

Compound Events (Pages 224–229)

A **compound event** consists of two or more simple events that are connected by the words *and* or *or*. Events connected by the word *and* are **independent events** if the outcome of one event does not affect the outcome of the other event. Events connected by the word *or* are either **mutually exclusive** events or **inclusive** events. Consider the probability of selecting a king or a jack from a standard deck of 52 cards. Since you cannot select both a king and a jack at the same time, the events are mutually exclusive. Consider the probability of selecting a king or a red card. *Both* events could happen since the card could be a red king. The events are inclusive.

Probability of Independent Events	Multiply the probability of the first event by the probability of the second event. $P(A \text{ and } B) = P(A) \cdot P(B)$
Probability of Mutually Exclusive Events	Add the probability of the first event and the probability of the second event. $P(A \text{ or } B) = P(A) + P(B)$
Probability of Inclusive Events	Add the probabilities of the first event and the second event, then subtract the probability of both events. $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

EXAMPLES

A Two dice are rolled. Find the probability that a 6 is rolled on the first die and a 6 is rolled on the second.

The events are independent.

$$P(6) = \frac{1}{6} \text{ and } P(6) = \frac{1}{6}$$

$$P(6 \text{ and } 6) = \frac{1}{6} \cdot \frac{1}{6} \text{ or } \frac{1}{36}$$

B Find the probability that a marble selected from a bag of 4 green, 5 blue, and 3 red is green or blue.

The events are mutually exclusive.

$$P(\text{green}) = \frac{4}{12} \text{ and } P(\text{blue}) = \frac{5}{12}$$

$$P(\text{green or blue}) = \frac{4}{12} + \frac{5}{12} \\ = \frac{9}{12} \text{ or } \frac{3}{4}$$

PRACTICE

A die is rolled and a card is drawn from a standard deck of 52 cards. Find the probability of each outcome.

- $P(4 \text{ and jack})$
- $P(\text{even and red})$
- $P(\text{odd and club})$
- $P(\text{less than 3 and black})$
- $P(\text{greater than 2 and red})$
- $P(4 \text{ or greater and face})$

A card is drawn from a standard deck of cards. Determine whether each event is mutually exclusive or inclusive. Then find each probability.

- $P(\text{king or six})$
- $P(\text{heart or ace})$
- $P(\text{diamond or black})$

10. Standardized Test Practice A coin is tossed twice. What is the probability that the first toss matches the second toss?

A $\frac{1}{2}$

B 1

C $\frac{1}{4}$

D $\frac{3}{4}$

Answers: 1. $\frac{78}{1}$ 2. $\frac{4}{1}$ 3. $\frac{8}{1}$ 4. $\frac{6}{1}$ 5. $\frac{3}{1}$ 6. $\frac{26}{3}$ 7. ME; $\frac{13}{2}$ 8. I; $\frac{13}{4}$ 9. ME; $\frac{4}{3}$ 10. A