Name: _____ **Date:** _____

Answer Key: Reasoning Rigor: The Senior Scholar's Logic Quest

Syllogistic validity, nuanced informal fallacies, and Bayesian probability — rigorous evaluation of complex claims to sharpen academic discernment for college readiness.

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1. In the context of the 'Gambler's Fallacy,' if a fair coin has landed on heads five times in a row, what is the logically sound evaluation of the next flip?

Answer: B) The probability remains 0.5 for heads and 0.5 for tails.

Each flip of a fair coin is an independent event; past outcomes do not influence the mathematical probability of future occurrences in a random system.

2. An argument can be logically valid even if all of its premises are factually false.

Answer: A) True

Validity refers only to the structural relationship between premises and conclusion; if the conclusion must follow from the premises (regardless of their truth), the argument is valid.

3. Assess this scenario: A politician argues that we should not listen to a scientist's report on oceanography because the scientist once failed their driving test. This is an example of a(n) _____ fallacy.

Answer: C) Ad Hominem Abusive

This is an Ad Hominem Abusive fallacy because it attacks a personal character trait irrelevant to the scientist's professional expertise and the argument at hand.

4. Analyze the following: 'If the treaty is signed, trade will increase. Trade has increased. Therefore, the treaty was signed.' Which formal fallacy is committed?

Answer: B) Affirming the Consequent

This is 'Affirming the Consequent.' Just because the outcome (consequent) occurred does not prove the specific condition (antecedent) caused it; trade could have increased for other reasons.

5. A researcher assumes that because a specific urban neighborhood has a high crime rate, any individual resident from that neighborhood is likely to be a criminal. This error in logic is known as the _____.

Answer: D) Ecological Fallacy

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The Ecological Fallacy occurs when one makes inferences about individuals based solely on aggregate data from the group to which they belong.

6. In formal logic, the law of non-contradiction states that contradictory propositions cannot both be true in the same sense at the same time.

Answer: A) True

This is a fundamental principle of Aristotelian logic, asserting that 'A' and 'not A' are mutually exclusive.

7. Evaluate the strength of this inductive argument: 'Every observed tiger in the wild has stripes. Therefore, the next tiger we see will have stripes.'

Answer: B) Strong/Cogent

Inductive arguments are evaluated by strength and cogency. Because the sample size (all observed tigers) is large and consistent, the conclusion is highly probable, making it strong and cogent.

8. In Bayesian reasoning, if you receive new evidence that contradicts an initial hypothesis, you must update your _____ probability to reach a posterior probability.

Answer: C) Prior

Prior probability (or 'priors') represents the initial estimate of the likelihood of an event before new evidence is considered.

9. Which of the following scenarios best demonstrates the 'Sunk Cost Fallacy'?

Answer: A) Investing more money into a failing business because you have already invested a million dollars.

The Sunk Cost Fallacy occurs when people continue an endeavor as a result of previously invested resources (time, money, effort), even if the current costs outweigh the benefits.

10. A Reification Fallacy occurs when an abstract concept (like 'The Government' or 'Nature') is treated as if it were a concrete, sentient entity with motives.

Answer: A) True

Reification (or concretism) involves treating a conceptual abstraction as a physical thing or a person with agency.