1. In your own words, write two arguments (refer back to the definition of an argument in section 3.1 of the textbook), one that *is valid* and one that is *not valid.*
2. In your responses to peers, determine which arguments posted by others are valid or not. Then, prove or disprove at least two arguments using deduction rules. Make sure to discuss in detail how the argument written by your peers is translated into the deduction rule that you are using to prove or disprove it.

An **argument** is a set of statements, one of which is called the **conclusion** and the rest of which are called **premises**. An argument is said to be **valid** if the conclusion must be true whenever the premises are all true. An argument is **invalid** if it is not valid; it is possible for all the premises to be true and the conclusion to be false.

Valid argument

The conclusion must be true whenever the premises are all true

Invalid argument

It is possible for all the premises to be true and the conclusion to be false

If Edith eats her vegetables, then she can have a cookie. Edith ate her vegetables. Therefore Edith gets a cookie.

Hello everyone,

Here are two arguments, one valid and one invalid:

1) It must be raining nonstop in order for Penelope to use her umbrella. Rain continues all day. Therefore Penelope uses her umbrella.
2) If the sun has set, then the bat is awake. It is night. Therefore the bat is awake.

The first argument is invalid. It is possible for all premises to be true and the conclusion to be false. In this case the argument does not specify that the *only* requirement for Penelope using her umbrella is nonstop rain; for instance, there could be another requirement such as Penelope stepping outside for a walk.

The second argument is valid. We can visualize the logical form of the argument (Levin, 2021) like this:

[image]

Thanks,

Lauren

References:

Levin, O. (2021). Discrete Mathematics: An Open Introduction. http://discrete.openmathbooks.org/dmoi3/frontmatter.html

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1. In your responses to peers, determine which arguments posted by others are valid or not. Then, prove or disprove at least two arguments using deduction rules. Make sure to discuss in detail how the argument written by your peers is translated into the deduction rule that you are using to prove or disprove it.

Hi Maria,

I decided to prove your first argument using conjunction. The rule of inference is as follows:

P

Q

$\therefore P \wedge Q$

The argument would then be:

Adriana has a birthday cake.

All birthday cakes are pink.

Therefore, Adriana has a pink birthday cake.

Lauren

Hi Tyrus,

For your second argument I decided to prove that it is indeed invalid. The argument affirms the consequent, $P \rightarrow Q$, and invalidly concludes the converse, $Q \rightarrow P$. This converse error is represented as the following where $P \equiv$ All boats are yachts, and $Q \equiv$ All yachts have to be boats:

$P \rightarrow Q$

Q

$\therefore P$

P is a possible condition for Q but as you stated, there is also an official classification for a boat to qualify as a yacht.

Lauren