Math 300 Intro Math Reasoning
Worksheet 02: Mathematical logic

(1) Consider the statement:

$\alpha =$"Every real solution of $x^2 + x - 6 = 0$ is positive."

(1) Formalize it using the propositional calculus.
(2) Give examples of sets of discourse A, B such that α is true in A and α is false in B.

(2) Write the negation of the following sentence **without** the negation symbol "$\neg$" and determine whether it is true or false in the set $\mathbb{R}$:

"$(\exists x(x > 5)) \Rightarrow (\forall y(y > -100))$."

(3) Compute $Tr^{\mathbb{N}}(\exists y,\ x + y = 4)$

(4) Prove that if a divides b then a divides $bc + ad$.