

# 12-9 Probability of Compound Events

(Pages 650–655)

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**.

When two events cannot happen at the same time, they are **mutually exclusive**.

<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> <li>To find the probability of one or the other of two <i>mutually exclusive</i> events, add the probability of the first event to the probability of the second event. <math>P(A \text{ or } B) = P(A) + P(B)</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  $\frac{1}{3}$ .*

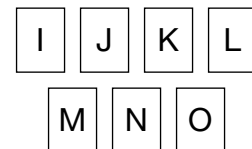
*The probability of choosing a penny is  $\frac{1}{2}$  since there are now only 2 coins left. The probability of both is  $\frac{1}{3} \cdot \frac{1}{2}$  or  $\frac{1}{6}$ .*

### 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
- Find the probability of each situation. A card is drawn from the cards at the right.

- a.**  $P(J \text{ or } K)$       **b.**  $P(L \text{ or } M \text{ or } N)$       **c.**  $P(L \text{ or a vowel})$



- 4. 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**  $\frac{1}{42}$

**Answers:** 1. dependent; There is one less marble in the bag when the second marble is drawn. 2. independent 3a.  $\frac{1}{2}$  3b.  $\frac{1}{3}$  3c.  $\frac{1}{3}$  4. B