Home Work N23

N 1a.

1) Basis Step: $f(0) = 1$

2) Recursive Step: $f(n+1) = f(n) + 2$

$f(1) = f(0) + 2 = 1 + 2 = 3$

$f(2) = f(1) + 2 = 3 + 2 = 5$

$f(3) = f(2) + 2 = 5 + 2 = 7$

$f(4) = f(3) + 2 = 7 + 2 = 9$

N 7a.

1) Basis Step: $\cancel{a_n = 6n}$ $a_1 = 6 \cdot 1 = 6$

2) Recursive Step: $a_n = 6n \rightarrow a_{(n+1)} = 6n + n$

$n = 1\cancel{2} \rightarrow a_1 = 6 \cdot 1 = 6$

$n = 2 \rightarrow a_2 = 6 \cdot 2 = 12$

~~recursive definition:~~

N 9.

1) Basis Step: $f(1) = 1$

2) Recursive Step: $F(n) = \sum_{k=1}^{n+1} a_k = \left(\sum_{k=1}^{n} a_k\right) + a_{n+1}$ $n \geq 1$

N 23.

1) Basis Step: $5 \in S$

2) Recursive Step: if $x \in S$ and $y \in S$, then $x + y \in S$

N 34a

Origina String: $w = w_1 w_2 \ldots w_n$

Reversal String: $w^R = w_n \ldots w_2 w_1$

if $W = 0101$ then $W^R = 1010$.

N 12

1) Basis Step: $P(1) = f(1) = f_{(1+2)} - 1 = f_3 - 1 \to$

~~f(2) = f(1)~~ $f_2 = \cancel{f_{(1+1)}}\ 1$ and $f_1 = 1 \to f_3 = 1 + 1 = 2 \to$

$2 - 1 = 1$. $P(1)$ is true.

2) Recursive Step: Assume $P(k)$ is true for positive integer $k \geq 1$. $f_1 + f_2 + \dots f_k = f_{k+2} - 1$

· $P(k+1) = f_1 + f_2 + \dots f_k + f_{k+1} = f_{(k+1)+2} - 1 = f_{k+3} - 1$.

· $P(k+1): (f_1 + f_2 + \dots f_k) + f_{k+1}$

· $P(k): (f_{k+2} \cancel{+1} - 1) + f_{k+1}$

· $(f_{k+2} + f_{k+1}) - 1$

· Recursive definition of Fibonacci Num: $f_{k+2} + f_{k+1} = f_{k+3} =$

$= f_{k-3} - 1$

· $P(k+1)$ is true.