Analyzing Related Statements to Understand Logical Implications

Below are three "quartets" of conditional statements. Read them carefully and do the following:

1. Determine whether the four statements of each quartet are true or false. Use Euler Diagrams to visualize the statements.

2. For each implication, analyze the relationship between the set satisfying the hypothesis statement and the set satisfying the conclusion statement.

3. Can you draw any conclusions about these set relationships and the truth of the implication itself?

4. Compare and contrast your conclusions within each quartet. Are the statements within each quartet related to one another?

5. Compare and contrast your conclusions across each quartet.

A1. *If a number is a multiple of 3, then it is a multiple of 6.*

A2. *If a number is a multiple of 6, then it is a multiple of 3.*

A3. *If a number is not a multiple of 6, then it is not a multiple of 3.*

A4. *If a number is not a multiple of 3, then it is not a multiple of 6.*

B1. *If a triangle is not acute, then it is obtuse.*

B2. *If a triangle is obtuse, then it is not acute.*

B3. *If a triangle is not obtuse, then it is acute.*

B4. *If a triangle is acute, then it is not obtuse.*

C1. *If a quadrilateral is a rectangle, then it is a square.*

C2. *If a quadrilateral is a square, then it is a rectangle.*

C3. *If a quadrilateral is not a square, then it is not a rectangle.*

C4. *If a quadrilateral is not a rectangle, then it is not a square.*