Math 8 HW # 15

25. Fibonacci Sequence, Prove $F_1 + F_2 \dots F_n = F_{n+2} - 1$

When $n=1$, $F_1 = F_{1+2} - 1 = F_3 - 1 = 2-1 = 1$.

Assume $K \geq 1$ and $F_1 + F_2 \dots + F_k = F_{k+2} - 1$.

If $F_1 + F_2 + F_3 + F_4 + \dots F_k + F_{k+1} =$

$(F_1 + F_2 + F_3 + F_4 + \dots F_k) + F_{k+1} =$

$F_{k+2} - 1 + F_{k+1} = (F_{k+1} + F_{k+2}) - 1$

$= F_{k+3} - 1$

Thus by induction $F_1 + F_2 + \dots F_n = F_{n+2} - 1$ ∎

27. Fibonacci Sequence, Prove. $F_1 + F_3 \dots + F_{2n-1} = F_{2n}$

If $n \geq 1$, $\sum_{i=1}^{n} F_{2i-1} = F_{2n}$.

Then, $\sum_{i=1}^{n+1} F_{2i-1} = F_{2n+1} + \sum_{i=1}^{n} F_{2i-1}$

$= F_{2n+1} + F_{2n}$

$= F_{2n+2}$

$= F_{2(n+1)}$

Thus by induction, $F_1 + F_3 + \dots F_{2n-1} = F_{2n}$ ⊠

1. Let $A = \{0,1,2,3,4,5\}$ R expresses > A

$R = \{(5,4)(5,3)(5,2)(5,1)(5,0)(4,3)(4,2)(4,1)(4,0)(3,2)$
$(3,1)(3,0)(2,1)(2,0)(1,0)\}$

2. Let $A = \{1,2,3,4,5,6\}$ R expresses | on A

$R = \{(6,6)(5,5)(4,4)(3,6)(3,3)(2,6)(2,4)(2,2)$
$(1,6)(1,5)(1,4)(1,3)(1,2)(1,1)\}$

3. Let $A = \{0,1,2,3,4,5\}$

$R = \{(5,5)(5,4)(5,3)(5,2)(5,1)(5,0)(4,4)(4,3)$
$(4,2)(4,1)(4,0)(3,3)(3,2)(3,1)(3,0)$
$(2,2)(2,1)(2,0)(1,1)(1,0)(0,0)\}$