

TOPIC: TRUTH TABLES FOR NEGATIONS, CONJUNCTIONS, AND DISJUNCTIONS

Truth Tables for Negations

◆ **Truth tables** show how the truth value of simple statements _____ the truth value of more complex statements.

New	Truth Tables for $\sim p$

HOW TO: Make a Truth Table

- 1) Create a **column** for $p, q, r, \dots$ as needed
- 2) **Make** a row for _____ possible truth values
- 3) Add a **column** for each compound statement
- 4) Find and fill out remaining truth values
 - p and $\sim p$ have _____ truth values

EXAMPLE

Create a truth table for $\sim(\sim p)$.

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Truth Tables for Compound Statements

◆ In truth tables, for 'and' & 'or' statements, add rows to consider all _____ of truth values.

New	Truth Table for $p \wedge q, p \vee q$

HOW TO: Make a Truth Table

- 1) Create a **column** for $p, q, r, \dots$ as needed
- 2) Make a **row** for *all* possible _____ of truth values
- 3) Add a **column** for each compound statement
- 4) Find and fill out remaining truth values
 - p and $\sim p$ have opposite truth values
 - $\wedge$: true when **all** statements are true
 - $\vee$: true when **at least 1** statement is true

EXAMPLE

Create a truth table for $\sim p \wedge q$.

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EXAMPLE

Create a truth table for $\sim p \vee q$. Is the statement true when p is true and q is false?

HOW TO: Make a Truth Table

- 1) Create a **column** for $p, q, r, \dots$ as needed
- 2) Make a **row** for *all* possible combinations of truth values
- 3) Add a **column** for each compound statement
- 4) Find and fill out remaining truth values
 - p and $\sim p$ have opposite truth values
 - $\wedge$: true when **all** statements are true
 - $\vee$: true when **at least 1** statement is true

PRACTICE

Create a truth table for $\sim p \wedge \sim q$. Is the statement true when p and q are true?

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PRACTICE

Create a truth table for $\sim p \vee \sim q$. Is the statement true when p is false and q is true?

HOW TO: Make a Truth Table

- 1) Create a **column** for $p, q, r, \dots$ as needed
- 2) Make a **row** for *all* possible combinations of truth values
- 3) Add a **column** for each compound statement
- 4) Find and fill out remaining truth values
 - p and $\sim p$ have opposite truth values
 - $\wedge$: true when **all** statements are true
 - $\vee$: true when **at least 1** statement is true

EXAMPLE

Create a truth table for $\sim p \wedge q \vee r$. How many cases result in a true statement?

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EXAMPLE

Create a truth table for $\sim(p \wedge q) \vee r$. Identify all rows where the statement is true.

HOW TO: Make a Truth Table

- 1) Create a **column** for $p, q, r, \dots$ as needed
- 2) Make a **row** for *all* possible combinations of truth values
- 3) Add a **column** for each compound statement
- 4) Find and fill out remaining truth values
 - p and $\sim p$ have opposite truth values
 - $\wedge$: true when **all** statements are true
 - $\vee$: true when **at least 1** statement is true

EXAMPLE

Represent the following statement in symbols and create a truth table for it: The number I choose is divisible by 2 or 3 and is not prime.