

Check Your Understanding 2.3 (Day 1 — Begin in Class)

These problems cover valid, sound, and invalid arguments introduced today. Students begin in the last 10–15 minutes of class.

Basic	Intermediate	Advanced
<i>Valid / Sound / Invalid — Basic</i> 1. Identify each argument as valid, sound, or invalid: <i>a. All squares have four sides. This shape is a square. ∴ This shape has four sides.</i> <i>b. All dogs are animals. All cats are animals. ∴ All cats are dogs.</i> <i>c. All unicorns can fly. Sparkle is a unicorn. ∴ Sparkle can fly.</i>	<i>Valid / Sound / Invalid — Intermediate</i> 2. Explain the difference between a valid argument and a sound argument. Use one of the arguments from problem 1 to illustrate the difference. 3. Argument c above (Sparkle the unicorn) is valid but not sound. What would need to be true for it to be sound?	<i>Valid / Sound / Invalid — Advanced</i> 4. A student claims: "If an argument has a true conclusion, it must be sound." Is this correct? Explain, and give a counterexample if it is wrong. 5. Write your own example of a valid but unsound argument. Then write a sound argument on the same topic.

CYU 2.3 Day 1 — Answer Key

1a. Sound — valid structure (law of detachment) and true premises.

1b. Invalid — undistributed middle. Sharing the property 'animals' doesn't make dogs and cats the same thing.

1c. Valid but not sound. The logic holds — if both premises were true, the conclusion would have to be true. But unicorns don't exist, so the first premise is false.

2. Valid = conclusion necessarily follows from premises (correct structure). Sound = valid AND all premises actually true. 1c illustrates the difference: valid structure, false premise, therefore not sound.

3. For it to be sound, unicorns would need to actually exist and actually be able to fly — both premises would need to be true.

4. Incorrect. A true conclusion does not guarantee soundness or even validity. Counterexample: 'All fish are animals. Dogs are animals. ∴ Dogs are fish.' — conclusion is false, but even if you modified the conclusion to something true by accident, the structure would still be invalid (undistributed middle).

5. Answers vary. Check: valid but unsound has correct structure with at least one false premise. Sound has correct structure and all premises true.