Homework 2

MATH 300 (due Feb 9) Feb 2, 2024

Problem 1. Formalize each of the following statements using the propositional calculus.

(a) Every real solution of $x^2 - 5x + 6 = 0$ is positive.

(b) Every prime number is greater than 1.

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Problem 2. For each of the following statements, write the negation of the sentences **without** the negation symbol "¬", and prove the negation:

1. $\exists\epsilon((\epsilon > 0) \wedge (\forall x(x > 0 \Rightarrow x > \epsilon)))$.

2. $\forall x((x > 5) \Leftrightarrow (\forall y(y > -100)))$.
   (Hint: Recall that $A \Leftrightarrow B \equiv (A \Rightarrow B) \wedge (B \Rightarrow A)$)

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Problem 3. Prove the following statement:

If both a and b are divisible by n, then $a - b$ is divisible by n.

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Problem 4. Prove the following implication:

If n is even then $n + 2$ is even.