Indeterminate Equation

The Factorization Method

Learn how to solve this *type* of problems, not just this problem.

1. Find the number of different rectangles whose sides lengths are all integers and areas are 2015.

2. Find the number of positive integers solutions to $x^2 - y^2 = 105$.

   (Ref Ref 163)

3. Determine all positive integers m and n such that $m^2 + 1$ is a prime number and $10(m^2 + 1) = n^2 + 1$.

   (Ref Ref 2821)

4. For positive integers n and m, each exterior angle of a regular n-sided polygon is 45 degrees larger than each exterior angle of a regular m-sided polygon. One example is $n = 4$ and $m = 8$ because the measures of each exterior angle of a square and a regular octagon are 90 degrees and 45 degrees, respectively. What is the greatest of all possible values of m?

   (Ref Ref 1116: 2014 MathCounts)

5. Let b and c be two positive integers, and a be a prime number. If $a^2 + b^2 = c^2$, show that $a < b$ and $b + 1 = c$.

   (Ref Ref 157: 1982 Germany Olympiad)