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 $1^3 + 2^3 + 3^3 + \ldots + n^3 = \left[\dfrac{n(n+1)}{2}\right]^2$

Test Hypothesis:

Proof by Induction: