

Independent and Dependent Events

1. A bag contains 5 red, 3 green, 4 blue, and 8 yellow marbles. Find the probability of randomly selecting a green marble, and then a yellow marble if the first marble is replaced.

$$\frac{3}{50}$$

$$P(g) \cdot P(y) = \frac{3}{20} \cdot \frac{8}{20}$$

2. A sock drawer contains 5 pairs of each color socks: white, green and blue. What is the probability of randomly selecting a pair of blue socks, replacing it, and then randomly selecting a pair of white socks?

$$\frac{1}{9}$$

$$P(b) \cdot P(w) = \frac{5}{15} \cdot \frac{5}{15}$$

3. In a standard deck of cards, what is the probability of picking a diamond and then another diamond without replacement?

$$\frac{1}{17}$$

$$P(d) \cdot P(d|d) = \frac{13}{52} \cdot \frac{12}{51}$$

4. Randy has 4 pennies, 2 nickels, and 3 dimes in his pocket. If he randomly chooses 2 coins, what is the probability that they are both dimes if he doesn't replace the first one?

$$\frac{1}{12}$$

$$P(d) \cdot P(d|d) = \frac{3}{9} \cdot \frac{2}{8}$$

5. Two students are chosen at random from a class of 30. What is the probability that both you and your friend are chosen?

$$\frac{1}{435}$$

$$\frac{2}{30} \cdot \frac{1}{29}$$

6. A test includes several multiple choice questions, each with 5 choices. Suppose you don't know the answers for three of these questions, so you guess. What is the probability of getting all three correct?

$$\frac{1}{125}$$

$$\frac{1}{5} \cdot \frac{1}{5} \cdot \frac{1}{5}$$

7. Using the letters in the state ARKANSAS. Find the probability of picking an S and then an A without replacement.

$$\frac{3}{28}$$

$$\frac{2}{8} \cdot \frac{3}{7}$$

8. Using the letters in the state ARKANSAS. Find the probability of picking a K and then an N without replacement.

$$\frac{1}{56}$$

$$\frac{1}{8} \cdot \frac{1}{7}$$

9. Using the letters in the state ARKANSAS. Find the probability of picking a R and then a S without replacement.

$$\frac{1}{28}$$

$$\frac{1}{8} \cdot \frac{2}{7}$$

Determining if 2 Events are Independent

Check the following events and determine if they are independent. $P(A \cap B) = P(A) \cdot P(B)$

10. $P(A) = 0.45$ $P(B) = 0.30$ $P(A \cap B) = 0.75$

$$0.75 \stackrel{?}{=} 0.45 \cdot 0.3$$

Conclusion: no! not independent $0.75 \neq 0.135$

11. $P(A) = 0.12$ $P(B) = 0.56$ $P(A \cap B) = 0.0672$

$$0.0672 \stackrel{?}{=} 0.12 \cdot 0.56$$

Conclusion: yes! independent

$$0.0672 = 0.0672$$

✓

12. $P(A) = \frac{4}{5}$ $P(B) = \frac{3}{8}$ $P(A \cap B) = \frac{7}{40}$

$$\frac{7}{40} \stackrel{?}{=} \frac{4}{5} \cdot \frac{3}{8}$$

Conclusion: no! not independent

$$\frac{7}{40} \neq \frac{3}{10}$$

13. $P(A) = \frac{7}{9}$ $P(B) = \frac{3}{4}$ $P(A \cap B) = \frac{7}{12}$

$$\frac{7}{12} \stackrel{?}{=} \frac{7}{9} \cdot \frac{3}{4}$$

Conclusion: yes! independent

$$\frac{7}{12} = \frac{7}{12} \checkmark$$
