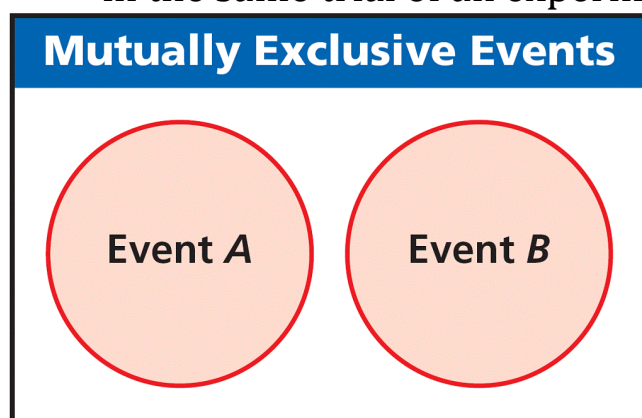


Exclusive and Inclusive Events

A **simple event** is an event that describes a single outcome.

A **compound event** is an event made up of two or more simple events.

- **Mutually exclusive events** are events that cannot both occur in the same trial of an experiment.



Notice how there is no intersection.

Mutually Exclusive Events	
WORDS	ALGEBRA
The probability of two mutually exclusive events A or B occurring is the sum of their individual probabilities.	For two mutually exclusive events A and B , $P(A \cup B) = P(A) + P(B).$

Recall: The notation $A \cup B$ means "A or B".

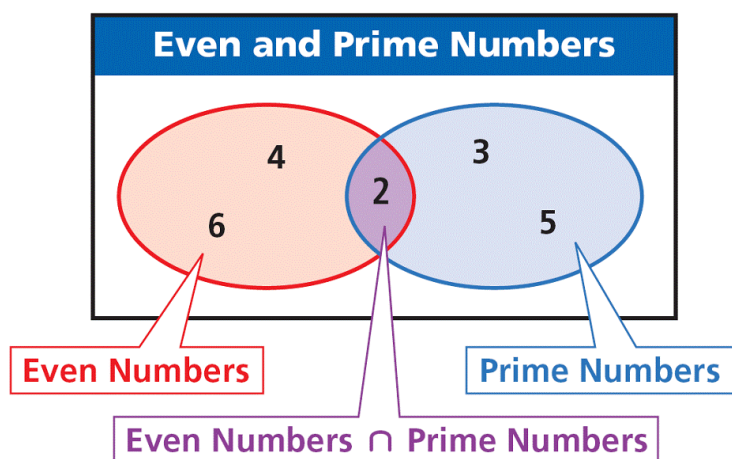
Example #1: Each student cast one vote for senior class president. Of the students, 25% voted for Ben, 20% for Daniel, and 55% for Josh. A student from the senior class is selected at random.

- Are the categories mutually exclusive? Why?
- What is the probability that a student voted for Daniel or Ben?

Example #2: A card is drawn randomly from nine cards labeled 1 through 9. What is the probability of picking a 5 or an even number?

Inclusive events are events that have one or more outcomes in common.

- When you roll a number cube, the outcomes “rolling an even number” and “rolling a prime number” are not mutually exclusive. The number 2 is both prime and even, so the events are inclusive.



Notice that there is a region that overlaps.

Inclusive Events

WORDS	The probability of two inclusive events A or B occurring is the sum of their individual probabilities minus the probability of <i>both</i> occurring.
ALGEBRA	For two inclusive events A and B , $P(A \cup B) = P(A) + P(B) - P(A \cap B).$

Example #3: When you arrive home today, you will find 27 cupcakes in a large circular plate. Your mom iced 13 of them and gave sprinkles to 11 of them. Four of the cupcakes are both iced and sprinkled.

a) Create a Venn Diagram for this situation.

b) Find the probability of choosing a cupcake that has icing or sprinkles.

Example #4: Of 1560 students surveyed, 840 were seniors and 630 read a daily paper. The rest of the students were juniors. Only 215 of the paper readers were juniors.

a) Create a Venn Diagram for this situation.

b) What is the probability that a student was a senior or read a daily paper?

You try: Out of 160 beauty spa customers, 96 had a hair styling and 61 had a manicure. There were 28 customers who had only a manicure. What is the probability that a customer had a hair styling or a manicure?

a) Explain why these events are mutually inclusive.

b) Draw a Venn Diagram.

c) Answer the question.

Review: What is the complement of an event?

Example #1: Each of 6 students randomly chooses a butterfly from a list of 8 types. What is the probability that at least 2 students choose the same butterfly?

Example #2: In one day, 5 different customers bought earrings from the same jewelry store. The store offers 62 different styles. Find the probability that at least 2 customers bought the same style.

Probability Day #4

You try: Each of 4 students randomly chooses a pen from 9 styles. What is the probability that at least 2 students choose the same style?