

Math 2326 - Introduction to Abstract Mathematics
Assignment 2 - Due Wednesday, January 23

Problem 7: In class it was asserted that an implication and its converse are *not* logically equivalent. Prove this assertion.

Problem 8: Let P , Q and R be statements.

- a. Show that “ $(P$ or $Q)$ and R ” is logically equivalent to “ $(P$ and $R)$ or $(Q$ and $R)$.”
- b. Are the statements “ $(P$ and $Q)$ or R ” and “ $(P$ or $R)$ and $(Q$ or $R)$ ” logically equivalent?

Problem 9: Consider the statement “If a is an even integer and b is an odd integer then $a + b$ is an odd integer.”

- a. Formulate the converse of this statement.
- b. Is the statement or its converse true?
- c. Prove your answer to part (b).

Problem 10: Let A denote the statement “The sum of two even integers is an even integer.”

- a. The statement A is an implication. Rewrite it in a way to make this obvious (i.e. in “if/then” form).
- b. Use your answer to part (a) to express the converse of A in a sentence.
- c. Is the converse of A true? Prove your answer.

Problem 11: Let B denote the statement “If n is an odd integer then n^2 is an odd integer.”

- a. Formulate the contrapositive of B . Write it without using the word “not.”
- b. Prove that the contrapositive of B is true.