Math 3040, Problems
due February 20, 2014

We proved the following in class;

Theorem 1. *If a, b, c are positive integers, with no common prime factors such that $a^2 + b^2 = c^2$, then there are two positive other integers $m > n$, such that*

$$a = 2mn, \quad b = m^2 - n^2, \quad c = m^2 + n^2,$$

possibly reversing the roles of a and b.

We say that the three positive integers a, b, c are a *Pythagorean triple* if $a^2 + b^2 = c^2$.

Problems:

1. For a Pythagorean triple a, b, c, where a is even and they have no common factor, prove that $c + a$ and $c - a$ are perfect squares.

2. For a Pythagorean triple a, b, c, where a is even and a, b, c have no common integer factor, show how to find the m and n of the Theorem.

3. Find, with proof, all the Pythagorean triples $a < b < c$, where $c = 65$.

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