

# 10-9 Probability of Independent and Dependent Events (Pages 530–534)

Events are **independent** when the outcome of one event does not influence the outcome of a second event. When the outcome of one event affects the outcome of a second event, the events are **dependent**.

<b>Finding Probability</b>	<ul style="list-style-type: none"> <li>To find the probability of two independent events both occurring, multiply the probability of the first event by the probability of the second event. <math>P(A \text{ and } B) = P(A) \cdot P(B)</math></li> <li>To find the probability of two dependent events both occurring, multiply the probability of <math>A</math> and the probability of <math>B</math> after <math>A</math> occurs. <math>P(A \text{ and } B) = P(A) \cdot P(B \text{ following } A)</math></li> </ul>
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## EXAMPLES

**A** Find the probability of tossing two number cubes and getting a 3 on each one.

*These events are independent.*

$$P(3) \cdot P(3) = \frac{1}{6} \cdot \frac{1}{6} \text{ or } \frac{1}{36}$$

The probability is  $\frac{1}{36}$ .

**B** A box contains a nickel, a penny, and a dime. Find the probability of choosing first a dime and then, without replacing the dime, choosing a penny.

*These events are dependent. The first probability is  $\frac{1}{3}$ . The probability of choosing a penny is  $\frac{1}{2}$  since there are now only 2 coins left. The probability of both is  $\frac{1}{3} \cdot \frac{1}{2}$  or  $\frac{1}{6}$ .*

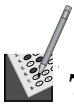
## PRACTICE

**Determine whether the events are independent or dependent.**

- selecting a marble and then choosing a second marble without replacing the first marble
- rolling a number cube and spinning a spinner

**Two fair dice, one red and one blue, are rolled. Find each probability.**

- $P(1 \text{ and } 1)$
- $P(4 \text{ and } 1)$
- $P(\text{an even number and a } 3)$
- $P(\text{a number greater than } 4 \text{ and a } 2)$



**7. Standardized Test Practice** David and Adrian have a coupon for a pizza with one topping. The choices of toppings are pepperoni, hamburger, sausage, onions, bell peppers, olives, and anchovies. If they choose at random, what is the probability that they both choose hamburger as a topping?

**A**  $\frac{1}{7}$

**B**  $\frac{1}{49}$

**C**  $\frac{2}{7}$

**D**  $\frac{1}{42}$

<b>Answers:</b> 1. dependent; There is one less marble in the bag when the second marble is drawn. 2. independent 3. $\frac{36}{1}$ 4. $\frac{18}{1}$ 5. $\frac{6}{1}$ 6. $\frac{9}{1}$ 7. B
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