MTH 230 HW 2 Fall '24 Esteban Worales 1) A= & 1,2,3,43 B= & 2,5,83 a) ANB = £ 23 b,) AUB = { 1,2,3,4,5,83 ci) AxB= { (1,2), (1,5), (1,3), (2,2), (2,5), (2,8), (3,2), (8,5), (3,8) (4,2), (4,5), (4,8) } (248) (1) d. P(A) = SE13. [33, [43, 0, 181, 23, 11, 33, 11, 43, {2,3} {2,43, {3,43, {1,2,33 }1, 343 {2,343 \$42,3,03 {1,2,43 } Has 16 elements since |P(A) |= 2141 IF dec then de (Anc) v(Ans) 2.) Show AUB = B => A C B therefore x & y Assume AUB = B: AUB:= {x | xeA xxeB3 = B = {x | xeB3 => &x | xeA v xeB3 = {x | xeB3 = by Assumption for this to be true If XEA = D XEB, since they are equal. => {x | xeA => xeB vxeB3 => (and) A CB since the adds no new Information or elements to the set AUB. 4) 163 A & 2 (Ae P(A)) Assume (ACBA) SA COV AND ACB := {x | x GA => KGB}, by assumption AUB:= {x | xeA v x 6 B} by def. Ex 3x (xEA => xEB) , x EB3, by assumption => ExlxeB v x & B3 by Net of Duboel XGA CED & SEXIXEB3=B => AUB=B &

ERICHAD MOINTES 12 Up 3.) Show 6 ANCBUC) = (ANB) U (ANC) } - A to show equality we It is enough to show that XCY, An (BUC) C (Any) U(Ang) let 26 An (BUC) Duck that XEA and XE BUC So Elther & To in B pre, or both is 18 18 If oxe B then de (ANB) u(Anc) If dec then de (Anc) u(AnB) thus for all possibilities, a & AncBuc) => a & (AnB) (Anc) therefore x Ly YCX ASSUM AUB = B; eet be (AnB) vang Esex V Aex 1x3 = 1804 50 BE ANBOOT BE ANC OF BOTH, Irregardless . hospe we can see that be Al sur so of city no If be B >> Cle Ancisuc) = Ax x (f be C => be Ancous) 82 A on both lases we consec that If & E(ANB) vAnc) => (2081) AA (2001) OF AUGUSTO TO THE SET AUG 4) yas A e 2 (Ae P(A)) and yes  $A \subseteq 2^A CA \subseteq P(A)$ ACB:= Exlxex=> MEBS, & acountion Ex. A= & 4,5,63 2 = P(A) = & 743,853, 263, 84,53 10 1 400000 d . EADX V (BOXCE \$363) 44,63 54,5,63 p3 As you can see \$4,5,63 = 24

3 = 3 8 and \$4,5,65 € 2

## 5.) for all P, (+xe5, P(x) => =xe5, P(x)) by our assumption, every single x in 5 makes our predicate, P(x) true so of course there exists at least 1 x such that P(x) Is true. This holds for when 5 70 If 5=0 then our antecedent of the Implication is false, which makes our implication vaccousts true, 6.) If n, me Z and m.n = 2ktl KEZ => n=2l+1, m=2V+1 . l, VEZ Case 1 n, m are both even n=2l, m=2V=>11.m=4vl=2(9), which is even case 2 if nodd, m even (w.lo.g.) n=2lt1, m=2v => n·m= 4lv+2v = 2(2lv+r) case 3 If n= 2lt1 m= 2v+1 => n·m even => n.m= 4lv+2l+2v+1 = 2(2lv+l+v)+1 = 2r+1, which is odd thus, It must be the case that in one m are both odd