

Elements of Deductive Logic

Exercise set #1: Standard Form, Validity and Soundness

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1 Standard form

Present the following arguments in standard form, supplying implicit premises if required.

1. You do not know that you are not currently just having a very vivid dream. So you do not know that you are sitting at your desk doing your logic exercises.
2. Complex living organisms couldn't have been generated by chance alone. They must have been crafted by some intelligent designer. We are therefore the descendent of Adam and Eve, as the Bible tells us.
3. In view of the current budget deficit, we ought to implement drastic cuts to public spending.
4. At you last visit, I suggested that the pain in your abdomen could be caused either by a kidney infection, a musculoskeletal injury or cancer of the pancreas or liver. But no indicators for a kidney infection showed up in the urinalysis, and if it were musculoskeletal, the pains would have subsided, not grown, by now. So I am afraid that the news is bad.
5. Abolishing capital punishment in a kind of despair over its fallibility would send out an unacceptable message. It would tell the public that our laws and courts and juries are fundamentally incapable of delivering what most Americans consider genuine justice.
6. If experts could always be trusted to make the right moral decision, then public participation would not be necessary—but they cannot be, and so it is.
7. Anyone who intentionally takes the life of another, with the exception of self-defense and acts of war, has committed murder. Hence, active euthanasia is murder.

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8. It is admitted that the mind has nothing to do with the causation of purely reflex actions. But the nervous structure and the nervous processes involved in deliberate action do not differ in kind from those involved in reflex action; they differ only in degree of complexity. The variability which characterizes deliberate action is fully explained by the variety of alternative paths and the variable resistances of the synapses. So it is unreasonable to suppose that the mind has any more to do with causing deliberate actions than it has to do with causing reflex actions. (C. D. Broad *Mind and Its Place in Nature*)

2 Validity and soundness

Indicate whether each of the following sentences is true. For those that are true, explain why they are true. For those that are false, show why they are false by giving a counterexample.

1. Every argument with a false conclusion is invalid.
2. Every argument with a false premise is invalid.
3. Every argument with a false premise and a false conclusion is invalid.
4. Every argument with a false premise and a true conclusion is invalid.
5. Every argument with true premises and a false conclusion is invalid.
6. Every argument with a true conclusion is sound.
7. Every argument with a false conclusion is unsound.
8. If it is not possible for the conclusion of an argument to be false, then the argument is valid.
9. Only sound arguments are valid
10. No sound arguments have a false conclusion.
11. Every valid argument with a false premise has a false conclusion.
12. If a sound argument has a false conclusion, then all of its premises are false.