

11-2 Probability

Objective:

- To find the probability of an event using theoretical, experimental, and simulation methods

Common Core Content Standard:

Prepares for S.IC.2 Decide if a specified model is consistent with results from a given data generating process, e.g., using simulation.

_____ measures how likely it is for an event to occur.

Take note**Key Concept Experimental Probability**

experimental probability of event: $P(\text{event}) = \frac{\text{number of times the event occurs}}{\text{number of trials}}$

Example 1: Finding Experimental Probability

You observe 119 animals at a zoo, 19 of them have wings. What is the experimental probability that an animal at this zoo has wings?

Sometimes actual trials are difficult or unreasonable to conduct. In these situations, you can estimate the experimental probability of an event by using a simulation. A _____ is a model of the event.

Example 2: Using a Simulation

On a multiple-choice test, each item has three choices, but only one choice is correct. How can you simulate guessing the answers? What is the probability that you will pass the test by guessing at least five of ten answers correctly?

The set of all possible outcomes to an experiment or activity is a _____. When each outcome in a sample space has the same chance of occurring, the outcomes are _____ outcomes.

Take note

Key Concept Theoretical Probability

If a sample space has n equally likely outcomes and an event A occurs in m of these outcomes, then the theoretical probability of event A is $P(A) = \frac{m}{n}$.



Example 3: Finding Theoretical Probability

What is the theoretical probability of each event?

- Getting a number less than 3 on one roll of a fair number cube

- Getting a sum that is a multiple of 4 on one roll of two fair number cubes

It can be easier to use _____ to find theoretical probability rather than listing and counting all the equally likely outcomes. Combinatorics include the Fundamental Counting Principle, and ways to count permutations and combinations.

Example 4: Finding Probability Using Combinatorics

What is the theoretical probability of being dealt exactly three 8's in a 5 card hand from a standard 52-card deck?

Example 5: Finding Geometric Probability

A carnival game consists of throwing darts at a circular board as shown. What is the geometric probability that a dart thrown at random will hit the shaded circle?



