

PRINCIPLES OF NEGATION

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The negation of a statement such as "All birds fly" is roughly formed by saying, "It is false that 'all birds fly.'" These rules also apply:

Rule 1: If a statement is true, its negation must be false.

Rule 2: If a statement is false, its negation must be true.

Below is a table of four statements that share negation relations but in ways that are not discerned easily. Statements in parenthesis are equivalent to those immediately above; "strong" or very clear statements are italicized:

A: All birds fly. (No birds don't fly.)	B: No birds fly (All birds don't fly.)
C: Some birds fly (Not all birds don't fly) (<i>At least one bird flies.</i>)	D: Some birds don't fly (Not all birds fly) (<i>At least one bird doesn't fly</i>)

The task now is to find the true negation relationships. On the surface, A and B look like the "most opposite", but in mathematics, that's not what is meant by negation. Let's look at statement A carefully and see what we can find to negate it. We'll start by applying rules 1 and 2.

A and B could both be false (on planet Earth, for instance). So to say A and B are negations violates Rule 2 above.

A and C could both be false (if all but the penguins died out, say). So A and C aren't negations of each other, either.

So **A and D are negations of each other**. Someone believing A will always disagree with someone who believes D.

Now look at statement B.

Compared with D, we can see that B and D would both be true in a world of penguins only. So B and D are not negations of each other.

B and C are true negations of each other.

Note patterns of some importance and help:

A and D are negations: A is an "all" statement; D is a "some" statement.

B and C are negations: B is an "all" statement; C is a "some" statement.

A and D are related by "all do" vs. "some don't", and

B and C are related by "none do" vs. "some do."

"All" and "none" are universal quantifiers. "Some", "not all", and "at least one" are existential quantifiers. If a statement involves a universal quantifier, its negation will involve an existential quantifier, and vice versa.