



PHILADELPHIA UNIVERSITY
DEPARTMENT OF BASIC SCIENCES

First Exam A

DISCRETE STRUCTURES

18-11-2008

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

- 1) Suppose $p \equiv F$ and $q \equiv T$. Which proposition is false?
a) $(\neg p \vee q) \rightarrow \neg p$ b) $(p \wedge q) \rightarrow \neg q$
c) $(p \vee \neg q) \rightarrow \neg p$ d) $(\neg p \vee \neg q) \rightarrow \neg q$
- 2) The proposition $(p \leftrightarrow q) \vee (p \oplus q)$ is an example of
a) tautology b) contradiction
c) contingency d) contrapositive
- 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) Which number is a common divisor of 30 and 18?
a) 0 b) 9
c) 6 d) 90
- 5) Evaluate $\text{LCM}(132, 18)$.
a) 738 b) 2214 c) 2376 d) 396
- 6) Convert the decimal number 2090 to hexadecimal.
a) 78A b) 7D9 c) 8D9 d) 82A

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

- 7) Convert the proposition $(p \oplus q) \rightarrow r$ to a CNF.
- 8) Prove by mathematical induction for all integer $n \geq 1$.

$$2 + 4 + 6 + 8 + 10 + \dots + 2n = n^2 + n$$