

## [Linear Functions]

Arithmetic Sequences: Add or Subtract [common difference]

Geometric Sequences: Multiply & Divide  
[Exponential Functions] [common Ratio]

### Geometric Sequences

- ① 5, 10, 15, 20, 25, 30, 35 +5
- ② 30, 22, 14, 6, -2, -10 -8
- ③ 3, 6, 12, 24, 48, 96, 192 x2
- ④ 100, 50, 25, 12.5, 6.25, 3.125 ÷2

### Explicit Formula

Formula used to find the  $n^{\text{th}}$  term of a sequence.

### Recursive Formula

a formula used to find the next term of a sequence when the previous term is known

### Geometric Sequence

A sequence of terms that have a

Common Ratio

between them.

To figure out common ratio:  
Take any 2 consecutive terms & divide  $\frac{2^{\text{nd}} \text{ term}}{1^{\text{st}} \text{ term}}$  Ex:  $\frac{25}{50} = \frac{1}{2}$

### Explicit Formula for Geometric Sequence

$$a_n = \underline{\underline{a_1}} (\underline{\underline{r}})^{n-1}$$

\*r is always the number you multiply by.

For example, in the sequence: 32, 16, 8, 4, ...

$r = \frac{1}{2}$ .

$a_1 = 1^{\text{st}} \text{ term of sequence}$

$r = \text{common ratio}$

### Recursive Formula for Geometric Sequence

$$a_1 = \underline{\underline{\#}}$$
$$a_n = a_{n-1} (\underline{\underline{r}})$$

4, .8, .16, .032, .0064

Write the explicit rule and the recursive rule.

$a_1 = 4$  and  $r = 0.2$

Explicit:  $a_n = a_1(r)^{n-1}$

Recursive:  $a_n = a_{n-1}(r)$

Ex:  $a_n = 4(.2)^{n-1}$

Rec:  
 $a_1 = 4$   
 $a_n = a_{n-1}(.2)$

Write an explicit rule and a recursive rule for the geometric sequence.

3, 6, 12, 24, ...  $a_1 = 3$   
 $r = 2$

Explicit Rule:  $a_n = 3(2)^{n-1}$

Recursive Rule:  $a_1 = 3$   
 $a_n = a_{n-1}(2)$

Find the common ratio, the explicit formula, and the seventh term.

$\frac{3}{1}, \frac{1.5}{2}, 0.75, 0.375, \dots$   $a_1 = 3$   
 $r = \frac{1.5}{3} = \frac{1}{2}$

$a_n = 3\left(\frac{1}{2}\right)^{n-1}$   
 $a_7 = 3\left(\frac{1}{2}\right)^{7-1}$   
 $a_7 = 3\left(\frac{1}{2}\right)^6$

$a_7 =$   
 $0.047$   
 $a_7 = \frac{3}{64}$

Find the next term and write the recursive rule. Explicit Rule

x	y
1	16
2	40
3	100
4	250
n	625

$a_1 = 16$   
 $R = \frac{40}{16} = 2.5$   
 Ex:  $a_n = 16(2.5)^{n-1}$

Find the next term and write the recursive rule. Explicit

x	y
1	2
2	14
3	98
4	686
n	

$a_1 = 2$   
 $r = 7$   
 Explicit:  $a_n = 2(7)^{n-1}$   
 Rule:  
 $a_{10} = 80,707,214$

The fifth term is 1,792. The common ratio is 4. Write the explicit formula.