \cup (A^c \cap B) \cup (A^c \cap B \cap C^c)$
    C. $(A \cap B) \cup (A \cap B^c) \cup (A^c \cap B) = (A^c \cap B^c)^c$
    D. $(A - B) - C = A - (B - C)$

Your Answer: A;B;C   **Correct Answer: B;C**   Incorrect   Discuss

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Q #17   Multiple Select Type   Award: 2   Penalty: 0   Probability

Which of the following is/are true?

    A. If two events A and B are disjoint, they must also be independent.
    B. If two events A and B are collectively exhaustive then $P(A) + P(B) = 1$.
    C. If two events A and B are collectively exhaustive then $P(A \cup B) = 1$.
    D. If two evens A and B are independent, then A^c and B^c are also independent.

Your Answer: C;D   **Correct Answer: C;D**   Correct   Discuss

Q #18 Multiple Select Type Award: 2 Penalty: 0 Probability

Which of the following is/are true?

A. Disjoint events are independent.
B. If events A and B are independent, then conditioned on any other event C, A and B are still independent.
C. $P\left(A^c \cup B\right) \leq 1 - P(A) + P(B)$ for any A and any B.
D. If A and B are independent, and B and C are independent, then A and C are also independent.

Your Answer: B;C   Correct Answer: C   Incorrect   Discuss

Q #19 Multiple Choice Type Award: 2 Penalty: 0.67 Probability

A coin is tossed until a head appears two times in a row. Given that we are using a fair coin, what is the probability that we toss the coin exactly 4 times such that the two consecutive heads are the 3rd and 4th trials?

A. $\frac{1}{4}$
B. $\frac{1}{8}$
C. $\frac{1}{2}$
D. $\frac{1}{6}$

Your Answer: B   Correct Answer: B   Correct   Discuss

Q #20 Multiple Choice Type Award: 2 Penalty: 0.67 Probability

Suppose X is a random variable taking values in $\{-2, -1, 0, 1, 2, 3, 4, 5\}$, each with probability $\frac{1}{8}$. Let $Y = X^2$. Find $E[Y]$.

A. $12/8$
B. $60/8$
C. 0
D. $1/8$

Your Answer: B   Correct Answer: B   Correct   Discuss

You're doing Great!

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