Worksheet 7 (Take Home)

November 30, 2021

1. Suppose 3m is a sum of 4 squares, then prove that m is also a sum of 4 squares.

2. As discussed in Lecture 16, complete the proof of the following theorem:

   Let $n = 2^{\alpha} \prod_{i=1}^{k} p_i^{\alpha_i} \prod_{j=1}^{m} q_j^{\beta_j}$, where p_i, q_j are distinct primes, and $p_i \equiv 1 \ mod\ 4$ and $q_j \equiv 3 \ mod\ 4$, then n is a sum of 2 squares if and only if all exponents β_j are even.