



PHILADELPHIA UNIVERSITY
DEPARTMENT OF BASIC SCIENCES

First Exam A

DISCRETE STRUCTURES

01-04-2009

Part 1 Each problem is worth 2 points. Circle one answer.

- 1) The proposition $(p \leftrightarrow q) \vee (p \oplus q)$ is an example of
 - a) tautology
 - b) contradiction
 - c) contingency
 - d) contrapositive
- 2) Convert the proposition $(\neg p \rightarrow q) \rightarrow \neg p$ to CNF.
 - a) $(\neg p \vee \neg q) \wedge (p \vee \neg q)$
 - b) $(\neg p \vee q) \wedge (p \vee \neg q)$
 - c) $(\neg p \vee \neg q) \wedge (\neg p \vee q)$
 - d) $(p \vee \neg q) \wedge (p \vee q)$
- 3) Let $P(x,y): y - x^2 < 0$. Which proposition is false?
 - a) $\exists x \forall y P$
 - b) $\forall x \exists y P$
 - c) $\exists y \forall x P$
 - d) $\forall y \exists x P$
- 4) Evaluate $\text{GCD}(3683, 2523)$.
 - a) 31
 - b) 29
 - c) 1
 - d) No correct answer
- 5) Convert the decimal number 4083 to hexadecimal.
 - a) EF6
 - b) FC6
 - c) EE3
 - d) FF3
- 6) Let $A = \{2,3,5,7\}$ and $B = \{1,3,4,7\}$. Then $\{2,5\} =$
 - a) $(A \oplus B) \oplus B$
 - b) $(A \oplus B) - B$
 - c) $(A \oplus B) \oplus A$
 - d) $(A \oplus B) - A$

Part 2 Each problem is worth 4 points. Write complete solution.

- 7) Find an explicit formula for the recurrence relation given by
$$\begin{aligned} f(0) &= 1 \\ f(1) &= 2 \\ f(n) &= -2 f(n-1) + 3 f(n-2) \end{aligned}$$
- 8) How many positive integers ≤ 1000 which are multiples of 9 or 12 or 15?

-Amin Witno