9/2/16 Jonathan Qum HW#2 Prove (4n) [hell=> 112-2+3.2"+4.2"+(...+)n.2"= (n-1)2" Base (ase (n=1) 1 1.2 = (1-172 +1 The RHS is (-()(2)+)=1. 1.1 (05(2)+)

The RHS is (-()(2)+)=1. 1.1 (0+) Truse are equal Induction Step : Henrill assume that nEIN and 172-2+3:2+4:2 (n-1)2 +1 Note that 1+2:2+3:2+4:23 ... + ho2n-1 = 8 k=2 From My, we derly Sk.2 = (n-1)2+ Note that & k.2 = & k.2 + (n+1)(2) = (h-1)(2")+1+h (2") = (h-1)(2)+h(2)+1 This completes be pullities step, and with it the proof QED

Proof i Prove In ENEIN=7 n 22"]

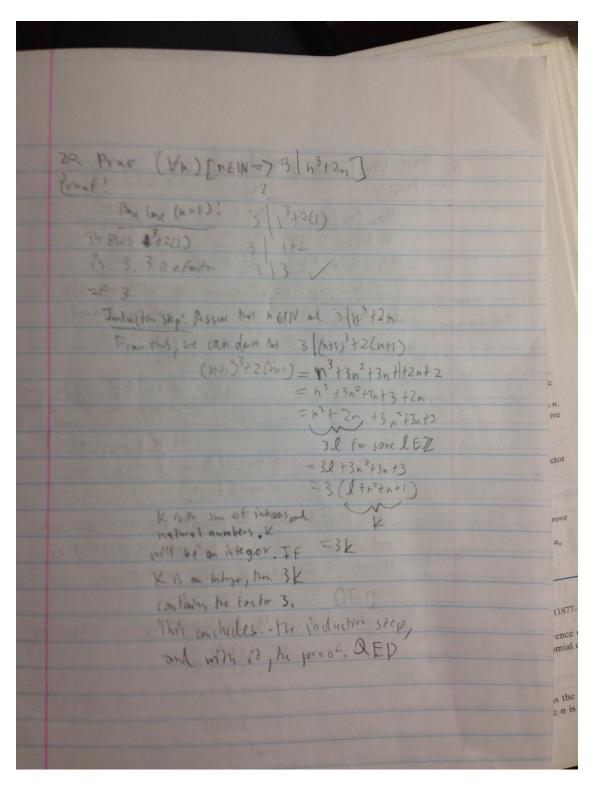
Proof i

Base (ac (n=1): 1 = 2"] The Lits is I. The 1. 2°

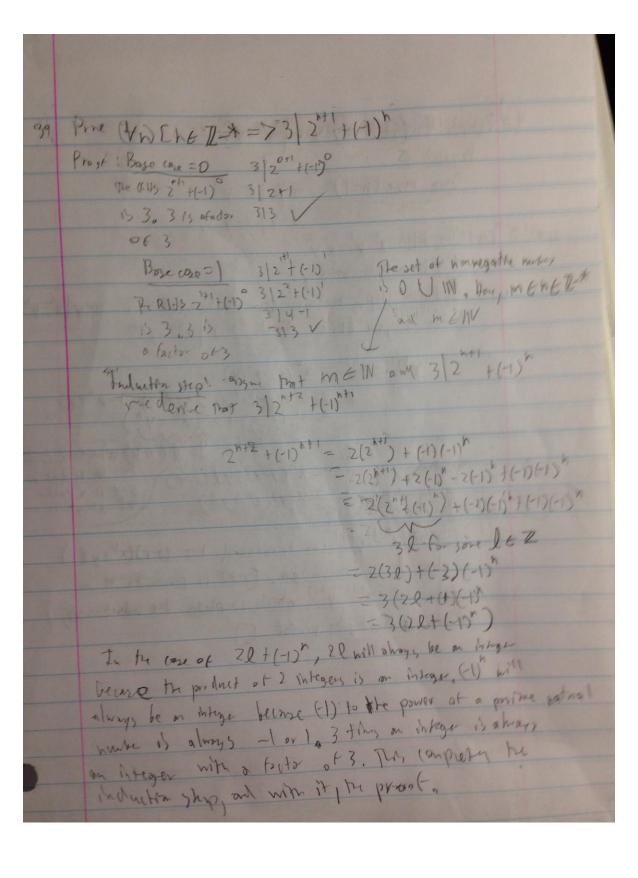
17 Its is also 1. 1 1

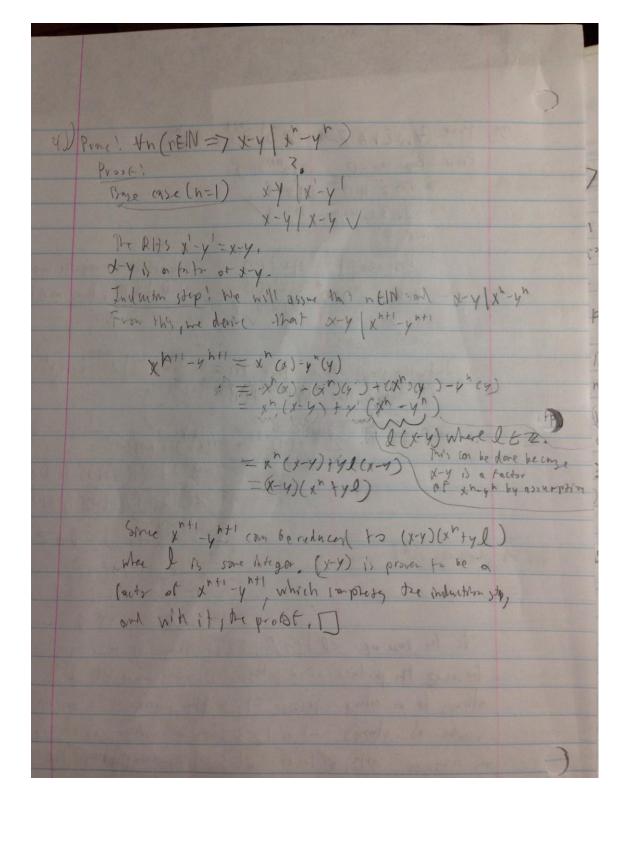
1 2 1

Induction Step : Assum NEIIV and NZ2 From this, we derive that $|n+1| \le 2^n$ $|n+1| = 2^n + 2^n$ This carbules to induction step in whit just prost of



36. Prove (4h) [NEIN=7 4/5"+3] Proof Base (n=1): 415'+3
The RHS is 5'+3=8 41 5+3
418 Industran Step " We will assure that not N me 4/5"+3, It follows that 915"+1+3 can be derived 5"1+3 = 5"+1+x(3)-5(3)+3 =5(5"+3)-3(5+1) He while LEZ. By Messymptron,) he lenow tood of 1's a factor or int 3, which amous 5 th 3 = 5(4)(1)-3(4) = 4/51-3) 52-3 EZ became the product at an integer and and integer (52) is an integer. The difference between 2 indegers is also on integer. Anything that is 4 multiplied by on integer has a factor of 4. QED





43. Provo (An) (nEIN Apx1 => (1+p) = 1+np Ban (on (n=1): (1+p) = 1+1p Inhuchen Step i Assue nEIN and ip>-(and (1+p) = 1tmp
We derre (1+p) n+1 = 1+(n+1)p (1+p) ht1 = 1+6+1)p (Itp)(Itp) = Itnp+p (1+p)(1+p) = (1+p) + np (1+p) > np (1+p) > np This compass to modulation szep, and with it, on proce]