

Problem 1: A Polynomial Identity

Find all polynomials satisfying the identity

$$p(x + 1) = p(x) + 2x + 1$$

for all $x \in \mathbb{R}$. Make sure to justify how you know you have found all such polynomials.

As always, show your work, fully explain and justify your answer. A solution mainly obtained by computers or calculators will not be accepted.

Posting Date 8/29/2018. Submit solutions to Noah Aydin, Mathematics Department, RBH 319 (e-mail or hard-copy, but hard copy submissions must include a time stamp) by 4 pm on 9/13/18.