

Problem 1. Let X mean “Ellen lives in Los Angeles” and let Y mean “Ellen lives in California”. Is the sentence $Y \implies X$ true or false?

- A) True B) False C) Who’s Ellen?

Problem 2. Let X be the sentence “The object in Jonathan’s right hand is a pen.” and let Y be the sentence “The object in Jonathan’s right hand is a writing implement.” Which of the following sentences are true?

- A) X implies Y B) Y implies X C) Both D) Neither

Solution. When I was holding a pen, the answer was C). When I was holding chalk, the answer was A). When I was holding sunglasses, the answer was C).

When you couldn’t see what I was holding, the best answer was A). However, the best thing to do in this situation was to ask for clarification: you can’t tell whether Y implies X unless you know what is in my hand. \square

Problem 3. Re-express the intended meaning of the sentence “If x is divisible by 4 then x is divisible by 2” as precisely as possible.

Solution. First interpretation: Every integer that is divisible by 4 is also divisible by 2.

Second interpretation: For every integer x , if x is divisible by 4 then x is divisible by 2.

Third interpretation: Each of the sentences in the infinite collection of sentences below is true:

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If -1 is divisible by 4 then -1 is divisible by 2.

If 0 is divisible by 4 then 0 is divisible by 2.

If 1 is divisible by 4 then 1 is divisible by 2.

If 2 is divisible by 4 then 2 is divisible by 2.

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