

For each of the following questions, seven possible answers are provided, but only one of them is correct: circle the corresponding letter.

Answers are marked with ●.

The symbols X , Y , and Z are used below to represent statements (e.g., “These pretzels are making me thirsty”).

1. If you know that X implies Y , then you can also conclude that:
 - (A) X is true, and Y is also true.
 - (B) X cannot be false.
 - (C) Y cannot be false.
 - (D) At least one of X and Y is true.
 - (E) If Y is true, then X is true.
 - (F) ● If Y is false, then X is false.
 - (G) If X is false, then Y is false.

2. Which of the following strategies is *not* a valid way to show that “ X implies Y ”?
 - (A) Assume that X is true, and then use this to show that Y is true.
 - (B) Assume that Y is false, and then use this to show that X is false.
 - (C) Show that either X is false, or Y is true, or both.
 - (D) Assume that X is true and Y is false, and deduce a contradiction.
 - (E) ● Assume that X is false and Y is true, and deduce a contradiction.
 - (F) Show that X implies some intermediate statement Z , and then show that Z implies Y .
 - (G) Show that some intermediate statement Z implies Y , and then show that X implies Z .

3. If you want to *disprove* the claim that “ X implies Y ”, you need to show that:
 - (A) Y is true, but X is false.
 - (B) ● X is true, but Y is false.
 - (C) X is false.
 - (D) Y is false.
 - (E) Both X and Y are false.
 - (F) Exactly one of X and Y is false.
 - (G) At least one of X and Y is false.

4. If you want to *disprove* the claim that “Both X and Y are true”, you need to show that:
 - (A) X does not imply Y , and Y does not imply X .
 - (B) X is true if and only if Y is false.
 - (C) X is false.
 - (D) Y is false.
 - (E) Both X and Y are false.
 - (F) Exactly one of X and Y is false.
 - (G) ● At least one of X and Y is false.

Adapted from a quiz by Terence Tao at <http://scherk.pbwiki.com/>.