

Math 142
Test #2 Practice Proofs
Spring 2024

1. If m is divisible by 4 and n is any even integer, then $m \cdot n$ is divisible by 8.

Test Hypothesis:

2. If n^2 is even, then n is even. (HINT: Use an indirect proof).

Test Hypothesis:

3. Prove that if n is odd, the sum of itself and its square is even.

Test Hypothesis:

4. Prove using an ***indirect*** proof, the following:

If $m + n$ is odd, then m or n must be even.

Test Hypothesis:

5. For any integer n , $n - 3n$ is always even. (**HINT: Use both cases for n , when n is even and when n is odd**).

Test Hypothesis:

6. Prove using induction that $1^3 + 2^3 + 3^3 + \dots + n^3 = \left[\frac{n(n+1)}{2} \right]^2$

Test Hypothesis:

Proof by Induction: