

Lecture 5

STAT 109: Introductory Biostatistics

Lecture 5: Addition Rule for Probability

Learning Outcomes:

1. State the **Addition Rule for any two events**
2. Use the addition rule to compute the probability of events A or B, being aware of special cases.

Addition Rule

For any two events A and B...

Visualizing the Addition Rule with a Venn Diagram

Example: Suppose a class consists of 20 students. Of these students, 12 have backpacks and 3 have hats. There is only 1 student with both a backpack and a hat.

Suppose one student is randomly selected from the 20. What is the probability this student will either have a backpack OR have a hat?

Practice Problem: Suppose a class consists of 30 students. Of these students, 8 like to go sky diving and 20 like to go surfing. There are 7 students that like both sky diving and surfing.

Suppose one student is randomly selected from the 30. What is the probability this student will like sky diving OR surfing

Special Cases of the Addition Rule

Complement Rule

Non-overlapping Events

Example: Suppose the probability of it snowing at least once this November is 0.83. what is the probability that it will not snow at all this November?

Example: Suppose that a brand of gummy vitamins come in three animal shapes: Lions, tigers or bears . The company creates the gummies as follows: 30% of the shapes are bears, 30% are tigers and 40% are lions.

What is the probability that a randomly selected gummy will be either a bear or a tiger?

Practice Problem: Suppose a card is drawn from a standard 52 card deck. What is the probability the card is...

- A “face” card (king, queen or jack)?
- An Ace?

c. Not an Ace?