



**JURUSAN PENDIDIKAN MATEMATIKA  
FAKULTAS PENDIDIKAN MATEMATIKA DAN IPA  
UNIVERSITAS PENDIDIKAN INDONESIA**

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**Final Examination**

**Subject** : Elementary Number Theory  
**Date** : 3 July 2009  
**Time** : 13:00- 14:40 P.M  
**Lecturers** : 1. Turmudi, Ph.D.  
2. Al Jupri, M.Sc.

**Direction:** Solve each problem below!

1. Prove each statement below.
  - a. Let  $a, b, c, d \in \mathbb{Z}$ . If  $a \equiv b \pmod{m}$  and  $c \equiv d \pmod{m}$ , then  $ac \equiv bd \pmod{m}$ .
  - b. Let  $a$  be an odd integer. Prove that  $a^2 \equiv 1 \pmod{8}$ . Deduce that  $a^2 \equiv 1 \pmod{4}$ .
2. Prove or disprove each of the following statements.
  - a. If  $a \equiv b \pmod{6}$ , then  $a^2 \equiv b^2 \pmod{36}$ .
  - b. If  $a \equiv b \pmod{7}$ , then  $a \equiv (5b - 7) \pmod{7}$ .
  - c. If today is Friday, then  $11^{736}$  days more is Sunday.
3. Find all solutions of the congruence  $16x \equiv 8 \pmod{28}$ .
4. Find solution(s) of the system of congruences below.
$$x \equiv 2 \pmod{3}$$
$$x \equiv 1 \pmod{5}$$
$$x \equiv 4 \pmod{7}$$