Arithmetic

3, 6, 9, 12, ...

initial value 3 (constant dif. 3)

Recursive function

$f(x)=f(x-1)+3$

Geometric

Geometric

	f(x)	explicit	Recursive
1	3	3x1	f(x)
2	6	3x2	
3	9	3x2 2 3(2)	
4	12		

Arithmetic or geometric

5, 10, 20

A

Seq 7, 12, 17

I: 7

CR: +5

Rec func: $f(1)=7$ $fx=f(x-1)+5$

Exp func: $F(x)=7+5(x-1$ or

$fx(=5x-2$

G

Seq 5, 10, 20 ...

I 5

CR x2

Recfunc: x2

exp func: $f(x)=5(2)$

A

General rules

initial value : I

Constant dif. D

Recursive func $f(x)=f(x-1)+D, f(1)=I$

Explicit function $f(x)=I+D(x-1)$

G

initial value I

constant ratio R

Recursive function $f(x)=f(x-1)\cdot R$

Explicit function $f(x=I(R)$

Arithmetic & Geometric

Arithmetic	Geometric
3, 6, 9, 12, ...	3, 6, 12, 24, ...
initial value: 3	initial value: 3
Recursive: $f(1)=3$	Recursive: $f(1)=3$
$f(x)=f(x-1)+3$	$f(x)=f(x-1)\times 2$
Constant: +3	Constant: $\times 2$
Explicit: $f(x)=3x$	Explicit:

Arithmetic	Geometric
Sequence: 7, 12, 17	Sequence: 5, 10, 20
I: 7	I: 5
CD: +5	CR: $\times 2$
Rec: $f(x)=f(x-1)+5$	Rec: $f(x)=f(x-1)$
Exp: $f(x)=7+5(x-1)$	Exp: $f(x)=5(2^{x-1})$

+5 +5

x	Seq.	f(x)	
1	7	7	f(1)=2
2	12	7+5	f(2)=f(1)+5
3	17	7+5+5	f(3)=f(2)+5
x			

Arithmetic:
Sequence: 7, 12, 17...
I: 7
CD: +5
Rec: $f(1)=7, f(x)=f(x-1)+5$
Exp: $f(x)=7+5(x-1)$

×2 ×2

x	Seq.	f(x)
1	5	5×2^0
2	10	5×2^1
3	20	5×2^2
		5×2^3

Geometric
Sequence: 5, 10, 20
I: 5
CR: $\times 2$
Rec: $f(x)=f(x-1)\cdot 5$, $f(1)=5$
Exp: $f(x)=5(2^{x-1})$

General Rules: (Arithmetic)
initial value - (I)

Constant difference - (D)

Recursive function - $f(x)=f(x-1)+D, f(1)=I$

Explicit function - $f(x)=I+D(x-1)$ ← could be x

General Rules: (Geometric)
initial value - (I)

Constant Ratio: (R)

Recursive function: $f(x)=f(x-1)\cdot R$

Explicit function: $f(x)=I(R)^{x-1}$ ← could be x

(A) Sequence: 7, 12, 17...
initial value: 7
Constant difference: +5 ← Always the same
Recursive: $f(1)=7, f(x)=f(x-1)+5$ ← constant difference
Explicit: $f(x)=7+5(x-1)$ or $f(x)=5x-2$

(G) Sequence: 5, 10, 20...
initial value: 5
Constant ratio: x2 ← Always the same ratio
recursive: $f(1)=5, f(x)=f(x-1)\cdot 2$
Explicit: $f(x)=5(2)^{x-1}$

*/ arithmetic vs geometric summary */

Arithmetic	Geometric
inital - 3	inital - 3
constant dif - +3	ratio - x2
explicit - $f(x) = 3x$	explicit $f(x) = 3 \cdot 2^{x-1}$
recursive - $f(1) = 3$, $f(x) = f(x-1) + 3$	recursive $f(1) = 3$, $f(x) = f(x-1) \times 2$
	ALWAYS EXPONENT

Arithmetic	Geometric
IV = 7	IV = 5
CD = +5	CR = x2
exp func - $f(x) = 7 + 5(x-1)$	exp func - $f(x) = 5 \cdot 2^{x-1}$
rec func - $f(1) = 7$, $f(x) = f(x-1) + 5$	rec func - $f(1) = 5$, $f(x) = f(x-1) \times 2$

general rules	general rules
IV = I	IV = I
CD = D	CR = R
ex = $f(x) = I + D(x-1)$ (can be just x; make table check)	exp = $I \times R^{x-1}$ (can be just x; make table to check)
rec = $f(x) = f(x-1) + D$, $f(1) = I$	rec = $f(x) = f(x-1) \cdot R$, $f(1) = I$

...metic vs Geometric
Summ...

Arithmetic +/−

Initial value: 3

Constant Difference: +3

Explicit Function: $f(x) = 3x$

Recursive Function: $f(x-1)+3$, $f(1)=3$

IV = 7
CD = +5
Exp Func = $7+5(x-1)$
Rec Func = $f(x)=f(x-1)+5$, $f(1)=7$

Explicit F − $f(x)$ = $I+D(x-1)$ table check

(make tables) to help

Geometric

Initial value: 3

Constant Ratio: x2

Explicit Function: $3 \cdot 2^{x-1}$

Recursive Function: $f(x)=f(x-1)$ ...

IV = 5
CR = x2
Exp Func = $5 \cdot 2^{x-1}$
Rec Func = $f(x)=f(x-1) \cdot 2$

$f(x) = f(x-1)$ +/− CD or x/÷ CR
$f(x) = I$ x/÷ CR

Recursive Function