

KING SAUD UNIVERSITY

COLLEGE OF COMPUTER & INFORMATION SCIENCES

DEPT OF COMPUTER SCIENCE

CSC281 Discrete Mathematics for CS Students

Second Semester 1437/1438 AH

(Spring 2017)

Second midterm Examination:

Tue 02.05.2017 C.E. (Time: 5-6:30 pm)

Instructor:

Dr. Aqil Azmi

Name:

ID:

1. [Marks 15]

Use fast modular exponentiation to compute $123^{1001} \bmod 101$. Show all details.

2. [Marks 15]

Solve the equation $6x \equiv 14 \bmod 89$. Show all details.

3. [Marks 20]

Suppose that a and b are integers, $a \equiv 11 \bmod 19$, and $b \equiv 3 \bmod 19$. Find the value of integer x such that $0 \leq x < 19$, where

(a)	$x \equiv 13a \bmod 19$	
(b)	$x \equiv 8b \bmod 19$	
(c)	$x \equiv (a - b) \bmod 19$.	
(d)	$x \equiv 7a + 3b \bmod 19$	
(e)	$x \equiv -b \bmod 19$.	

4. [Marks 10]

Let a, b, n be integers. Prove that if $a \equiv b \bmod n$ then $a^2 \equiv b^2 \bmod n$.

5. [Marks 10]

Write the inverse of the following numbers in modulo 10. If there is no inverse then write X. NOTE: b is the inverse of a in modulo n if $ab \equiv 1 \bmod n$.

a	1	2	3	4	5	6	7	8	9
inverse									

6. [Marks 20]

Use the Chinese Remainder Theorem to solve the two equations: $x \equiv 3 \bmod 5$ and $x \equiv 2 \bmod 8$. Show all the steps.

7. [Marks 10]

Compute $\gcd(30124, 476)$. Show all the steps.