



Examination 1

Subject : Elementary Number Theory
Date : 15 April 2009
Time : 10:20 – 12:00 A.M
Room : S. 305
Lecturers : 1. Turmudi, Ph.D.
2. Al Jupri, M.Sc.

Direction: Solve each problem below!

1. Prove each of the following statements using mathematical induction.
 - a. If n is an integer with $n \geq 5$, then $2^n > n^2$.
 - b. $2^n \leq (n+1)!$
2. Prove or disprove the following statements.
 - a. If p, q, r , and s are integers such that $p \mid q$ and $r \mid s$, then $pr \mid qs$.
 - b. Let p, q , and r are integers. $p \mid q$ if and only if $pr \mid qr$.
 - c. Every even integer greater than 4 can be expressed as the sum of two distinct prime numbers.
 - d. Let p, q, r , and s are integers. If $p \mid r$ and $q \mid r$, then $pq \mid r$.
 - e. Let m, n, p are integers, with p prime. If $p \mid mn$, then $p \mid m$ or $p \mid n$.
3. Find the greatest common divisor (gcd) and the least common multiple of 25174 and 42722. Express the gcd as an integral linear combination of the original integers.