## 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 $10\left(m^{2}+1\right)=$ $n^{2}+1$.
(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)
