

Section 4.2 — Addition

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Complementary Events

Addition

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The **complement** of event A , denoted A^C , consists of all possible outcomes in which A does *not* occur.

Example

- Choose a red card out of a deck of cards.

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- Roll two six-sided dice and the sum is even.

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- Roll two six-sided dice and the sum is even.
- At least two people in this class share a birthday

Rule of Complements

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$$P(A) + P(A^C) = 1$$

Addition

Notation

$P(A \text{ or } B) = P(A \cup B)$ is the probability that A , B , or both occur in a single trial.

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$P(A \text{ and } B) = P(A \cap B)$ is the probability that both A and B occur in a single trial.

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	Positive Result	Negative Result
Used drugs	44	6
Not a Drug User	90	860

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	Positive Result	Negative Result
Used drugs	44	6
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1. Let A be the event that the person used drugs and B be the event that there was a negative test result.
2. What is the probability someone was not a drug user or had a positive test result?

Table 2: Civil Rights Act of 1964 Votes

	Yes	No
Democrats	152	96
Republicans	138	34

Civil Rights Act of 1964

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	Yes	No
Democrats	152	96
Republicans	138	34

Question

What is the probability that selected congressman is a Democrat or voted yes?

Addition Rule

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Dice

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2. What's the probability the sum is a 4 or both dice are the same?

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Two events are **mutually exclusive** if they have no outcomes in common.

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Mutually Exclusive Rule

If E and F are two mutually exclusive events, then

$$P(E \text{ or } F) = P(E) + P(F)$$

Breakdowns

In a survey of consumers aged 12 and older, respondents were asked how many cell phones were in use in their household. (No two respondents were from the same household). These are the results of the survey.

Number of cell phones	Number who responded
None	221
One	290
Two	378
Three	146
Four or more	122