Probability of an Event

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What is the Probability of an Event?

If an event E has $n(E)$ equally likely outcomes and its sample space S has $n(S)$ likely outcomes, then the *probability* of the event E is:

$$P(E) = \frac{\text{number of elements in } E}{\text{number of elements in } S} = \frac{n(E)}{n(S)}$$

Example

Two coins are tossed. What is the probability of getting two heads?

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$S = \{HH, HT, TH, TT\}$

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Two coins are tossed. What is the probability of getting two heads?

$S = \{HH, HT, TH, TT\}$
$E = \{HH\}$

Example

Two coins are tossed. What is the probability of getting two heads?

$S = \{HH, HT, TH, TT\}$ $\quad n(S) = 4$

$E = \{HH\}$

Example

Two coins are tossed. What is the probability of getting two heads?

$S = \{HH, HT, TH, TT\}$ $\quad n(S) = 4$

$E = \{HH\}$ $\quad n(E) = 1$

Example

Two coins are tossed. What is the probability of getting two heads?

$S = \{HH, HT, TH, TT\}$ $\quad n(S) = 4$

$E = \{HH\}$ $\quad n(E) = 1$

$P(E)$

Example

Two coins are tossed. What is the probability of getting two heads?

$S = \{HH, HT, TH, TT\}$ $\quad n(S) = 4$

$E = \{HH\}$ $\quad n(E) = 1$

$$P(E) = \frac{n(E)}{n(S)}$$

Example

Two coins are tossed. What is the probability of getting two heads?

$S = \{HH, HT, TH, TT\}$ $\quad n(S) = 4$

$E = \{HH\}$ $\quad n(E) = 1$

$$P(E) = \frac{n(E)}{n(S)}$$

$P(E)$

Example

Two coins are tossed. What is the probability of getting two heads?

$S = \{HH, HT, TH, TT\}$ $\quad n(S) = 4$

$E = \{HH\}$ $\quad n(E) = 1$

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{1}{4}$$

Example

Two coins are tossed. What is the probability of getting two heads?

$S = \{HH, HT, TH, TT\}$ $\quad n(S) = 4$

$E = \{HH\}$ $\quad n(E) = 1$

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{1}{4} \text{ or } 25\%$$

Example

A die is rolled. What is the probability of getting a prime number?

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$S = \{1, 2, 3, 4, 5, 6\}$
$E = \{2, 3, 5\}$

Example

A die is rolled. What is the probability of getting a prime number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{2, 3, 5\}$

Example

A die is rolled. What is the probability of getting a prime number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{2, 3, 5\}$ $\quad n(E) = 3$

Example

A die is rolled. What is the probability of getting a prime number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{2, 3, 5\}$ $\quad n(E) = 3$

$P(E)$

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$$P(E) = \frac{n(E)}{n(S)}$$

$P(E)$

Example

A die is rolled. What is the probability of getting a prime number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{2, 3, 5\}$ $\quad n(E) = 3$

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{3}{6}$$

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A die is rolled. What is the probability of getting a prime number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{2, 3, 5\}$ $\quad n(E) = 3$

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{3}{6}$$

$P(E)$

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A die is rolled. What is the probability of getting a prime number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{2, 3, 5\}$ $\quad n(E) = 3$

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{3}{6}$$

$$P(E) = \frac{1}{2}$$

Example

A die is rolled. What is the probability of getting a prime number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{2, 3, 5\}$ $\quad n(E) = 3$

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{3}{6}$$

$$P(E) = \frac{1}{2} \text{ or } 50\%$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a black ace?

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$$S = \{A\heartsuit, \ldots, K\heartsuit, \\ A\diamondsuit, \ldots, K\diamondsuit,$$

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A card is drawn from a standard deck of cards. What is the probability of getting a black ace?

$$S = \{A\heartsuit, \ldots, K\heartsuit,$$
$$A\diamondsuit, \ldots, K\diamondsuit,$$
$$A\clubsuit, \ldots, K\clubsuit,$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a black ace?

$$S = \{A\heartsuit, \ldots, K\heartsuit,$$
$$A\diamondsuit, \ldots, K\diamondsuit,$$
$$A\clubsuit, \ldots, K\clubsuit,$$
$$A\spadesuit, \ldots, K\spadesuit\}$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a black ace?

$$
\begin{aligned}
S = \{&A\heartsuit, \ldots, K\heartsuit, \\
&A\diamondsuit, \ldots, K\diamondsuit, \\
&A\clubsuit, \ldots, K\clubsuit, \\
&A\spadesuit, \ldots, K\spadesuit\} \\
E = \{&A\clubsuit, A\spadesuit\}
\end{aligned}
$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a black ace?

$$S = \{A\heartsuit, \ldots, K\heartsuit, A\diamondsuit, \ldots, K\diamondsuit, A\clubsuit, \ldots, K\clubsuit, A\spadesuit, \ldots, K\spadesuit\} \qquad n(S) = 52$$

$$E = \{A\clubsuit, A\spadesuit\}$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a black ace?

$$S = \{A\heartsuit, \ldots, K\heartsuit, A\diamondsuit, \ldots, K\diamondsuit, A\clubsuit, \ldots, K\clubsuit, A\spadesuit, \ldots, K\spadesuit\}$$
$$E = \{A\clubsuit, A\spadesuit\}$$

$$n(S) = 52$$
$$n(E) = 2$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a black ace?

$S = \{A\heartsuit, \ldots, K\heartsuit,$
$A\diamondsuit, \ldots, K\diamondsuit,$
$A\clubsuit, \ldots, K\clubsuit,$
$A\spadesuit, \ldots, K\spadesuit\}$
$E = \{A\clubsuit, A\spadesuit\}$

$n(S) = 52$
$n(E) = 2$

$P(E)$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a black ace?

$$S = \{A\heartsuit, \ldots, K\heartsuit, A\diamondsuit, \ldots, K\diamondsuit, A\clubsuit, \ldots, K\clubsuit, A\spadesuit, \ldots, K\spadesuit\}$$

$$E = \{A\clubsuit, A\spadesuit\}$$

$$P(E) = \frac{n(E)}{n(S)}$$

$$n(S) = 52$$

$$n(E) = 2$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a black ace?

$$S = \{A\heartsuit, \ldots, K\heartsuit, A\diamondsuit, \ldots, K\diamondsuit, A\clubsuit, \ldots, K\clubsuit, A\spadesuit, \ldots, K\spadesuit\}$$

$$E = \{A\clubsuit, A\spadesuit\}$$

$$P(E) = \frac{n(E)}{n(S)} \quad P(E)$$

$$n(S) = 52$$

$$n(E) = 2$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a black ace?

$$S = \{A\heartsuit, \ldots, K\heartsuit, A\diamondsuit, \ldots, K\diamondsuit, A\clubsuit, \ldots, K\clubsuit, A\spadesuit, \ldots, K\spadesuit\}$$

$$E = \{A\clubsuit, A\spadesuit\}$$

$$n(S) = 52$$

$$n(E) = 2$$

$$P(E) = \frac{n(E)}{n(S)} \quad P(E) = \frac{2}{52}$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a black ace?

$$S = \{A\heartsuit, \ldots, K\heartsuit, A\diamondsuit, \ldots, K\diamondsuit, A\clubsuit, \ldots, K\clubsuit, A\spadesuit, \ldots, K\spadesuit\}$$

$$E = \{A\clubsuit, A\spadesuit\}$$

$$n(S) = 52$$

$$n(E) = 2$$

$$P(E) = \frac{n(E)}{n(S)} \quad P(E) = \frac{2}{52}$$

$P(E)$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a black ace?

$$S = \{A\heartsuit, \ldots, K\heartsuit, A\diamondsuit, \ldots, K\diamondsuit, A\clubsuit, \ldots, K\clubsuit, A\spadesuit, \ldots, K\spadesuit\} \qquad n(S) = 52$$

$$E = \{A\clubsuit, A\spadesuit\} \qquad n(E) = 2$$

$$P(E) = \frac{n(E)}{n(S)} \quad P(E) = \frac{2}{52}$$

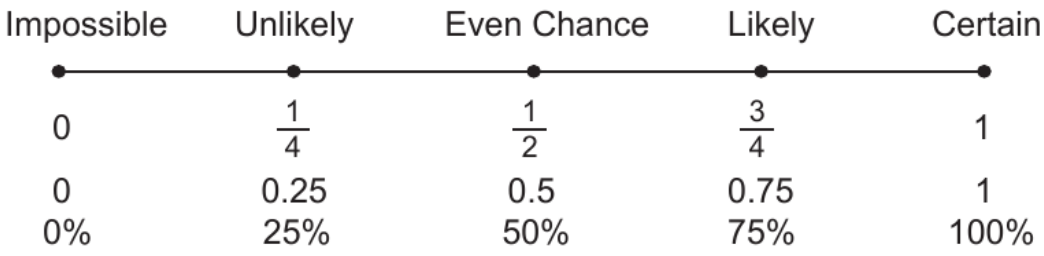
$$P(E) = \frac{1}{26}$$

What are the Properties of Probability?

1. The probability of an event, $P(E)$, is a number from 0 to 1 which tells how likely the event is to happen.

$$0 \leq P(E) \leq 1$$

What are the Properties of Probability?



The closer the probability of an event to 1, the more likely the event is to happen and the closer the probability of an event to zero, the less likely it is to happen.

Example

A die is rolled. What is the probability of getting an even prime number?

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$E = \{2\}$

Example

A die is rolled. What is the probability of getting an even prime number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad\quad$ $n(S) = 6$

$E = \{2\}$

Example

A die is rolled. What is the probability of getting an even prime number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{2\}$ $\quad n(E) = 1$

Example

A die is rolled. What is the probability of getting an even prime number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{2\}$ $\quad n(E) = 1$

$P(E)$

Example

A die is rolled. What is the probability of getting an even prime number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{2\}$ $\quad n(E) = 1$

$$P(E) = \frac{n(E)}{n(S)}$$

Example

A die is rolled. What is the probability of getting an even prime number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{2\}$ $\quad n(E) = 1$

$$P(E) = \frac{n(E)}{n(S)}$$

$P(E)$

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A die is rolled. What is the probability of getting an even prime number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{2\}$ $\quad n(E) = 1$

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{1}{6}$$

Example

A die is rolled. What is the probability of getting an even prime number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{2\}$ $\quad n(E) = 1$

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{1}{6} \text{ or } 0.167$$

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A die is rolled. What is the probability of getting a number less than 6?

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Example

A die is rolled. What is the probability of getting a number less than 6?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

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Example

A die is rolled. What is the probability of getting a number less than 6?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{1, 2, 3, 4, 5\}$ $\quad n(E) = 5$

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A die is rolled. What is the probability of getting a number less than 6?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{1, 2, 3, 4, 5\}$ $\quad n(E) = 5$

$P(E)$

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A die is rolled. What is the probability of getting a number less than 6?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

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$$P(E) = \frac{n(E)}{n(S)}$$

Example

A die is rolled. What is the probability of getting a number less than 6?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

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$$P(E) = \frac{n(E)}{n(S)}$$

$P(E)$

Example

A die is rolled. What is the probability of getting a number less than 6?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{1, 2, 3, 4, 5\}$ $\quad n(E) = 5$

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{5}{6}$$

Example

A die is rolled. What is the probability of getting a number less than 6?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{1, 2, 3, 4, 5\}$ $\quad n(E) = 5$

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{5}{6} \text{ or } 0.83$$

What are the Properties of Probability?

2. The probability of an event that cannot happen is 0.

$$P(\varnothing) = 0$$

Example

A die is rolled. What is the probability of getting a number greater than 6?

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A die is rolled. What is the probability of getting a number greater than 6?

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Example

A die is rolled. What is the probability of getting a number greater than 6?

$S = \{1, 2, 3, 4, 5, 6\}$
$E = \{\}$

Example

A die is rolled. What is the probability of getting a number greater than 6?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{\}$

Example

A die is rolled. What is the probability of getting a number greater than 6?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{\}$ $\quad n(E) = 0$

Example

A die is rolled. What is the probability of getting a number greater than 6?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{\}$ $\quad n(E) = 0$

$P(E)$

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A die is rolled. What is the probability of getting a number greater than 6?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

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$$P(E) = \frac{n(E)}{n(S)}$$

Example

A die is rolled. What is the probability of getting a number greater than 6?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{\}$ $\quad n(E) = 0$

$$P(E) = \frac{n(E)}{n(S)}$$

$P(E)$

Example

A die is rolled. What is the probability of getting a number greater than 6?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{\}$ $\quad n(E) = 0$

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{0}{6}$$

Example

A die is rolled. What is the probability of getting a number greater than 6?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{\}$ $\quad n(E) = 0$

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{0}{6} \text{ or } 0$$

What are the Properties of Probability?

3. If an event is sure to happen, then the probability is 1.

Example

A die is rolled. What is the probability of getting a number greater than 0?

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Example

A die is rolled. What is the probability of getting a number greater than 0?

$S = \{1, 2, 3, 4, 5, 6\}$
$E = \{1, 2, 3, 4, 5, 6\}$

Example

A die is rolled. What is the probability of getting a number greater than 0?

$S = \{1, 2, 3, 4, 5, 6\}$ $\qquad n(S) = 6$

$E = \{1, 2, 3, 4, 5, 6\}$

Example

A die is rolled. What is the probability of getting a number greater than 0?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{1, 2, 3, 4, 5, 6\}$ $\quad n(E) = 6$

Example

A die is rolled. What is the probability of getting a number greater than 0?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{1, 2, 3, 4, 5, 6\}$ $\quad n(E) = 6$

$P(E)$

Example

A die is rolled. What is the probability of getting a number greater than 0?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{1, 2, 3, 4, 5, 6\}$ $\quad n(E) = 6$

$$P(E) = \frac{n(E)}{n(S)}$$

Example

A die is rolled. What is the probability of getting a number greater than 0?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{1, 2, 3, 4, 5, 6\}$ $\quad n(E) = 6$

$$P(E) = \frac{n(E)}{n(S)}$$

$P(E)$

Example

A die is rolled. What is the probability of getting a number greater than 0?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{1, 2, 3, 4, 5, 6\}$ $\quad n(E) = 6$

$$P(E) = \frac{n(E)}{n(S)}$$

$$P(E) = \frac{6}{6}$$

Example

A die is rolled. What is the probability of getting a number greater than 0?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$E = \{1, 2, 3, 4, 5, 6\}$ $\quad n(E) = 6$

$$P(E) = \frac{n(E)}{n(S)}$$

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

What are the Properties of Probability?

4. The sum of the probabilities of all the outcomes in the sample space is 1.

Example

Experiment: Tossing a coin

Example

Experiment: Tossing a coin

$$P(H) = \frac{1}{2}$$

Example

Experiment: Tossing a coin

$$P(H) = \frac{1}{2}$$

$$P(T) = \frac{1}{2}$$

Example

Experiment: Tossing a coin

$P(H) = \frac{1}{2}$

$P(T) = \frac{1}{2}$

$P(S)$

Example

Experiment: Tossing a coin

$$P(H) = \frac{1}{2}$$

$$P(T) = \frac{1}{2}$$

$$P(S) = P(H) + P(T)$$

Example

Experiment: Tossing a coin

$$P(H) = \frac{1}{2}$$

$$P(T) = \frac{1}{2}$$

$$P(S) = P(H) + P(T)$$

$$P(S)$$

Example

Experiment: Tossing a coin

$$P(H) = \frac{1}{2}$$

$$P(T) = \frac{1}{2}$$

$$P(S) = P(H) + P(T)$$

$$P(S) = \frac{1}{2} + \frac{1}{2}$$

Example

Experiment: Tossing a coin

$$P(H) = \frac{1}{2}$$

$$P(T) = \frac{1}{2}$$

$$P(S) = P(H) + P(T)$$

$$P(S) = \frac{1}{2} + \frac{1}{2}$$

$$P(S)$$

Example

Experiment: Tossing a coin

$$P(H) = \frac{1}{2}$$

$$P(T) = \frac{1}{2}$$

$$P(S) = P(H) + P(T)$$

$$P(S) = \frac{1}{2} + \frac{1}{2}$$

$$P(S) = \frac{2}{2}$$

Example

Experiment: Tossing a coin

$$P(H) = \frac{1}{2}$$

$$P(T) = \frac{1}{2}$$

$$P(S) = P(H) + P(T)$$

$$P(S) = \frac{1}{2} + \frac{1}{2}$$

$$P(S) = \frac{2}{2} = 1$$

Example

Experiment: Rolling a fair die

Example

Experiment: Rolling a fair die

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

Example

Experiment: Rolling a fair die

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

$$P(2) = \frac{1}{6}$$

Example

Experiment: Rolling a fair die

$$P(1) = \frac{1}{6} \qquad P(3) = \frac{1}{6}$$

$$P(2) = \frac{1}{6}$$

Example

Experiment: Rolling a fair die

$$P(1) = \frac{1}{6} \qquad P(3) = \frac{1}{6}$$

$$P(2) = \frac{1}{6} \qquad P(4) = \frac{1}{6}$$

Example

Experiment: Rolling a fair die

$$P(1) = \frac{1}{6} \qquad P(3) = \frac{1}{6} \qquad P(5) = \frac{1}{6}$$

$$P(2) = \frac{1}{6} \qquad P(4) = \frac{1}{6}$$

Example

Experiment: Rolling a fair die

$$P(1) = \frac{1}{6} \qquad P(3) = \frac{1}{6} \qquad P(5) = \frac{1}{6}$$

$$P(2) = \frac{1}{6} \qquad P(4) = \frac{1}{6} \qquad P(6) = \frac{1}{6}$$

Example

Experiment: Rolling a fair die

$$P(1) = \frac{1}{6} \qquad P(3) = \frac{1}{6} \qquad P(5) = \frac{1}{6}$$

$$P(2) = \frac{1}{6} \qquad P(4) = \frac{1}{6} \qquad P(6) = \frac{1}{6}$$

$P(S)$

Example

Experiment: Rolling a fair die

$$P(1) = \frac{1}{6} \qquad P(3) = \frac{1}{6} \qquad P(5) = \frac{1}{6}$$
$$P(2) = \frac{1}{6} \qquad P(4) = \frac{1}{6} \qquad P(6) = \frac{1}{6}$$

$$P(S) = P(1) + P(2) + P(3) + P(4) + P(5) + P(6)$$

Example

Experiment: Rolling a fair die

$$P(1) = \frac{1}{6} \qquad P(3) = \frac{1}{6} \qquad P(5) = \frac{1}{6}$$
$$P(2) = \frac{1}{6} \qquad P(4) = \frac{1}{6} \qquad P(6) = \frac{1}{6}$$

$$P(S) = P(1) + P(2) + P(3) + P(4) + P(5) + P(6)$$

$$P(S)$$

Example

Experiment: Rolling a fair die

$$P(1) = \frac{1}{6} \qquad P(3) = \frac{1}{6} \qquad P(5) = \frac{1}{6}$$
$$P(2) = \frac{1}{6} \qquad P(4) = \frac{1}{6} \qquad P(6) = \frac{1}{6}$$

$$P(S) = P(1) + P(2) + P(3) + P(4) + P(5) + P(6)$$
$$P(S) = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$$

Example

Experiment: Rolling a fair die

$$P(1) = \frac{1}{6} \qquad P(3) = \frac{1}{6} \qquad P(5) = \frac{1}{6}$$
$$P(2) = \frac{1}{6} \qquad P(4) = \frac{1}{6} \qquad P(6) = \frac{1}{6}$$

$$P(S) = P(1) + P(2) + P(3) + P(4) + P(5) + P(6)$$
$$P(S) = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$$

$$P(S)$$

Example

Experiment: Rolling a fair die

$$P(1) = \frac{1}{6} \qquad P(3) = \frac{1}{6} \qquad P(5) = \frac{1}{6}$$
$$P(2) = \frac{1}{6} \qquad P(4) = \frac{1}{6} \qquad P(6) = \frac{1}{6}$$

$$P(S) = P(1) + P(2) + P(3) + P(4) + P(5) + P(6)$$
$$P(S) = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$$
$$P(S) = \frac{6}{6}$$

Example

Experiment: Rolling a fair die

$$P(1) = \frac{1}{6} \qquad P(3) = \frac{1}{6} \qquad P(5) = \frac{1}{6}$$
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$$P(S) = P(1) + P(2) + P(3) + P(4) + P(5) + P(6)$$
$$P(S) = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$$
$$P(S) = \frac{6}{6} = 1$$

What are the Properties of Probability?

5. The probability of any two disjoint events E_1 and E_2 is the sum of the probabilities of each individual event.

$$P(E_1 \text{ or } E_2) = P(E_1) + P(E_2)$$

Example

A die is rolled. What is the probability of getting 2 or an odd number?

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$S = \{1, 2, 3, 4, 5, 6\}$
$\{\text{Getting } 2\} = \{2\}$

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A die is rolled. What is the probability of getting 2 or an odd number?

$S = \{1, 2, 3, 4, 5, 6\}$
$\{\text{Getting } 2\} = \{2\}$
$\{\text{Getting odd}\} = \{1, 3, 5\}$

Example

A die is rolled. What is the probability of getting 2 or an odd number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\qquad n(S) = 6$

$\{\text{Getting } 2\} = \{2\}$

$\{\text{Getting odd}\} = \{1, 3, 5\}$

Example

A die is rolled. What is the probability of getting 2 or an odd number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$\{\text{Getting 2}\} = \{2\}$ $\quad n(\text{Getting 2}) = 1$

$\{\text{Getting odd}\} = \{1, 3, 5\}$

Example

A die is rolled. What is the probability of getting 2 or an odd number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

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Example

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$\{\text{Getting odd}\} = \{1, 3, 5\}$ $\quad n(\text{Getting odd}) = 3$

$P(\text{Getting 2 or odd})$

Example

A die is rolled. What is the probability of getting 2 or an odd number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$\{\text{Getting 2}\} = \{2\}$ $\quad n(\text{Getting 2}) = 1$

$\{\text{Getting odd}\} = \{1, 3, 5\}$ $\quad n(\text{Getting odd}) = 3$

$P(\text{Getting 2 or odd}) = P(\text{Getting 2}) + P(\text{Getting odd})$

Example

A die is rolled. What is the probability of getting 2 or an odd number?

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$$P(\text{Getting 2 or odd}) = P(\text{Getting 2}) + P(\text{Getting odd})$$

$$P(\text{Getting 2 or odd}) = \frac{1}{6} + \frac{3}{6}$$

Example

A die is rolled. What is the probability of getting 2 or an odd number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$\{\text{Getting 2}\} = \{2\}$ $\quad n(\text{Getting 2}) = 1$

$\{\text{Getting odd}\} = \{1, 3, 5\}$ $\quad n(\text{Getting odd}) = 3$

$$P(\text{Getting 2 or odd}) = P(\text{Getting 2}) + P(\text{Getting odd})$$

$$P(\text{Getting 2 or odd}) = \frac{1}{6} + \frac{3}{6}$$

$P(\text{Getting 2 or odd})$

Example

A die is rolled. What is the probability of getting 2 or an odd number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

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$\{\text{Getting odd}\} = \{1, 3, 5\}$ $\quad n(\text{Getting odd}) = 3$

$$P(\text{Getting 2 or odd}) = P(\text{Getting 2}) + P(\text{Getting odd})$$

$$P(\text{Getting 2 or odd}) = \frac{1}{6} + \frac{3}{6}$$

$$P(\text{Getting 2 or odd}) = \frac{4}{6}$$

Example

A die is rolled. What is the probability of getting 2 or an odd number?

$S = \{1, 2, 3, 4, 5, 6\}$ $\quad n(S) = 6$

$\{\text{Getting 2}\} = \{2\}$ $\quad n(\text{Getting 2}) = 1$

$\{\text{Getting odd}\} = \{1, 3, 5\}$ $\quad n(\text{Getting odd}) = 3$

$$P(\text{Getting 2 or odd}) = P(\text{Getting 2}) + P(\text{Getting odd})$$

$$P(\text{Getting 2 or odd}) = \frac{1}{6} + \frac{3}{6}$$

$$P(\text{Getting 2 or odd}) = \frac{4}{6} \text{ or } \frac{2}{3}$$

What are the Properties of Probability?

6. The probability of any event which is not in E is the difference between 1 and the probability of event E.

$$P(E') = 1 - P(E)$$

E' signifies "not in E."

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

Example

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$S = \{A\heartsuit, \ldots, K\heartsuit,$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$S = \{A\heartsuit, \ldots, K\heartsuit,$$
$$A\diamondsuit, \ldots, K\diamondsuit,$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$S = \{A\heartsuit, \ldots, K\heartsuit, \\ A\diamondsuit, \ldots, K\diamondsuit, \\ A\clubsuit, \ldots, K\clubsuit,$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$S = \{A\heartsuit, \ldots, K\heartsuit, \\ A\diamondsuit, \ldots, K\diamondsuit, \\ A\clubsuit, \ldots, K\clubsuit, \\ A\spadesuit, \ldots, K\spadesuit\}$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$
\begin{aligned}
S = \{&A\heartsuit, \ldots, K\heartsuit, \\
&A\diamondsuit, \ldots, K\diamondsuit, \\
&A\clubsuit, \ldots, K\clubsuit, \\
&A\spadesuit, \ldots, K\spadesuit\} \\
F = \{&J\heartsuit, \ldots, K\heartsuit,
\end{aligned}
$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$
\begin{aligned}
S = \{&A\heartsuit, \ldots, K\heartsuit, \\
&A\diamondsuit, \ldots, K\diamondsuit, \\
&A\clubsuit, \ldots, K\clubsuit, \\
&A\spadesuit, \ldots, K\spadesuit\} \\
F = \{&J\heartsuit, \ldots, K\heartsuit, \\
&J\diamondsuit, \ldots, K\diamondsuit,
\end{aligned}
$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

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\begin{aligned}
S = \{&A\heartsuit, \ldots, K\heartsuit, \\
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&A\clubsuit, \ldots, K\clubsuit, \\
&A\spadesuit, \ldots, K\spadesuit\} \\
F = \{&J\heartsuit, \ldots, K\heartsuit, \\
&J\diamondsuit, \ldots, K\diamondsuit, \\
&J\clubsuit, \ldots, K\clubsuit,
\end{aligned}
$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

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\begin{aligned}
S = \{&A\heartsuit, \ldots, K\heartsuit, \\
&A\diamondsuit, \ldots, K\diamondsuit, \\
&A\clubsuit, \ldots, K\clubsuit, \\
&A\spadesuit, \ldots, K\spadesuit\} \\
F = \{&J\heartsuit, \ldots, K\heartsuit, \\
&J\diamondsuit, \ldots, K\diamondsuit, \\
&J\clubsuit, \ldots, K\clubsuit, \\
&J\spadesuit, \ldots, K\spadesuit\}
\end{aligned}
$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$
\begin{aligned}
S = \{&A\heartsuit, \ldots, K\heartsuit, \quad n(S) = 52 \\
&A\diamondsuit, \ldots, K\diamondsuit, \\
&A\clubsuit, \ldots, K\clubsuit, \\
&A\spadesuit, \ldots, K\spadesuit\} \\
F = \{&J\heartsuit, \ldots, K\heartsuit, \\
&J\diamondsuit, \ldots, K\diamondsuit, \\
&J\clubsuit, \ldots, K\clubsuit, \\
&J\spadesuit, \ldots, K\spadesuit\}
\end{aligned}
$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$
\begin{aligned}
S = \{&A\heartsuit, \ldots, K\heartsuit, \\
&A\diamondsuit, \ldots, K\diamondsuit, \\
&A\clubsuit, \ldots, K\clubsuit, \\
&A\spadesuit, \ldots, K\spadesuit\}
\end{aligned}
\qquad n(S) = 52
$$

$$
\begin{aligned}
F = \{&J\heartsuit, \ldots, K\heartsuit, \\
&J\diamondsuit, \ldots, K\diamondsuit, \\
&J\clubsuit, \ldots, K\clubsuit, \\
&J\spadesuit, \ldots, K\spadesuit\}
\end{aligned}
\qquad n(F) = 12
$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$S = \{A\heartsuit, \ldots, K\heartsuit, \quad A\diamondsuit, \ldots, K\diamondsuit, \quad A\clubsuit, \ldots, K\clubsuit, \quad A\spadesuit, \ldots, K\spadesuit\}$$

$$F = \{J\heartsuit, \ldots, K\heartsuit, \quad J\diamondsuit, \ldots, K\diamondsuit, \quad J\clubsuit, \ldots, K\clubsuit, \quad J\spadesuit, \ldots, K\spadesuit\}$$

$n(S) = 52$

$n(F) = 12$

$P(\text{not F})$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$S = \{A\heartsuit, \ldots, K\heartsuit, \quad A\diamondsuit, \ldots, K\diamondsuit, \quad A\clubsuit, \ldots, K\clubsuit, \quad A\spadesuit, \ldots, K\spadesuit\}$$

$$F = \{J\heartsuit, \ldots, K\heartsuit, \quad J\diamondsuit, \ldots, K\diamondsuit, \quad J\clubsuit, \ldots, K\clubsuit, \quad J\spadesuit, \ldots, K\spadesuit\}$$

$n(S) = 52$

$n(F) = 12$

$P(\text{not F}) = 1 - P(F)$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$S = \{A\heartsuit, \ldots, K\heartsuit, \quad A\diamondsuit, \ldots, K\diamondsuit, \quad A\clubsuit, \ldots, K\clubsuit, \quad A\spadesuit, \ldots, K\spadesuit\}$$

$$F = \{J\heartsuit, \ldots, K\heartsuit, \quad J\diamondsuit, \ldots, K\diamondsuit, \quad J\clubsuit, \ldots, K\clubsuit, \quad J\spadesuit, \ldots, K\spadesuit\}$$

$n(S) = 52$

$n(F) = 12$

$P(\text{not F}) = 1 - P(F)$

$P(\text{not F})$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$S = \{A\heartsuit, \ldots, K\heartsuit, \quad A\diamondsuit, \ldots, K\diamondsuit, \quad A\clubsuit, \ldots, K\clubsuit, \quad A\spadesuit, \ldots, K\spadesuit\}$$
$$F = \{J\heartsuit, \ldots, K\heartsuit, \quad J\diamondsuit, \ldots, K\diamondsuit, \quad J\clubsuit, \ldots, K\clubsuit, \quad J\spadesuit, \ldots, K\spadesuit\}$$

$$n(S) = 52$$
$$n(F) = 12$$

$$P(\text{not F}) = 1 - P(F)$$
$$P(\text{not F}) = 1 - \frac{12}{52}$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$S = \{A\heartsuit, \ldots, K\heartsuit, \quad A\diamondsuit, \ldots, K\diamondsuit, \quad A\clubsuit, \ldots, K\clubsuit, \quad A\spadesuit, \ldots, K\spadesuit\}$$

$$F = \{J\heartsuit, \ldots, K\heartsuit, \quad J\diamondsuit, \ldots, K\diamondsuit, \quad J\clubsuit, \ldots, K\clubsuit, \quad J\spadesuit, \ldots, K\spadesuit\}$$

$$n(S) = 52$$

$$n(F) = 12$$

$$P(\text{not F}) = 1 - P(F)$$

$$P(\text{not F}) = 1 - \frac{12}{52}$$

$$P(\text{not F})$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$S = \{A\heartsuit, \ldots, K\heartsuit, \quad A\diamondsuit, \ldots, K\diamondsuit, \quad A\clubsuit, \ldots, K\clubsuit, \quad A\spadesuit, \ldots, K\spadesuit\}$$
$$F = \{J\heartsuit, \ldots, K\heartsuit, \quad J\diamondsuit, \ldots, K\diamondsuit, \quad J\clubsuit, \ldots, K\clubsuit, \quad J\spadesuit, \ldots, K\spadesuit\}$$

$$n(S) = 52$$
$$n(F) = 12$$

$$P(\text{not F}) = 1 - P(F)$$
$$P(\text{not F}) = 1 - \frac{12}{52}$$
$$P(\text{not F}) = \frac{40}{52}$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$S = \{A\heartsuit, \ldots, K\heartsuit, \quad A\diamondsuit, \ldots, K\diamondsuit, \quad A\clubsuit, \ldots, K\clubsuit, \quad A\spadesuit, \ldots, K\spadesuit\}$$

$$F = \{J\heartsuit, \ldots, K\heartsuit, \quad J\diamondsuit, \ldots, K\diamondsuit, \quad J\clubsuit, \ldots, K\clubsuit, \quad J\spadesuit, \ldots, K\spadesuit\}$$

$$n(S) = 52$$

$$n(F) = 12$$

$$P(\text{not F}) = 1 - P(F)$$

$$P(\text{not F}) = 1 - \frac{12}{52}$$

$$P(\text{not F}) = \frac{40}{52}$$

$$P(\text{not F})$$

Example

A card is drawn from a standard deck of cards. What is the probability of getting a card that is not a face card?

$$S = \{A\heartsuit, \ldots, K\heartsuit, \quad A\diamondsuit, \ldots, K\diamondsuit, \quad A\clubsuit, \ldots, K\clubsuit, \quad A\spadesuit, \ldots, K\spadesuit\}$$
$$F = \{J\heartsuit, \ldots, K\heartsuit, \quad J\diamondsuit, \ldots, K\diamondsuit, \quad J\clubsuit, \ldots, K\clubsuit, \quad J\spadesuit, \ldots, K\spadesuit\}$$

$$n(S) = 52$$
$$n(F) = 12$$

$$P(\text{not F}) = 1 - P(F)$$
$$P(\text{not F}) = 1 - \frac{12}{52}$$
$$P(\text{not F}) = \frac{40}{52}$$
$$P(\text{not F}) = \frac{10}{13}$$

Practice

1. What is the probability of getting a HEART from a deck of cards?

Practice

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$n(S) = 52$

Practice

1. What is the probability of getting a HEART from a deck of cards?

$n(S) = 52$
$n(\heartsuit) = 13$

Practice

1. What is the probability of getting a HEART from a deck of cards?

$n(S) = 52$
$n(\heartsuit) = 13$

$P(\heartsuit)$

Practice

1. What is the probability of getting a HEART from a deck of cards?

$n(S) = 52$
$n(\heartsuit) = 13$
$P(\heartsuit) = \dfrac{n(\heartsuit)}{n(S)}$

Practice

1. What is the probability of getting a HEART from a deck of cards?

$n(S) = 52$
$n(\heartsuit) = 13$
$P(\heartsuit) = \dfrac{n(\heartsuit)}{n(S)}$

$P(\heartsuit)$

Practice

1. What is the probability of getting a HEART from a deck of cards?

$$n(S) = 52$$
$$n(\heartsuit) = 13$$
$$P(\heartsuit) = \frac{n(\heartsuit)}{n(S)}$$
$$P(\heartsuit) = \frac{13}{52}$$

Practice

1. What is the probability of getting a HEART from a deck of cards?

$n(S) = 52$
$n(\heartsuit) = 13$
$P(\heartsuit) = \dfrac{n(\heartsuit)}{n(S)}$
$P(\heartsuit) = \dfrac{13}{52}$

$P(\heartsuit)$

Practice

1. What is the probability of getting a HEART from a deck of cards?

$$n(S) = 52$$
$$n(\heartsuit) = 13$$
$$P(\heartsuit) = \frac{n(\heartsuit)}{n(S)}$$
$$P(\heartsuit) = \frac{13}{52}$$
$$P(\heartsuit) = \frac{1}{13}$$

Practice

2. There are 20 marbles in a container: 4 are red, 5 are blue, and 11 are yellow. What is the probability that a blue marble will be picked?

Practice

2. There are 20 marbles in a container: 4 are red, 5 are blue, and 11 are yellow. What is the probability that a blue marble will be picked?

$n(S) = 20$

Practice

2. There are 20 marbles in a container: 4 are red, 5 are blue, and 11 are yellow. What is the probability that a blue marble will be picked?

$n(S) = 20$
$n(\text{blue marble}) = 5$

Practice

2. There are 20 marbles in a container: 4 are red, 5 are blue, and 11 are yellow. What is the probability that a blue marble will be picked?

$n(S) = 20$
$n(\text{blue marble}) = 5$

$P(\text{blue marble})$

Practice

2. There are 20 marbles in a container: 4 are red, 5 are blue, and 11 are yellow. What is the probability that a blue marble will be picked?

$n(S) = 20$

$n(\text{blue marble}) = 5$

$$P(\text{blue marble}) = \frac{n(\text{blue marble})}{n(S)}$$

Practice

2. There are 20 marbles in a container: 4 are red, 5 are blue, and 11 are yellow. What is the probability that a blue marble will be picked?

$n(S) = 20$

$n(\text{blue marble}) = 5$

$$P(\text{blue marble}) = \frac{n(\text{blue marble})}{n(S)}$$

$P(\text{blue marble})$

Practice

2. There are 20 marbles in a container: 4 are red, 5 are blue, and 11 are yellow. What is the probability that a blue marble will be picked?

$$n(S) = 20$$
$$n(\text{blue marble}) = 5$$
$$P(\text{blue marble}) = \frac{n(\text{blue marble})}{n(S)}$$
$$P(\text{blue marble}) = \frac{5}{20}$$

Practice

2. There are 20 marbles in a container: 4 are red, 5 are blue, and 11 are yellow. What is the probability that a blue marble will be picked?

$n(S) = 20$

$n(\text{blue marble}) = 5$

$$P(\text{blue marble}) = \frac{n(\text{blue marble})}{n(S)}$$

$$P(\text{blue marble}) = \frac{5}{20}$$

$P(\text{blue marble})$

Practice

2. There are 20 marbles in a container: 4 are red, 5 are blue, and 11 are yellow. What is the probability that a blue marble will be picked?

$$n(S) = 20$$
$$n(\text{blue marble}) = 5$$
$$P(\text{blue marble}) = \frac{n(\text{blue marble})}{n(S)}$$
$$P(\text{blue marble}) = \frac{5}{20}$$
$$P(\text{blue marble}) = \frac{1}{4}$$

Practice

3. If a letter is chosen at random from the word PERSEVERANCE, what is the probability that the letter chosen is not E?

Practice

3. If a letter is chosen at random from the word PERSEVERANCE, what is the probability that the letter chosen is not E?

$n(S) = 12$

Practice

3. If a letter is chosen at random from the word PERSEVERANCE, what is the probability that the letter chosen is not E?

$n(S) = 12$
$n(E) = 4$

Practice

3. If a letter is chosen at random from the word PERSEVERANCE, what is the probability that the letter chosen is not E?

$n(S) = 12$
$n(E) = 4$
$P(E')$

Practice

3. If a letter is chosen at random from the word PERSEVERANCE, what is the probability that the letter chosen is not E?

$n(S) = 12$
$n(E) = 4$
$P(E') = 1 - P(E)$

Practice

3. If a letter is chosen at random from the word PERSEVERANCE, what is the probability that the letter chosen is not E?

$n(S) = 12$
$n(E) = 4$
$P(E') = 1 - P(E)$

$P(E')$

Practice

3. If a letter is chosen at random from the word PERSEVERANCE, what is the probability that the letter chosen is not E?

$n(S) = 12$
$n(E) = 4$
$P(E') = 1 - P(E)$
$P(E') = 1 - \frac{4}{12}$

Practice

3. If a letter is chosen at random from the word PERSEVERANCE, what is the probability that the letter chosen is not E?

$n(S) = 12$
$n(E) = 4$
$P(E') = 1 - P(E)$
$P(E') = 1 - \frac{4}{12}$

$P(E')$

Practice

3. If a letter is chosen at random from the word PERSEVERANCE, what is the probability that the letter chosen is not E?

$n(S) = 12$
$n(E) = 4$
$P(E') = 1 - P(E)$
$P(E') = 1 - \frac{4}{12}$
$P(E') = \frac{8}{12}$

Practice

3. If a letter is chosen at random from the word PERSEVERANCE, what is the probability that the letter chosen is not E?

$n(S) = 12$
$n(E) = 4$
$P(E') = 1 - P(E)$
$P(E') = 1 - \frac{4}{12}$
$P(E') = \frac{8}{12}$ or $\frac{2}{3}$

Practice

4. Of the 45 students in a class, 25 are boys. If a student is selected at random for a field trip, what is the probability of selecting a girl?

Practice

4. Of the 45 students in a class, 25 are boys. If a student is selected at random for a field trip, what is the probability of selecting a girl?

$n(S) = 45$

Practice

4. Of the 45 students in a class, 25 are boys. If a student is selected at random for a field trip, what is the probability of selecting a girl?

$n(S) = 45$
$n(boy) = 25$

Practice

4. Of the 45 students in a class, 25 are boys. If a student is selected at random for a field trip, what is the probability of selecting a girl?

$n(S) = 45$
$n(boy) = 25$
$P(girl)$

Practice

4. Of the 45 students in a class, 25 are boys. If a student is selected at random for a field trip, what is the probability of selecting a girl?

$n(S) = 45$
$n(boy) = 25$
$P(girl) = 1 - P(boy)$

Practice

4. Of the 45 students in a class, 25 are boys. If a student is selected at random for a field trip, what is the probability of selecting a girl?

$n(S) = 45$
$n(boy) = 25$
$P(girl) = 1 - P(boy)$

$P(girl)$

Practice

4. Of the 45 students in a class, 25 are boys. If a student is selected at random for a field trip, what is the probability of selecting a girl?

$n(S) = 45$
$n(boy) = 25$
$P(girl) = 1 - P(boy)$
$P(girl) = 1 - \frac{25}{45}$

Practice

4. Of the 45 students in a class, 25 are boys. If a student is selected at random for a field trip, what is the probability of selecting a girl?

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$P(girl)$

Practice

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$$n(S) = 45$$
$$n(boy) = 25$$
$$P(girl) = 1 - P(boy)$$
$$P(girl) = 1 - \frac{25}{45}$$
$$P(girl) = \frac{20}{45}$$

Practice

4. Of the 45 students in a class, 25 are boys. If a student is selected at random for a field trip, what is the probability of selecting a girl?

$n(S) = 45$
$n(boy) = 25$
$P(girl) = 1 - P(boy)$
$P(girl) = 1 - \frac{25}{45}$
$P(girl) = \frac{20}{45}$ or $\frac{4}{9}$

Practice

5. Two fair coins are tossed simultaneously. What is the probability of showing two tails or two heads?

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$n(S) = 4$

Practice

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$n(S) = 4$
$n(TT) = 1$

Practice

5. Two fair coins are tossed simultaneously. What is the probability of showing two tails or two heads?

$n(S) = 4$
$n(TT) = 1$
$n(HH) = 1$

Practice

5. Two fair coins are tossed simultaneously. What is the probability of showing two tails or two heads?

$n(S) = 4$
$n(TT) = 1$
$n(HH) = 1$
$P(\text{TT or HH})$

Practice

5. Two fair coins are tossed simultaneously. What is the probability of showing two tails or two heads?

$n(S) = 4$
$n(TT) = 1$
$n(HH) = 1$
$P(\text{TT or HH}) = P(TT) + P(HH)$

Practice

5. Two fair coins are tossed simultaneously. What is the probability of showing two tails or two heads?

$n(S) = 4$
$n(TT) = 1$
$n(HH) = 1$
$P(\text{TT or HH}) = P(TT) + P(HH)$

$P(\text{TT or HH})$

Practice

5. Two fair coins are tossed simultaneously. What is the probability of showing two tails or two heads?

$n(S) = 4$
$n(TT) = 1$
$n(HH) = 1$
$P(\text{TT or HH}) = P(TT) + P(HH)$
$P(\text{TT or HH}) = \frac{1}{4} + \frac{1}{4}$

Practice

5. Two fair coins are tossed simultaneously. What is the probability of showing two tails or two heads?

$n(S) = 4$
$n(TT) = 1$
$n(HH) = 1$
$P(\text{TT or HH}) = P(TT) + P(HH)$
$P(\text{TT or HH}) = \frac{1}{4} + \frac{1}{4}$

$P(\text{TT or HH})$

Practice

5. Two fair coins are tossed simultaneously. What is the probability of showing two tails or two heads?

$n(S) = 4$
$n(TT) = 1$
$n(HH) = 1$
$P(\text{TT or HH}) = P(TT) + P(HH)$
$$P(\text{TT or HH}) = \frac{1}{4} + \frac{1}{4}$$
$$P(\text{TT or HH}) = \frac{2}{4}$$

Practice

5. Two fair coins are tossed simultaneously. What is the probability of showing two tails or two heads?

$n(S) = 4$
$n(TT) = 1$
$n(HH) = 1$
$P(\text{TT or HH}) = P(TT) + P(HH)$
$P(\text{TT or HH}) = \frac{1}{4} + \frac{1}{4}$
$P(\text{TT or HH}) = \frac{2}{4}$ or $\frac{1}{2}$

Thank you for attending the virtual class.