

Discrete Mathematics
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Exam 1
19-11-2003

1. Is the following a tautology, contradiction, or contingency?
Use Quine's method or the truth table.

$$(q \rightarrow p) \rightarrow (\neg q \leftrightarrow p)$$

2. Given the predicate $P(x,y): x^2 - y^2 \leq 0$ find the values of the following propositions.
(Circle your answer.)

- | | |
|---------------------------------|-------|
| a) $\forall x \forall y P(x,y)$ | T / F |
| b) $\forall x \exists y P(x,y)$ | T / F |
| c) $\exists x \forall y P(x,y)$ | T / F |
| d) $\exists x \exists y P(x,y)$ | T / F |
| e) $\exists y \forall x P(x,y)$ | T / F |

3. Convert the proposition $(q \rightarrow \neg p) \leftrightarrow \neg q$ to a full CNF or DNF.

4. Convert the octal number 1053 to hexadecimal.