

PHILADELPHIA UNIVERSITY  
DEPARTMENT OF BASIC SCIENCES

Exam 1

Set Theory

30-03-2010

Solutions must be complete in order to receive full credit.

1. Is this argument valid? Prove it.

Premise 1:  $x$  is odd if and only if  $x$  is prime.

Premise 2:  $x$  is either composite or odd.

Conclusion:  $x$  is either prime or even.

2. Find an example to show that  $P(A \cup B) = P(A) \cup P(B)$  is false.

3. Prove that if  $x$  and  $y$  are both odd numbers, then  $x^2 + xy + y^2$  is odd.

4. Prove that if  $x^2 - x$  is irrational, so is  $x - 1$ .

-Amin Witno