# **Section 3 – Sequences (65 points)**

Show your work, if possible, on the worksheet. If the answer is wrong and you've shown your work, you can receive partial credit. But if the answer is wrong and you haven't shown your work, there will be no credit for that question.

60/65

1. (15 points) Give the first FIVE terms for the following explicit sequences:
   1. (5 pts) A = (n +2)2 MOD 3n for n >= 1

A1= 0 Im not sure what I did here, I may have used the ^2 in the wrong spot

A2= 16

A3= 0

A4= 108

A5= 147

* 1. (5 pts) A = ⌊-() n⌋ + ⌈(n)/3⌉ for n >= 1

A1= 0

A2= 0

A3= 0

A4= 0

A5= 0

* 1. (5 pts) A = for n >= 1. The answers can be left in radical form

A1= 1

A2= √6

A3= √15

A4= 2√7 These two are √28 and V45 just simplified 5/5

A5= 3√5

1. (18 points) Give the first SIX terms for the following geometric and arithmetic sequences:
   1. (4 pts) A geometric sequence Sn with a first value of -4 and a common ratio of 1/3.

S1= -4

S2= -1.333

S3= -0.444

S4= -0.148

S5= -0.049

S6=- 0.016 I gave some extra values here because I thought it was 6 not

S7= -0.005 including the one given to us

* 1. (5 pts) A geometric sequence defined by the function

A(n) = 3(An-1)\*⌈(An-2)/5⌉ for n >= 1 where the first value A1 = 2, A2 = 3

A1= 2

A2= 3

A3= 9

A4= 27

A5= 162

A6= 2916

A7= 16038

A8= 224788608 I gave some extra values here

* 1. (4 pts) An arithmetic sequence Sn in which the first value is 13 and the common difference is 3.

S1= 13

S2= 16

S3= 19

S4= 22

S5= 25

S6= 28

S7= 31 I gave some extra values here

* 1. (5 pts) An arithmetic sequence defined by the function A(n) = (An-2) + n!

for n >= 1 where the first value A1 = 1 and A2 = 3

A1= 1

A2= 3

A3= 7

A4= 27

A5= 127

A6= 747

A7= 5167

A8= 41067 I gave some extra values here

1. (20 points) Give the ***next*** five terms <after those given> for the following recursive sequences:
   1. (5 pts) A = 2(An-1) – 4(An-2) - 3 n >= 1 where A1 = -1, A2 = 0

A1= -1

A2= 0

A3= 1

A4= -1

A5= -9

A6=-17

A7= -1

* 1. (5 pts) A = ⌈n/3\*(An-2)⌉ for n >= 1 where A1 = 1, A2 = 2,

A1= 1

A2= 2

A3= 1

A4= 3

A5= 2

A6= 6

A7= 5

***Change index:***

* 1. (5 pts) A = n(An-2)n MOD 5 for n >= 0 where A0 = -2, A1 = 1

A0= -2

A1= 1

A2= 3

A3= 3

A4= 4

A5= 0

A6= 1

* 1. (5 pts) A = 2(An-1) + 3(An-2) - 4(An-3) for n >= 0 where A0 = 2, A1 = 3, A2 = 4

A0= 2

A1= 3

A2= 4

A3= 9

A4= 18

A5= 47

A6= 112

A7= 293

1. (12 points) Find a formula for the following sequences and tell if it’s explicit (E) or

recursive (R). Use A for the sequence and use n for the element in the sequence.

*For instance*

* *for the infinite sequence S = 3, 6, 9, 12, 15, 18…* 
  + *The formula is* ***A(n)*** *= 3n, for n >=1 and it’s explicit (E)*
  + *Can also be written as* ***An*** *= 3n, for n >=1 and it’s explicit (E)*
* *for the infinite sequence S1 = 100, 96, 87, 71, 46…*
  + *The formula is A(n) = An-1 – n2 for n >= 1 where A1 = 100 and it’s recursive (R)*

**There can be more than one function that generates a sequence. There can even be separate explicit and recursive functions that generate the same sequence.**

**If your answer is not the same as mine, show me how you generate the 5 elements in the sequence using YOUR function. Make sure the writing is legible.**

* 1. (6 pts) S1 = 2, 9, 28, 65, 126, 217…

S(n) = n^3 +1 for n >= 1 and its explicit (E)

* 1. (6 pts) S2 = 0, 1/2, 1, 3/2, 2, 5/2, 3

S(n) = S(n-1) + ½ for n >=2 and its recursive (R)

Different answer here:

S(0) = 0

S(1) = 1/2

S(2) = S(1) + ½ = 1

S(3) = S(2) + ½ = 3/2

S(4) = S(3) + ½ = 2

S(5) = S(6) + ½ = 5/2

S(6) = S(7) + ½ = 3

