

IN CLASS LOGIC EXERCISES

Instructions: Determine whether the following are propositions. If some are not propositions, see if they can be rewritten as propositions.

- (1) I have superpowers.
- (2) Not here, Bob!
- (3) I think I'm going to sell little Joey into slavery.

Instructions: Identify the premises and conclusions in the following arguments, and identify any premise and conclusion indicators.

- (4) English is the best language since it's the only one that I speak.
- (5) Bob likes to argue all the time, and for that reason he would make a good lawyer.
- (6) In view of the fact that Joe cheated on his taxes, we consequently cannot appoint him to the ethics committee.

Instructions: Diagram the following arguments. First number each statement, then use plus signs and arrows to designate the argument structure as either a joint inference or an independent inference.

- (7) Joe has no friends since the only people he knows are on social media, and those aren't real friends.
- (8) Bob was voted most popular student in class, and Bob is always seen with lots of people around him. Thus, Bob has many friends.
- (9) Joe and Bob aren't friends because each says that he can't stand the other, and each angrily insults the other when they pass in the hall.

Premise Indicators

Since
For
Because
Given that
For the reason that

In view of the fact that

Conclusion Indicators

Therefore
Thus
Hence
So
Accordingly
For this reason
Consequently
It follows that

Argument Diagrams

Joint inference:

$1+2 \rightarrow 3$

Independent inference:

$1 \rightarrow 3$ and $2 \rightarrow 3$

Instructions: Identify the informal fallacy in each of the following.

- (10) “The Dead Milkmen” is a rock band. Most people who were once milkmen in the U.S. are now dead. Yikes! That’s one big rock band!
- (11) Hey, forget about Beth, she’s nothing special. Is there anything special about her kidneys, tonsils, or small intestine? She’s only a collection of those things.
- (12) Of course the Major thinks that the Army offers good career opportunities. He’s an Army man himself.
- (13) I think Beth will go out with you. I haven’t heard anything which suggests that she wouldn’t.
- (14) We have a good faculty here at Preppy State University. Therefore, Dr. Joseph Drunkard, who teaches here, is a good faculty member.

FALLACIES OF RELEVANCE

Argument against the Person (argumentum ad hominem): attacking a person’s character instead of the content of that person’s argument.

Argument from Ignorance (argumentum ad ignorantiam): concluding that something is true since you can’t prove it is false.

Appeal to Pity (argumentum ad misericordiam): appealing to a person’s unfortunate circumstance as a way of getting someone to accept a conclusion.

Appeal to the Masses (argumentum ad populum): going along with the crowd in support of a conclusion.

Appeal to Authority (argumentum ad verecundiam): appealing to a popular figure who is not an authority in that area

Irrelevant Conclusion (non sequitur): drawing a conclusion which does not follow from the evidence.

OTHER COMMON FALLACIES

False Cause (post hoc ergo propter hoc): inferring a causal connection based on mere correlation.

Circular Reasoning: implicitly using your conclusion as a premise.

Equivocation: an argument which is based on two definitions of one word.

Composition: assuming that the whole must have the properties of its parts.

Division: assuming that the parts of a whole must have the properties of the whole.

Red Herring: introducing an irrelevant or secondary subject and thereby diverting attention from the main subject.

Straw Man: distorting an opposing view so that it is easy to refute.

Instructions: In each of the following identify the logical connective being used and translate the proposition into standard form.

(15) Father Joe's marriage to Beth implies that he first leaves the priesthood.

(16) I was accepted at Yale University, but I'd much rather attend Thrift Community College.

(17) Bob's name does not appear on Santa's "nice" list.

Instructions: Determine which of the following are well-formed nested propositions.

(18) if P then (Q or R)

(19) (P and Q) not

(20) not (P or Q)

(21) P and (if Q then R)

Logical Connectives

Conjunction: P and Q

Disjunction: P or Q

Conditional: if P then Q

Negation: not P

Conjunction Clue Words ("And")

P, but Q

P, although Q

P; Q

P, besides Q

P, however Q

P, whereas Q

Conditional Clue Words ("If-Then")

If P, it follows that Q

P implies Q

P entails Q

Whenever P, Q

P, therefore Q

Q follows from P

Q, since P

Instructions: Translate the following premises and conclusions into standard form and decide which valid argument form or fallacious argument form is being used.

- (22) If the band “Satan’s Pitchfork” performs in town, they will play “Hell, Sweet Hell.” If they perform “Hell, Sweet Hell” then dudes will stage dive. Therefore, if they perform, dudes will stage dive.
- (23) Either Bob will go bankrupt, or I will. Bob will go bankrupt. Therefore, I will not.
- (24) If Joe flunks out of college, then his brother Bob will inherit the family business. Joe will not flunk out of college. Therefore, Bob will not inherit the family business.

Instructions: Make up a valid argument that leads to the conclusion given. Use the rule indicated in parentheses. You will need to invent some simple

proposition to make your premises complete.

- (25) Joe will fail his exam. (modus ponens)
- (26) Polly wants a cracker. (disjunctive syllogism)
- (27) If you insult Beth’s mother, you will go to the hospital. (hypothetical syllogism)
- (28) Thrift Community College is not a good school. (modus tollens)

Modus Ponens

premise (1) If P then Q
premise (2) P
concl. (3) Therefore, Q

Modus Tollens

premise (1) If P then Q
premise (2) Not Q
concl. (3) Therefore, not P

Disjunctive Syllogism (two versions)

premise (1) P or Q

premise (2) not P
concl. (3) therefore, Q

Hypothetical Syllogism

premise (1) if P then Q
premise (2) if Q then R
concl. (3) Therefore, if P then R

Instructions: Are the following arguments valid, invalid, sound, or unsound?

(29) If Fido is a Dalmatian, then Fido would have lots of spots
It is not the case that Fido is a Dalmatian
Therefore, it is not the case that Fido has lots of spots

(30) If Joseph Stalin had U.S. citizenship, then he would have been born in the U.S.
It is not the case that Joseph Stalin was born in the U.S.
Therefore, it is not the case that Joseph Stalin had U.S. citizenship.

Instructions: The following test your understanding of soundness.

(31) Can a valid argument have a false conclusion?
(32) Can a sound argument have a false conclusion?

Modus Ponens

premise (1) If P then Q
premise (2) P
concl. (3) Therefore, Q

Modus Tollens

premise (1) If P then Q
premise (2) Not Q
concl. (3) Therefore, not P

Disjunctive Syllogism (two versions)

premise (1) P or Q
premise (2) not P
concl. (3) therefore, Q

Hypothetical Syllogism

premise (1) if P then Q
premise (2) if Q then R
concl. (3) Therefore, if P then R

Instructions: What is the inductive strength of each of the following (that is, very strong, strong, weak, very weak)?

- (33) Some notable guitarist have died in their 20s. Joe is a notable guitarist. Therefore, Joe will probably die in his 20s.
- (34) College dropouts make \$1 million less during their careers than college graduates. Joe is a college dropout. Therefore, Joe will probably make around \$1 million less during his career than an average college graduate.
- (35) 45% of Americans go to church at least once a month. Joe is an American. Therefore Joe will probably go to church this month.

Inductive Probability

Inductively very strong:
probability is close to certain.

Inductively strong: probability is high.

Inductively weak: probability is low.

Inductively very weak:
probability is close to non-existent.

Instructions: For each of the following, indicate the inductive argument form that is followed, and whether it commits any inductive fallacy.

(36) Joe and Bob live in the same town, listen to the same music, and like the same sports teams. Joe is Presbyterian. Therefore, Bob is probably also Presbyterian.

(37) 60% of college students in the U.S. are women. Preppy State University is a U.S. College. Therefore, there is a very high probability that the next student who walks out of Preppy State's student center will be a woman.

(38) 100% of 20 randomly surveyed adults in the small town of Hornbeak, Tennessee shop at Walmart. Therefore, 100% of Americans shop at Walmart.

Statistical induction: drawing a conclusion about a population based on a statistically acceptable sample.

premise (1) n percent of a sample has attribute A.

concl. (2) Therefore, n percent of a population probably has attribute A.

Fallacy of small sample: a conclusion is too strong to be supported by a small sample number.

Fallacy of biased sample: a conclusion is too strong to be supported by a nonrandom sampling technique.

Statistical syllogism: drawing a conclusion about an item based on statistics about the population as a whole.

premise (1) n percentage of a population has attribute A.

premise (2) x is a member of that population.

concl. (3) Therefore, there is an n percent probability that x has A.

Fallacy of small proportion: a conclusion is too strong to be supported by the small population proportion with the attribute.

Argument from Analogy: drawing a conclusion about one item based on its similarities with another item.

premise (1) Objects x and y each have attributes A, B and C.

premise (2) Object x has an additional attribute D.

concl. (3) Therefore, object y probably also has attribute D.

Fallacy of false analogy: comparing two items that have trivial points in common, but differ from each other in more significant ways.