KING SAUD UNIVERSITY

COLLEGE OF COMPUTER & INFORMATION SCIENCES
DEPT OF COMPUTER SCIENCE

CSC281 Discrete Mathematics
Second Semester 1438/1439 AH
Second Midterm Examination: Thursday 5.04.2018 C.E. (7-8:30 pm)
Instructor: Dr. Aqil Azmi

S/N: **Name:** **ID:**

1. [Marks 10]
Write the inverse *y* of all elements *x* in modulo 10. That is $x * y \equiv 1 \bmod 10$.

x	1	2	3	4	5	6	7	8	9
y									

2. [Marks 10]
Solve the equation $x^2 \equiv 3 \bmod 11$. Find all the solutions.

3. [Marks 20]
Use the Chinese Remainder Theorem to solve the following equations:
$x \equiv 2 \bmod 5$
$x \equiv 3 \bmod 8$
$x \equiv 5 \bmod 9$.

4. [Marks 15]
Express the $\gcd(128, 81)$ as a linear combination of 128 and 81.

5. [Marks 10]
If p, q are two different primes, show that if $a \equiv b \bmod p$ and $a \equiv b \bmod q$, then $a \equiv b \bmod pq$.

6. [Marks 10]
Suppose *x* is rational, and *y* is irrational. Using proof by contradiction show that *x* + *y* is irrational.

7. [Marks 10]
Consider the statement: if $a|bc$ then $a|b$ or $a|c$. Use counter example to show this statement is wrong.

8. [Marks 15]
Calculate $15^{1000} \bmod 97$. Show all the steps.