

Math 2283 - Introduction to Logic

Quiz #13 - 2006.11.06

Solutions

Find a structure in which the following wff is false:

$$\exists y (Wy \Rightarrow Sy) \Rightarrow (\exists y Wy \Rightarrow \exists y Sy)$$

Note: You cannot use the example from the book!

Consider the domain $D = \{9, 15, 16\}$

Define Sy : y is prime.

Define Wy : y is even.

To make the left side of the main conditional true, we need to find a y in the domain such that the statement $Wy \Rightarrow Sy$ is true. This can be done by letting $y = 9$ or $y = 15$. To make the right side of the conditional false, notice that $\exists y Wy$ is satisfied by $y = 16$ and notice that $\exists Sy$ is false.

Thus we have

$$T \Rightarrow (T \Rightarrow F)$$

which is false.