Assignment 7

1. Prove: If n = 25, 100, 169, then n is a perfect square and is the sum of

two perfect squares.

n = 25 n = 100 n = 169

√25 = 5 √100 = 10 √169 = 13

25 = 9 + 16 100 = 36 + 64 169 = 144 + 25

√9 = 3 √36 = 6 √144 = 12

√16 = 4 √64 = 8 √25 = 5

True: Proof by Exhaustion

2. Prove: The sum of two odd integers is even. Hint: By definition, even

integers can be expressed as 2n, thus odd integers can be expressed as 2n + 1

x = 2a + 1

y = 2b + 1

x + y – even

(2a + 1) + (2b + 1) - even

2a + 2b + 2 – even

2(a + b + 1) - even

a + b + 1 = c

2c – even

True;

3. Prove: The sum of an even integer and it's square is even.

2n + (2n)2 - even

2n + 4n2 - even

2(n + 2n^2) - even

n + 2n2 = a

2a – even

True;

4. Prove by Contradiction: If n squared is odd, then n is odd.

n2 can’t be odd.

n2 is odd, by contradiction -> n2 isn’t odd.

n2 = 2a ! odd

n2 = (2a)2 ! odd

n2 = 4a^2 ! odd

n2 = 2(2a2) ! odd

2a2 = b

n2 = 2b ! odd -> true