PHILADELPHIA UNIVERSITY
DEPARTMENT OF BASIC SCIENCES

Exam 1 **Set Theory** **14–11–2010**

Each solution must be complete in order to receive full credit.

1. Prove using truth table:

$$p \to (q \wedge r) \equiv (p \to q) \wedge (p \to r)$$

2. Prove using contrapositive:

If $3x^2 + 4x - 7$ is odd then x is even.

3. Prove by cases:

If x is any integer then $x^3 - 5x$ is even.

4. Prove by contradiction:

The number $\sqrt[4]{2}$ is irrational.

–Amin Witno