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Individual Assignments #58

Assignment: 4.3: 2(a,b), 8, 24, 26a, 28a, 32a

# Q2

1. f(1) = -2\*f(0) = -2\*3 = 6  
   f(2) = -2\*f(1) = -2\*-6 = 12  
   f(3) = -2\*f(2) = -2\*12 = -24  
   f(4) = 2\*f(3) = -2\*-24 = 48  
   f(5) = 2\*f(4) = -2\*48 = -96
2. f(1) = 3\*f(0) +7 = 3\*3+7 = 16  
   f(2) = 3\*f(1) +7 = 3\*16 +7 = 55  
   f(3) = 3\*f(2) + 7 = 3\*55 + 7 = 172  
   f(4) = 3\*f(3) + 7 = 3\*172 + 7 = 523  
   f(5) = 3\*f(4) +7 = 3\*523 + 7 = 1576

# Q8

## Part A

Base Step: a1 = 2

Recursive Step an+1 = an + ?  
? = 4\*(n+1)-2-(4n-2)  
? = 4n+4-2-4n+2  
? = 4  
an+1 = an + 4

## Part B

Base Step: a1 = 0

Recursive Step an+1 = an + ?  
? =1+(-1)n+1 – (1+(-1)n)  
? = (-1) (-1)n – (-1)n? = -2(-1)n+1  
an+1 = an -2(-1)n+1

## Part C

Base Step: a1 = 2

Recursive Step an+1 = an + ?  
? = (n+1)(n+1+1)-(n(n+1))  
? = n(n+1)+(n+1)+(n+1)-n(n+1)  
? = 2(n+1)  
an+1 = an +2(n+1)

## Part D

Base Step: a1 = 1

Recursive Step an+1 = an + ?  
? = n2 +2n+1-n2  
? = 2n+1  
an+1 = an +2n+1

# Q24

1. BASE: 1∊S, RECURSIVE: If n∊S, then n+2∊S.
2. BASE: 1∊S, RECURSIVE: If n3∊S, then (n+2)3∊S.
3. BASE: (0,0)∊S, RECURSIVE: If (a,b)∊S then (a+1,b) ∊S, (a,b+1) ∊S, (a+1,b+1) ∊S

# Q26a

## Step 1

Starting pair: (0,0)

Results: (2,3);(3,2)

## Step 2

Starting pairs: (2,3);(3,2)

Results: (4,6);(5,5);(6,4)

## Step 3

Starting pairs: (4,6);(5,5);(6,4)

Results: (6,9);(7,8);(8,7);(9,6)

## Step 4

Starting pairs: (6,9);(7,8);(8,7);(9,6)

Results: (8,12);(9,11);(10,10);(11,9);(12,8)

## Step 5

Starting pairs: (8,12);(9,11);(10,10);(11,9);(12,8)

Results: (10,15);(11,14);(12,13);(13,12);(14,11);(15,10)

# 28a

BASE: (1,2) ∊S OR (2,1) ∊S

RECURSIVE: If (a,b) ∊S then (a+2,b) ∊S, (a,b+2) ∊S

# 32a

BASE: Ones(λ) = 0 (where λ is the empty string)

RECURSIVE: Ones(Sx) =