MA 350 Number– Spring 2024

Homework 1

Due: January 26, 2024

Submit your written work in Canvas as a single PDF file. Show your work. Answers with no work will get zero credit.

1. Determine the value of $[x] + [-x]$ where $x \in \mathbb{R}$.
2. Show that if the square of an integer is odd then the integer is odd. (Hint: Use the method of contradiction.)
3. Let c be an odd integer. Show that the equation $x^2 + x + c = 0$ has no integer solutions.
4. Show that, if $a|bc$ and $\gcd(a, b) = 1$ then $a|c$.
5. Use mathematical induction to prove that, for all positive integers m and n,
$$F_m F_n + F_{m+1} F_{n+1} = F_{m+n+1}$$
where F_k is the k^{th} Fibonacci number. (Hint: First show that the equation is true for $n = 1$ and for all $m \in \mathbb{Z}^+$. Next, assume the equation is true for $n = p$ and for all $m \in \mathbb{Z}^+$. Then prove that the equation is true for $n = p + 1$ and for all $m \in \mathbb{Z}^+$.)