Writing Assignment 1: Due Wednesday, January 31

Problem 1: Determine whether the statement

$$\text{"There exists } m, n \in \mathbb{Z} \text{ such that } 34m + 30n = 2\text{"}$$

is true or false. Explain your reasoning thoroughly in complete sentences.

Problem 2: In this problem, you will show that the statement

$$\text{"There exists } x \in \mathbb{Z} \text{ with } x^4 + x^2 - 5x + 2 = 0\text{"}$$

is false.
a. Using inequalities (no graphs or calculus) and complete sentences, carefully argue that if $x \in \mathbb{Z}$ and $x \leq 0$, then $x^4 + x^2 - 5x + 2 > 0$.
b. Using inequalities (no graphs or calculus) and complete sentences, carefully argue that if $x \in \mathbb{Z}$ and $x \geq 2$, then $x^4 + x^2 - 5x + 2 > 0$.
c. Show that the given statement is false.

Problem 3: In this problem, you will show that the statement

$$\text{"For all } a, c \in \mathbb{R}, \text{ there exists } x \in \mathbb{R} \text{ with } ax = c\text{"}$$

is false.
a. Write the negation of the statement so that no "not" appears.
b. Show that the given statement is false by arguing that its negation is true.