To find the probability of two events that are independent (the probability of the first does not affect the second), multiply the probabilities of the events.

\[ P(A \text{ and } B) = P(A) \cdot P(B) \]

To find the probability of two events that are dependent (the probability of the first does affect the second), multiply the probability of the first by the probability of the second happening after the first.

\[ P(A \text{ then } B) = P(A) \cdot P(B \text{ after } A) \]

**Examples**

A bag contains 6 white counters, 5 red counters, and 19 counters of other colors.

A. Find the probability of choosing a white and then a red counter if you replace the first counter before choosing the second counter.

\[ P(A) = P(\text{white}) = \text{total number} = \frac{6}{30} = \frac{1}{5} \]

\[ P(B) = P(\text{red}) = \text{total number} = \frac{5}{30} = \frac{1}{6} \]

\[ P(A \text{ and } B) = \frac{1}{5} \cdot \frac{1}{6} = \frac{1}{30} \]

The probability of choosing a white and then a red counter (with replacing the first counter) is \( \frac{1}{30} \).

B. Find the probability of choosing a white and then a red counter if you do not replace the first counter before choosing the second counter.

\[ P(A) = P(\text{white}) = \text{total number} = \frac{6}{30} = \frac{1}{5} \]

\[ P(B) = P(\text{red}) = \text{total number} = \frac{5}{29} \]

\[ P(A \text{ and } B) = \frac{1}{5} \cdot \frac{5}{29} = \frac{1}{29} \]

The probability of choosing a white and then a red counter (without replacing the first counter) is \( \frac{1}{29} \).

**Exercises**

Choose counters of two colors, A and B. Write down the number of each, and put them in a bag.

1. Find the probability of choosing a counter of color A and then a counter of color B if you replace the first before you pick the second.

2. Find the probability of choosing a counter of color A and then a counter of color B if you do not replace the first pick.