Sean Reilly

Assignment: Section 5.3: 2 (a,b), 8, 24, 26a, 28a, 32a (7th edition)

2.

a) f(1) = -6

f(2) = 12

f(3) = -24

f(4) = 48

f(5) = -96

b) f(1) = 16

f(2) = 55

f(3) = 172

f(4) = 523

f(5) = 1576

8.

a) Basis: $a_1 = 4 * 1 – 2 = 2$

Recursive: Give a rule for finding a_{n+1} from a_n, for n >= 1:

$a_{n+1} = 4(n + 1) – 2$

$= 4n + 2$

$= a_n + 4$

b) Basis: $a_1 = 1 + (−1)^1 = 0$

Recursive: Give a rule for finding a_{n+1} from a_n, for n >= 1:

$a_{n+1} = 1 + (-1)^{n+1}$

$= 1 + (-1)^n(-1)$

$= 1 + [((-1)^n + 1) – 1] (-1)$

$= 1 + (a_n – 1)(-1)$

$= 2 - a_n$

c) Basis: $a_1 = 1(1 + 1) = 2.$

Recursive: Give a rule for finding a_{n+1} from a_n, for n >= 1:

$a_{n+1} = (n + 1)[(n + 1) + 1]$

= n(n + 1) + n + (n + 1) + 1

= a_n + 2n + 2

d) Basis: a_1 = 1^2 = 1.

Recursive: Give a rule for finding a_{n+1} from a_n, for n >= 1:

a_{n+1} = (n + 1)^2

= n^2 + 2n + 1

= a_n + 2n + 1

24.

a) Basis: 1 ∈ S

Recursive: If x ∈ S, then x + 2 ∈ S

b) Basis: 3 ∈ S

Recursive: If x ∈ S, then 3x ∈ S

c) Basis: 0 ∈ S

Recursive: If p(x) ∈ S, then p(x) + cx^n ∈ S

26.

a)

1) (2,3), (3,2);

2) (4,6), (5,5), (6,4);

3) (6,9), (7,8), (8,7), (9,6);

4) (8,12), (9,11), (10,10), (11,9), (12,8);

5) (10,15), (11,14), (12,13), (13,12), (14,11), (15,10)

28.

a) Basis: (1,2) and (2,1) ∈ S

Recursive: If (a, b) ∈ S, then (a, b + 2) ∈ S, (a + 2, b) ∈ S.
All elements put in S satisfy the condition, because (1, 2) and (2, 1) have an odd
sum of coordinates, and if (a, b) has an odd sum of coordinates, then so do (a + 2, b) and (a, b + 2).

32.

a)

Basis: one(λ) = 0, where λ is the empty string that contains no sumbols

Recursive: If x $\in$ $\sum$, and w $\in$ $\sum^*$, then ones(wx) = ones(w) + x, where x is a bit either 1 or 0.