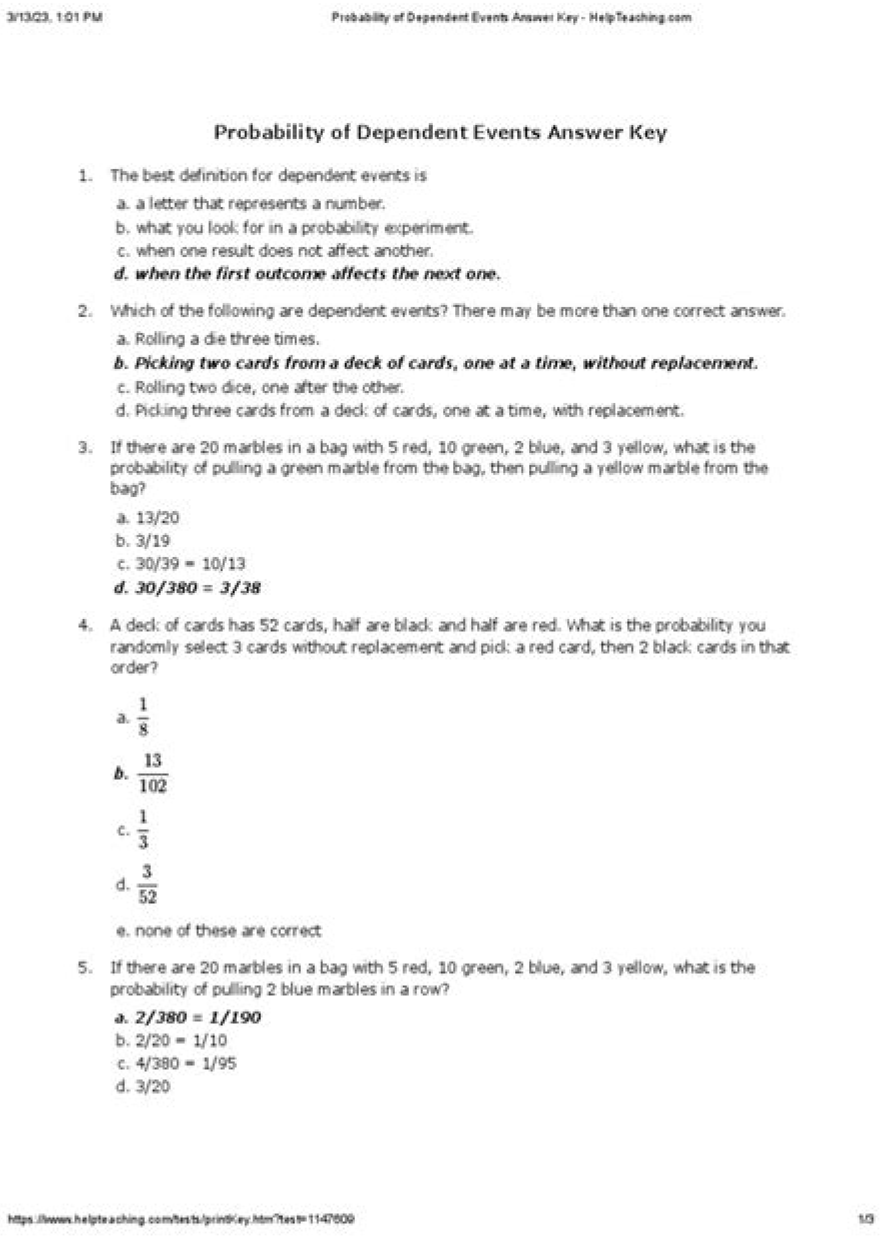
Unit Probability Homework 6 Dependent Events Answer Key



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Probability of Dependent Events Answer Key

1. The best definition for dependent events is
   a. a letter that represents a number.
   b. what you look for in a probability experiment.
   c. when one result does not affect another.
   d. when the first outcome affects the next one.
2. Which of the following are dependent events? There may be more than one correct answer.
   a. Rolling a die three times.
   b. Picking two cards from a deck of cards, one at a time, without replacement.
   c. Rolling two dice, one after the other.
   d. Picking three cards from a deck of cards, one at a time, with replacement.
3. If there are 20 marbles in a bag with 5 red, 10 green, 2 blue, and 3 yellow, what is the probability of pulling a green marble from the bag, then pulling a yellow marble from the bag?
   a. 13/20
   b. 3/19
   c. 30/39 = 10/13
   d. 30/380 = 3/38
4. A deck of cards has 52 cards, half are black and half are red. What is the probability you randomly select 3 cards without replacement and pick a red card, then 2 black cards in that order?
   a. $\frac{1}{8}$
   b. $\frac{13}{102}$
   c. $\frac{1}{3}$
   d. $\frac{3}{52}$
   e. none of these are correct
5. If there are 20 marbles in a bag with 5 red, 10 green, 2 blue, and 3 yellow, what is the probability of pulling 2 blue marbles in a row?
   a. 2/380 = 1/190
   b. 2/20 = 1/10
   c. 4/380 = 1/95
   d. 3/20

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Unit probability homework 6 dependent events answer key serves as a crucial resource for students grappling with the intricacies of probability theory, specifically when it comes to understanding dependent events. In probability, events are considered dependent when the occurrence of one event affects the likelihood of the occurrence of another. This article aims to elucidate the key concepts surrounding dependent events, provide examples, and present a comprehensive answer key to typical homework problems related to this topic.

Understanding Dependent Events

Definition of Dependent Events

Dependent events are those where the outcome of one event influences the outcome of another. This means that the probability of the second event occurring is changed based on whether the first event has occurred. For example, if you draw two cards from a deck without replacement, the outcome of the first draw affects the probability of the second draw since the total number of cards and the composition of the deck have changed.

Mathematical Representation

The probability of two dependent events, A and B, can be calculated using the formula:

$$P(A \text{ and } B) = P(A) \times P(B|A)$$

Where:
- $P(A)$ is the probability of event A occurring.
- $P(B|A)$ is the probability of event B occurring given that event A has already occurred.

Examples of Dependent Events

1. Drawing Cards: If you draw a card from a deck of 52 cards and do not replace it, the probability of drawing a second card changes because there are now only 51 cards left in the deck.

2. Picking Marbles: If you have a bag containing 5 red marbles and 3 blue marbles, and you draw one marble and do not replace it, the probability of drawing a blue marble on the second draw depends on the color of the first marble drawn.

Common Dependent Event Scenarios in Homework Problems

When working through unit probability homework focused on dependent events, you may encounter various scenarios. Below are some common situations with brief explanations:

1. Card Games

In card-related problems, students may be asked to find the probability of drawing certain cards in succession.

Example Problem: What is the probability of drawing an Ace and then a King from a standard deck of cards without replacement?

Solution Steps:
- Probability of drawing an Ace first: $P(Ace) = \frac{4}{52}$
- Probability of drawing a King after an Ace: $P(King|Ace) = \frac{4}{51}$
- Combined probability: $P(Ace \text{ and } King) = P(Ace) \times P(King|Ace) = \frac{4}{52} \times \frac{4}{51}$

2. Dice Rolls

When rolling dice, the outcome of one roll can affect subsequent rolls if conditions change (e.g., removing or adding dice).

Example Problem: If you roll a die and it lands on an even number, what is the probability that the next roll will also be even?

Solution Steps:
- Probability of rolling an even number on the first roll: $P(Even) = \frac{3}{6}$ (since there are 3 even numbers: 2, 4, 6)
- The second roll is independent, but if you consider an event where you are interested in consecutive even rolls, you would still calculate it the same way since the outcomes do not affect each other directly.

3. Lottery Draws

In lottery scenarios, the selection of numbers can also create dependent events.

Example Problem: In a lottery where you draw 6 numbers from a pool of 49, what is the probability that the second number drawn is less than the first number drawn?

Solution Steps:
- The probability of the first draw is $P(A) = \frac{1}{49}$.
- The second draw's probability would depend on the first number drawn. If the first number drawn is x, then the probability that the second number is less than x must be calculated based on the remaining options after the first draw.

Answer Key for Homework Problems

The following is an answer key for typical dependent event problems that may appear in unit probability homework 6. These answers can help students understand the step-by-step process of solving these types of problems.

Problem Set

1. Problem: A bag contains 4 red balls and 6 blue balls. If you draw one ball and do not replace it, what is the probability of drawing a red ball first and a blue ball second?
- Solution:
- \(P(Red) = \frac{4}{10} \)
- \(P(Blue|Red) = \frac{6}{9} \)
- Combined probability: \(P(Red \text{ and } Blue) = \frac{4}{10} \times \frac{6}{9} = \frac{24}{90} = \frac{4}{15} \)

2. Problem: If you roll two dice, what is the probability that the second die shows a number greater than the first?
- Solution:
- There are 36 possible outcomes when rolling two dice.
- Count favorable outcomes where the second die is greater than the first (e.g., (1,2), (1,3), ..., (5,6)).
- There are 15 such outcomes, so the probability is \(\frac{15}{36} = \frac{5}{12} \).

3. Problem: In a class of 30 students, 12 are boys and 18 are girls. If a student is selected at random, what is the probability that the first student is a girl and the second student selected is a boy?
- Solution:
- \(P(Girl) = \frac{18}{30} = \frac{3}{5} \)
- After selecting a girl, there are now 29 students left, with still 12 boys: \(P(Boy|Girl) = \frac{12}{29} \)
- Combined probability: \(P(Girl \text{ and } Boy) = \frac{3}{5} \times \frac{12}{29} = \frac{36}{145} \)

Conclusion

Understanding unit probability homework 6 dependent events answer key is essential for mastering the concepts of probability, particularly when dealing with dependent events. The examples and problems discussed in this article provide a solid foundation for tackling homework assignments and exams. By practicing these problems and studying the provided solutions, students can enhance their comprehension of dependent events and improve their problem-solving skills in probability.

Frequently Asked Questions

What are dependent events in probability?

Dependent events are events where the outcome or occurrence of one event affects the outcome or occurrence of another event.

How do you calculate the probability of two dependent events?

To calculate the probability of two dependent events A and B, you use the formula P(A and B) = P(A) P(B|A), where P(B|A) is the probability of event B occurring given that event A has already occurred.

Can you provide an example of dependent events?

Sure! If you have a deck of cards and you draw one card, the probability of drawing a second card that is a heart becomes dependent on the first card drawn. If the first card is a heart, there are now fewer hearts left in the deck.

What is an example question from 'unit probability homework 6' involving dependent events?

An example question could be: 'If you draw two cards from a deck without replacement, what is the probability that both cards are aces?'

Where can I find the answer key for homework 6 on dependent events?

The answer key for unit probability homework 6 can typically be found on your course's online platform or through your instructor's website.

How can I improve my understanding of dependent events in probability?

To improve your understanding, practice solving problems involving dependent events, review definitions, and use visual aids like tree diagrams to illustrate how the events are connected.

What mistakes should I avoid when working with dependent events?

Common mistakes include treating dependent events as independent, forgetting to adjust probabilities based on previous outcomes, and miscalculating conditional probabilities.

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