

MAT-CSC A67: Discrete Mathematics — Summer 2024

Quiz 2

Due Date: Friday, May 24, 11:59 PM, on Crowdmark

Q1. Consider the following predicates.

- $I(x)$: “ x is interesting”
- $U(x)$: “ x is useful”
- $M(x, y)$: “ x has more students than y ”

Find the appropriate predicate logic form for the statements “all interesting MATH classes are useful,” “there are some interesting MATH classes that are useful,” and “every interesting MATH class has more students than any non-interesting MATH class”. The domain is the set of MATH classes.

Q2. Consider the claim “if ab is an even number, then a or b is even.” Which of the following proofs is a valid proof of this claim?

1. Assume that a or b is even - say it is a (the case where b is even will be identical). That is, $a = 2k$ for some integer k . Then $ab = (2k)b = 2(kb)$. Thus, ab is even.
2. Assume a and b are odd. Choose k and m such that $a = 2k + 1$ and $b = 2m + 1$. Then $ab = (2k + 1)(2m + 1) = 4km + 2k + 2m + 1 = 2(2km + k + m) + 1$. Therefore, ab is odd.