CSCI 246: Assignment 1
Due: February 2, 2026

Name: _____

Problem 1 (6 points). Give definitions to the following terms, and give 3 examples that satisfy the definiton and 3 that do not.

    A. *even.*

    B. *odd.*

    C. *divisible.*

    D. *prime.*

    E. *composite.*

    F. *perfect square.*

Problem 2 (5 points). Rewrite the following statements to be in the if-then form. For each statement, determine if the statement is always true, always false, or sometimes true.

    A. Every square is a rectangle.

    B. The sum of three odd numbers is odd.

    C. Perfect squares are composite.

    D. Polygons are triangles.

    E. The sum of positive numbers is negative.

Problem 3 (4 points). Show that for any statements A, B, and C that

$$(A \text{ or } B) \Rightarrow C$$

is equivalent to

$$(A \implies C) \text{ and } (B \implies C)$$

Problem 4 (5 points). Prove that a^2 is *odd* if and only if a is *odd*.

Problem 5 (10 points). Prove or provide a counter example to the statement:
   a is *odd* if and only if $a^2 + 2a + 1$ is *even*.

Problem 6 (10 points). Prove or provide a counter example to:
   a is *even* if and only if $a^2 + 2a + 1$ is *even*.

Problem 7 (10 points). Prove or provide a counter example to the statement:
Every integer greater than or equal to 2 is prime or composite.

Problem 8 (10 points). Prove or provide a counter example to the statement:
For $0 \leq c < a$, if a *divides* b, then a divides $b + c$ if and only if $c = 0$.