

Probability is a measure of how _____ it is that an event will occur.

Ratio: Probability = _____

The collection of all possible outcomes is called the _____.

Using Function Notation

If a fair six-sided die is tossed, the probability of rolling a 5 would be denoted:

Properties of Probability

- Probability must be between _____ and _____.
- If A and B are independent events, then the probability that *both* will occur is given by:

EXAMPLE: Two fair six-sided dice are tossed. Find the probability that both will end up on an odd number.

- If A and B are mutually exclusive events, then the probability that one or the other will occur is given by:

EXAMPLE: A fair six-sided die is tossed. Find the probability of rolling a 5 or a 6.

Properties of Probability - Continued

- If A and B are not mutually exclusive, then the probability that one or the other will occur is given by:

Example: A card is randomly drawn from a regular 52-card deck. Find the probability of drawing a 5 or a heart.

Related Concepts

- _____ probability is a measure of how likely it is that one event will occur, given that another event has already occurred.

EXAMPLE: Marbles are being randomly taken (and not replaced) from a bag that contains 3 red and 3 green marbles. Find the probability that the second marble taken will be red, given that the first marble taken is red.

- The _____ (or opposite) of an event is the outcome(s) in which the event does not occur.

EXAMPLE: A fair six-sided die is tossed. If a multiple of 3 is considered to be a positive outcome, how can this be achieved? What is the complement?

Relationship of an event and its complement:

$$P(A) + P(A') = \underline{\hspace{2cm}}$$

Equivalently:

Sometimes, it is simpler to focus primarily on the complement when calculating probability...

EXAMPLE: Three people toss a fair six-sided die. Find the probability that at least two of them will roll the same number.

"Direct" Approach

"Indirect" Approach

EXAMPLE: A group of 20 people is randomly chosen. Find the probability that two of them have the same birthday. (Assume that nobody's birthday is on leap-day, and that there are no sets of twins in the group.)

What if 25 people are randomly chosen...?

A _____ assigns a probability to each possible outcome. (It can be given graphically or numerically.)

EXAMPLE: A fair six-sided die is tossed...

EXAMPLE: Write a probability distribution for the sum of the values when two fair six-sided dice are tossed.

If there are a _____ number of possible outcomes, then the probability distribution is **discreet**.

If this is the case, probability is represented by a **probability _____ function**.

EXAMPLE: If X is the outcome of tossing a fair six-sided die, then

$$P(X = x) =$$

Many situations in real life involve an _____ number of possible outcomes. And, between any two possible outcomes, we can find more possible outcomes. In these cases, the probability distribution is **continuous**.

If this is the case, probability is represented by a **probability _____ function**.

Also - in continuous cases, we calculate probability that an occurrence will fall within a specified interval.

The _____ distribution is one of the most common continuous probability distributions.

Important Values in a Normal Distribution

$\mu =$

$\sigma =$

Percentages to memorize:

_____ percent of occurrences are within 1 standard deviation of μ

_____ percent of occurrences are within 2 standard deviations of μ

_____ percent of occurrences are within 3 standard deviations of μ

EXAMPLE: The height of an American adult male is normally distributed. If the mean of this distribution is 70 inches and the standard deviation is 3 inches then...

_____ percent of American males are between ____ and ____ inches tall

_____ percent of American males are between ____ and ____ inches tall

_____ percent of American males are between ____ and ____ inches tall

~The End...~

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