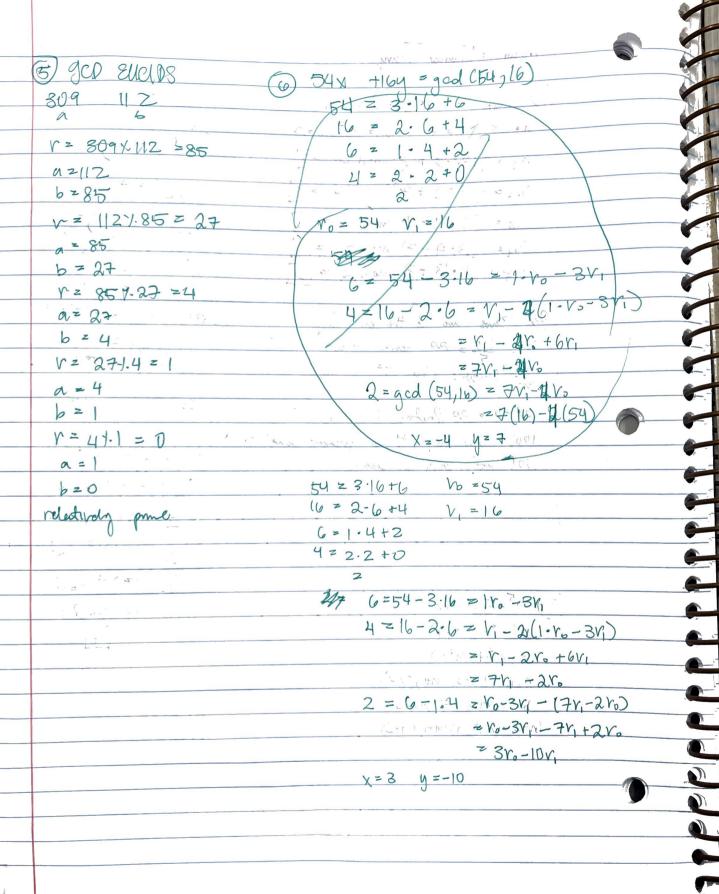
Problem 1: Number Theory (4) 1333 42 mod 11 a= 3, c= 7 , X= 5, m=12 Fo = 1333 7.1 13332 1.11 X1 = (13.-5+7) mod 12 = 2 X2= (13°2+7) mod |2 = 9 (1333)21)2 mod 11 X3 = (13.9+7) mod 12 = 4 X4= (13.4+7) mod 12 = 11 (333) ((33310) 2) / may (1 X5= (11.13+7) mod 12 = 6 (338) ((3335×2)2)2 yod 1 2) Zeros are at the end of 100! ((1333) (1333(13334))2)2)2 LOOP LOD = 20 terms drugte by 5' $(2)^{21}$ mod ||25 Streets by 52 (2(210)2)2 mod 11 20+4 = 24 Jachne 5 in 100! 1001 = dw log 1024 no greater power of 10 (2(25)4)2 md 11 1001 ende with 24 zers (2 (32)4)2 mod 11 (10 = 2-1 +1) (2(10)4)2 mod 11 (2(100)2)2 mill (2(1)2)2 mod 11 3) N5-5N3+4n 4 mod 11 - Ja(h4-5n2+4) = + n (N=4)(N=1) n (n+z)(n-z)(n+)(n-1) Consecutive 15 mumbers (n+2)(n+)(n)(n+1)(n+2) must be div W 15=10 8=1



7) Multiplicative cliverse of X = 33 mod 112 Mutiplicative linerse. 33 mod 112 . X2 33 M= 112 gcd (33,112) =1 2. m +y. x = 1 (mod m) 7.112 + 4.33 = 1 (mod 112) 112=3(33) +13 => 13=112-3(33)=1,-310 33=2 (13)+7=7+=33-2(B)=10-2(ri-3rs)=10-2ri+616 13 = 1 (7) + 6 = 7 = 13 - 1(7) - (n-316) - (4r6-24) = 476-24 $= r_1 - 3r_0 - 7r_0 + 2r_1$ $7 = ||(G) + || = ||7 - ||(G)|| = ||7 - ||(G)|| = ||7 - ||(3r_1 + ||(3r_1 +$ = 7/0-2/1-3/1+10/0 2'17/0-5/1 6 = 6(1) + 010-33 11 V=112 Choose 17, as it is y value Muttiplicative envere = 17