

Math 270 - Basic Discrete Mathematics
Practice Quiz on Section 4.2

Solutions

Directions: Answer the problem given below.

1. Prove that for all integers m and n , if m is odd and n is even then $4m + 5n$ is even.

Proof: Suppose m and n are arbitrary integers, m is odd, and n is even. By definition of odd, there is an integer k such that $m = 2k + 1$, and by definition of even, there exists an integer l such that $n = 2l$.

Then

$$\begin{aligned} 4m + 5n &= 4(2k + 1) + 5(2l) \\ &= 8k + 4 + 10l \\ &= 2(4k + 2 + 5l). \end{aligned}$$

Then since $k, l \in \mathbb{Z}$, $4k + 2 + 5l \in \mathbb{Z}$ by closure, so $4m + 5n$ is even by definition. Since m, n are arbitrary, the proof is complete. \square