$\{15,23,31,39\}$

Next three terms $\{15,23,31,39,47,55,63\}$

Note: $39-31=8$

$31-23=8$

$23-15=8$

This means that this sequence can be written as an arithmetic sequence

d = 8

$a_1=15$

Arithmetic Sequence $a_n=a_1+(n-1)d$

$=15+(n-1)(8)$

Explicit Form of this Sequence

$a_n=15+8n-8$

$a_n=7+8n$

	A seq_1	B
=		
1	15	
2	23	
3	31	
4	39	
5		
6		
7		
8		
9		
10		
11		

A1 15

finding a_{100} given that $a_n = 15+(n-1)(8)$

$$a_{100} = 15+(100-1)(8)$$

$$= 807$$

finding a_{100} given that $a_n = 7+8n$

$$a_{100} = 7+(8)(100)$$

$$= 807$$

now you CAN write an arithmetic sequence as a recursive sequence, but arithmetic is easier!

$a_1 = 15$

$a_{n+1} = a_n + 8$

Problem 2

$\{4096,512,64,8\}$ Including the next three terms $\left\{4096,512,64,8,1,\frac{1}{8},\frac{1}{64}\right\}$

Note: $\frac{512}{4096}=\frac{1}{8}$ $\frac{64}{512}=\frac{1}{8}$ $\frac{8}{64}=\frac{1}{8}$

This means that this sequence can be written as a geometric sequence

r = $\frac{1}{8}$ $a_1=4096$ Geometric Sequence $a_n=a_1\cdot r^{n-1}$

$$=4096\cdot\left(\frac{1}{8}\right)^{n-1}$$

Explicit Form of this Sequence

$$a_n=4096\cdot\left(\frac{1}{8}\right)^{n-1} \quad \text{factor}(4096) \blacktriangleright 2^{12}$$

$$a_n=2^{12}\cdot\left(2^{-3}\right)^{n-1}$$

$$=2^{12}\cdot\left(2^{-3n+3}\right)$$

$$=2^{-3n+15}=32768\cdot 2^{-3n}$$

	A seq_1	B
=		
1	4096	
2	512	
3	64	
4	8	
5		
6		
7		
8		
9		
10		
11		

A1 4096

finding a_9 given that $a_n = 4096\left(\frac{1}{8}\right)^{n-1}$

$$a_9 = 4096\left(\frac{1}{8}\right)^{9-1}$$

$$= 4096\left(\frac{1}{8}\right)^{8}$$

$$= \frac{4096}{16777216} = \frac{1}{4096}$$

now you CAN write an geometric sequence as a recursive sequence, but geometic is easier!

$$a_1 = 4096$$

$$a_{n+1} = \frac{1}{8} a_n$$

Problem 3

$$\left\{\frac{1}{4},\frac{-1}{16},\frac{1}{64},\frac{-1}{256}\right\}$$

Including the next three terms $\left\{\frac{1}{4},\frac{-1}{16},\frac{1}{64},\frac{-1}{256},\frac{1}{1024},\frac{-1}{4096},\frac{1}{16384}\right\}$

Note: $\frac{\frac{-1}{16}}{\frac{1}{4}}=\frac{-1}{4}$ $\quad \frac{\frac{1}{64}}{\frac{-1}{16}}=\frac{-1}{4}$ $\quad \frac{\frac{-1}{256}}{\frac{1}{64}}=\frac{-1}{4}$

This means that this sequence can be written as a geometric sequence

$r=\frac{-1}{4}$ $\quad a_1=\frac{1}{4}$ $\quad$ Geometric Sequence $a_n=a_1\cdot r^{n-1}$

$$=\frac{1}{4}\cdot\left(\frac{-1}{4}\right)^{n-1}$$

	A seq_1	B
=		
1	1/4	
2	-1/16	
3	1/64	
4	-1/256	
5		
6		
7		
8		
9		
10		

A1 $\frac{1}{4}$

finding a_{10} given that $a_n = \frac{1}{4}\left(\frac{-1}{4}\right)^{n-1}$

$$a_{10} = \frac{1}{4}\left(\frac{-1}{4}\right)^{10-1}$$

$$= \frac{1}{4}\left(\frac{-1}{4}\right)^{9}$$

$$= \frac{-1}{1048576}$$

now you CAN write an geometric sequence as a recursive sequence, but geometic is easier!

$$a_1 = \frac{1}{4}$$

$$a_{n+1} = \frac{-1}{4} a_n$$

Problem 4

$\{11,14,18,23,29\}$ Including the next three terms $\{11,14,18,23,29,36,44,53\}$

Note: $\frac{14}{11}=\frac{14}{11}$ $\frac{18}{14}=\frac{9}{7}$ $\frac{23}{18}=\frac{23}{18}$ $\frac{29}{23}=\frac{29}{23}$

Note: $14-11=3$ $18-14=4$ $23-18=5$ $29-23=6$

So this does not have a common ratio or a common difference

This means that this sequence cannot be written as a geometric or an arithmetic sequence

So we must write a different type of sequence, recursive sequence

$a_1=11$

$a_{n+1}=(n+2)+a_n$ (this means add the number of term plus 2 to the previous term)

	A	B	C	D	E	F	G
=							
1		a1	a2	a3	a4	a5	
2	a_n	11	14	18	23	29	

C

D11 =d10