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problem set 3, problem 2.2: alternative solution? 6

De Morgan's Laws - Intuition 7

BY: COMMUNITY TA

De Morgan's Laws - Intuition

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discussion posted about a month ago by **mickst3r**

COMMUNITY TA

DeMorgan's laws can be expressed in plain English, and hopefully it'll help people remember and understand them.

In English: "If x is not in any set, then it must be in the complement of every set. And vice versa"

In symbols: $(\bigcup_n S_n)^c = \bigcap_n S_n^c$

The other law:

In English: "If x is not in every set, then it must be in at least one set's complement. And vice versa"

In symbols: $(\bigcap_n S_n)^c = \bigcup_n S_n^c$

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Martin-A

about a month ago

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Thanks. That makes sense and is helpful. We tend to forget that maths notation is really just a shorthand way of expressing things that could be expressed in English. We sometimes manipulate the formulas without ever asking what they are really saying.

Well, maths notation really comes into its own when it enables us to express things that are very difficult, if not impossible, to express precisely in English. In that sense, it is rather more than "just a shorthand". Also, sometimes, it's okay to manipulate formulas without asking what they say... :)

posted 30 days ago by **KevinH**

Yes... And if lawyers would have used maths, half of the rainforests would have been saved ;-D

posted 29 days ago by **10five10**

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jalegris

28 days ago

2 Votes

@ mickst3r

Thanks, that's a pleasing way to express it in English.

I independently discovered the logical form of DeMorgan's law when I was a kid! I was playing with some electrical parts: a battery, a light bulb, some wire and a couple of switches, the switches wired in parallel. Closing EITHER switch lit the bulb (a logical OR function). But then I noticed that only opening BOTH switches turned the bulb off, giving a negative sort of AND function. In other words: A OR B = ~(~A AND ~B)

Nice example ! :)

posted 26 days ago by **Ziedbc** STAFF

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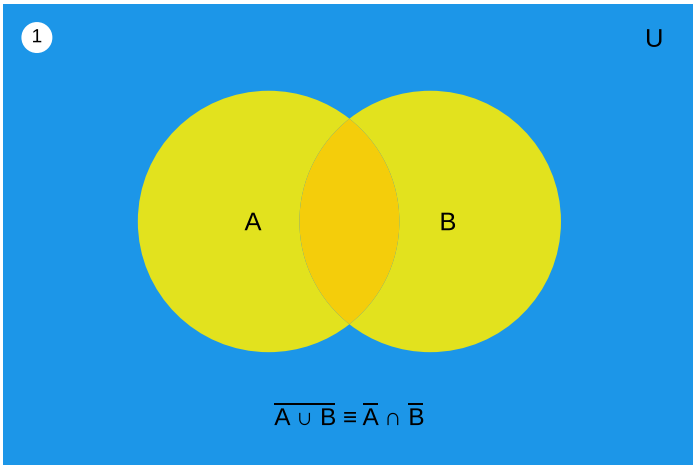
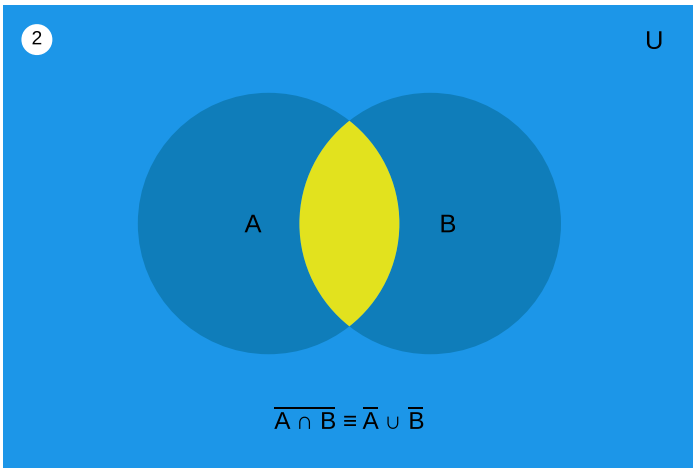
zazzem

24 days ago - endorsed 20 days ago by **Ziedbc** STAFF

2 Votes

While examples can help build intuition, I think the best way is to look at a diagram and have a good, hard think about why something must be true.





Think about what $\overline{\mathbf{A}}$ represents, and what $\overline{\mathbf{B}}$ represents:

1. Think about what you'll get if you intersect (take the overlapping parts of) the 2.
2. Think about what you'll get if you join (take all the parts of) the 2.

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