Discrete Mathematics and Applications

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Hanoi 2010
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1   Assignment No. 1: proofs

Due: Wednesday, Sep. 15

Please submit your answer in a neat, readable properly organized format.
In general, a * in exercises indicates a more challenging problem.

1. Prove that if a,b are real positive numbers then $a^2 + b^2 \geq 2ab$

2. Prove that if a,b,c are real positive numbers then $a^3 + b^3 + c^3 \geq 3abc$

3. Let $S = \{n | n = a^2 + b^2, \ a, b, n \in N, \ a, b > 0\}$
   Find an integer m such that $\{m, m + 1, m + 2\} \subset S$

4. * Prove that there are infinitely many integers m for which $\{m, m+1, m+2\} \subset S$