	A	B	C	D	E	F	G
=							
1	seq_num	value	difference	diff_diff			
2	1	-145	-10	-5			
3	2	-155	-15	-5			
4	3	-170	-20	-5			
5	4	-190	-25				
6	5	-215					
7							
8							
9							
10							
11							

D5

$\{-145,-155,-170,-190,-215\}$

this sequence is NOT arithmetic nor geometric

this sequence can be written as a recursive pattern

The pattern changes after the second term to an arithmetic pattern

THE PATTERN

So we need to get a sequence to add -10 to its first term and then only and then after that only add -5 to each successive term

$a_1 = -145$ (this is always just stated in a recursive sequence)

$a_2 = -155 = -145 + [-10 + \mathbf{0}(-5)]$

$a_3 = -170 = -155 + [-10 + \mathbf{1}(-5)]$

$a_4 = -190 = -170 + [-10 + \mathbf{2}(-5)]$

$a_5 = -215 = -190 + [-10 + \mathbf{3}(-5)]$

$a_1 = -145$ (this is always just stated in a recursive sequence)

notice that the highlighted counters are off by 2

$a_2 = -155 = -145 + [-10 + \mathbf{0}(-5)]$

$a_3 = -170 = -155 + [-10 + \mathbf{1}(-5)]$

$a_4 = -190 = -170 + [-10 + \mathbf{2}(-5)]$

$a_5 = -215 = -190 + [-10 + \mathbf{3}(-5)]$

$a_1 = -145$ (this is always just stated in a recursive sequence)

Since the highlighted counters are off by 2,

lets make that adjustment by subtracting 2 from sequence number, n.

$a_2 = -155 = -145 + [-10 + (n-2)(-5)]$

$a_3 = -170 = -155 + [-10 + (n-2)(-5)]$

$a_4 = -190 = -170 + [-10 + (n-2)(-5)]$

$a_5 = -215 = -190 + [-10 + (n-2)(-5)]$

$a_1 = -145$ (this is always just stated in a recursive sequence)

Use the pattern to find the next two terms

$a_2 = -155 = -145 + [-10 + (2-2)(-5)]$

$a_3 = -170 = -155 + [-10 + (3-2)(-5)]$

$a_4 = -190 = -170 + [-10 + (4-2)(-5)]$

$a_5 = -215 = -190 + [-10 + (5-2)(-5)]$

$a_6 = -245 = -215 + [-10 + (6-2)(-5)]$

$a_7 = -280 = -245 + [-10 + (7-2)(-5)]$

So now we can write a rule for the sequence $\{-145,-155,-170,-190,-215\}$

$a_1 = -145$

$a_n = a_{n-1} + [-10 + (n-2)(-5)]$

Now the second part of the rule has an EXPLICIT formula that all versions of this rule must eventually become

$a_n = a_{n-1} + -5 \cdot n$

	A	B	C	D	E	F	G
=							
1	seq_num	value	ratio	diff_ratio			
2	1	8	66	6			
3	2	528	72	6			
4	3	38016	78	6			
5	4	2965248	84				
6	5	249080832					
7							
8							
9							
10							
11							

B7

$\{8,528,38016,2965248,249080832\}$

this sequence is NOT arithmetic nor geometric

this sequence can be written as a recursive pattern

The pattern changes after the second term to an arithmetic pattern

THE PATTERN

So we need to get a sequence to multiply by 66 to its first term and then only and then after that multiply by 6 more than the previous term to each successive term

$a_1 = 8$ (this is always just stated in a recursive sequence)

$a_2 = 528 = 8\,[66 + \mathbf{0}(6)]$

$a_3 = 38016 = 528\,[66 + \mathbf{1}(6)]$

$a_4 = 2965248 = 38016\,[66 + \mathbf{2}(6)]$

$a_5 = 249080832 = 2965248\,[66 + \mathbf{3}(6)]$

$a_1 = 8$ (this is always just stated in a recursive sequence)

notice that the highlighted counters are off by 2

$a_2 = 528 = 8[66 + \mathbf{0}(6)]$

$a_3 = 38016 = 528[66 + \mathbf{1}(6)]$

$a_4 = 2965248 = 38016[66 + \mathbf{2}(6)]$

$a_5 = 249080832 = 2965248[66 + \mathbf{3}(6)]$

$a_1 = 8$ (this is always just stated in a recursive sequence)

Since the highlighted counters are off by 2,

lets make that adjustment by subtracting 2 from sequence number, n.

$a_2 = 528 = 8[66 + (n-2)(6)]$

$a_3 = 38016 = 528[66 + (n-2)(6)]$

$a_4 = 2965248 = 38016[66 + (n-2)(6)]$

$a_5 = 249080832 = 2965248[66 + (n-2)(6)]$

$a_1 = 8$ (this is always just stated in a recursive sequence)

Use the pattern to find the next two terms

$a_2 = 528 = 8 + [66 + (2-2)(6)]$

$a_3 = 38016 = 528 + [66 + (3-2)(6)]$

$a_4 = 2965248 = 38016 + [66 + (4-2)(6)]$

$a_5 = 249080832 = 2965248 + [66 + (5-2)(6)]$

$a_6 = 22417274880 = 249080832 + [66 + (6-2)(6)]$

$a_7 = 2152058388480 = 22417274880 + [66 + (7-2)(6)]$

So now we can write a rule for the sequence **seq_1**

$a_1 = 8$

$a_n = a_{n-1}[66 + (n-2)(6)]$

Now the second part of the rule has an EXPLICIT formula that all versions of this rule must eventually become

$a_n = a_{n-1}[6 \cdot n + 54]$

	A	B	C	D	E	F	G
=							
1	seq_num	value	difference	diff_diff			
2	1	18	77	14			
3	2	95	91	14			
4	3	186	105	14			
5	4	291	119				
6	5	410					
7							
8							
9							
10							
11							

B7

$\{18,95,186,291,410\}$

this sequence is NOT arithmetic nor geometric

this sequence can be written as a recursive pattern

The pattern changes after the second term to an arithmetic pattern

THE PATTERN

So we need to get a sequence to add 77 to its first term and then only and then after that only add 14 to each successive term

$a_1 = 18$ (this is always just stated in a recursive sequence)

$a_2 = 95 = 18 + [77 + \mathbf{0}(14)]$

$a_3 = 186 = 95 + [77 + \mathbf{1}(14)]$

$a_4 = 291 = 186 + [77 + \mathbf{2}(14)]$

$a_5 = 410 = 291 + [77 + \mathbf{3}(14)]$

$a_1 = 18$ (this is always just stated in a recursive sequence)

notice that the highlighted counters are off by 2

$a_2 = 95 = 18 + [77 + \mathbf{0}(14)]$

$a_3 = 186 = 95 + [77 + \mathbf{1}(14)]$

$a_4 = 291 = 186 + [77 + \mathbf{2}(14)]$

$a_5 = 410 = 291 + [77 + \mathbf{3}(14)]$

$a_1 = 18$ (this is always just stated in a recursive sequence)

Since the highlighted counters are off by 2,

lets make that adjustment by subtracting 2 from sequence number, n.

$$a_2 = 95 = 18 + [77 + (n-2)(14)]$$

$$a_3 = 186 = 95 + [77 + (n-2)(14)]$$

$$a_4 = 291 = 186 + [77 + (n-2)(14)]$$

$$a_5 = 410 = 291 + [77 + (n-2)(14)]$$

$a_1 = 18$ (this is always just stated in a recursive sequence)

Use the pattern to find the next two terms

$a_2 = 95 = 18 + [77 + (2-2)(14)]$

$a_3 = 186 = 95 + [77 + (3-2)(14)]$

$a_4 = 291 = 186 + [77 + (4-2)(14)]$

$a_5 = 410 = 291 + [77 + (5-2)(14)]$

$a_6 = 543 = 410 + [77 + (6-2)(14)]$

$a_7 = 690 = 543 + [77 + (7-2)(14)]$

So now we can write a rule for the sequence $\{18,95,186,291,410\}$

$$a_1 = 18$$

$$a_n = a_{n-1} + [77 + (n-2)(14)]$$

Now the second part of the rule has an EXPLICIT formula that all versions of this rule must eventually become

$$a_n = a_{n-1} + 14 \cdot n + 49$$