

Course No: SWE1303
Course Title: Discrete Math.
Date: 26/03/2015
No. of Questions: (04)
Time: 1:30 H:MM
Using Calculator (YES)

University of Palestine

Mid Sem. Exam
2014/2015
Total Grade: 20 Marks

Instructor Name: Dr. Ibrahim Tabash
Student No.: _____
Student Name: _____
College Name: _____
Dep. / Specialist: _____
Using Dictionary (No)

Q1

- A) Determine whether each of these conditional statements is true or false.
- a) If $1 + 1 = 2$, then $2 + 2 = 5$.
 - b) If $1 + 1 = 3$, then $2 + 2 = 4$.
 - c) If $1 + 1 = 2$, then $2 + 2 = 5$.
 - d) If monkeys can fly, then $1 + 1 = 3$.
- B) How many rows appear in a truth table for each of these compound propositions?
- a) $(q \rightarrow \neg p) \vee (\neg p \rightarrow \neg q)$
 - b) $(p \vee \neg t) \wedge (p \vee \neg s)$
 - c) $(p \rightarrow r) \vee (\neg s \rightarrow \neg t) \vee (\neg u \rightarrow v)$
 - d) $(p \wedge r \wedge s) \vee (q \wedge t) \vee (r \wedge \neg t)$
- c) Construct a truth table for each of these compound propositions.
- a) $p \leftrightarrow \neg p$
 - b) $(p \leftrightarrow q) \vee (\neg q \leftrightarrow r)$

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Q2

A) Show that the following propositions are logically equivalent by developing a series of logical equivalences.

- 1) $\neg(p \vee (\neg p \wedge q))$ and $\neg p \wedge \neg q$
- 2) $\neg(p \oplus q)$ and $p \leftrightarrow q$

B) Determine the truth value of each of these statements if the domain consists of all real numbers.

- a) $\exists x(x^3 = -1)$
- b) $\exists x(x^4 < x^2)$
- c) $\forall x((-x)^2 = x^2)$

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Q3

- A) List all the steps used to search for 9 in the sequence 1, 3, 4, 5, 6, 8, 9, 11 using a binary search.

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Q4

A) Find $a \text{ div } m$ and $a \text{ mod } m$ when $a = -111$, $m = 99$.

B) Decide whether each of these integers is congruent to 5 modulo 17

a) 80

c) -29