

PHILADELPHIA UNIVERSITY
DEPARTMENT OF BASIC SCIENCES

Exam 1

Set Theory

11-11-2013

1. Draw the truth table for the following proposition.

$$((p \iff q) \vee \neg r) \rightarrow q$$

2. Find the elements of each given set.

- (a) $\{1, 3, 4, 5, 7\} \oplus \{1, 2, 4, 5, 6\}$
- (b) $\{1, 2, 4, 5, 6\} - \{2, 4, 5, 7\}$
- (c) $\{x \in \mathbb{Z} \mid x^2 \leq 9\} \cap \mathbb{N}$
- (d) $\{X \in P(\{2, 3, 4\}) \mid |X| = 2\}$

3. Use direct proof to prove that if x is an odd number, then $(x - 2)^3$ is also odd.
4. Use contrapositive to prove that if $x^2 + 5$ is an irrational number, then $x + 5$ is also irrational.
5. Prove that the product of two integers is even if and only if one of them is even.

-Amin Witno