Problem of the Week

Week 3, due Feb 2nd 11.59pm

NAME: _____

NAU Email: _____

Instructor: _____

Please write clean, neat and complete solutions to the problem in order to receive full credit. Your job is to convince me, or really anybody who reads this document, that you understand the problem and are able to communicate what you are thinking about. Please submit your solutions through Gradescope(https://www.gradescope.com/) by the indicated deadline. You might need to create an account with your NAU email. To enroll into the Problem of the Week course use entry code: NYZ56P. Good luck and have fun!

PROBLEM. Let p be a polynomial with real coefficients. That is,

$$p(x) = a_n x^n + a_{n-1} x^{n-1} + \cdots + ax + a_0,$$

and $a_0, a_1, \ldots, a_n \in \mathbb{R}$. Let E be the sum of the coefficients of the even powers, and let O be the sum of the coefficients of the odd powers. Prove that

$$E^2 - O^2 = p(1)p(-1)$$