Sequences

Arithmetic Seq +

Geometric Sequences

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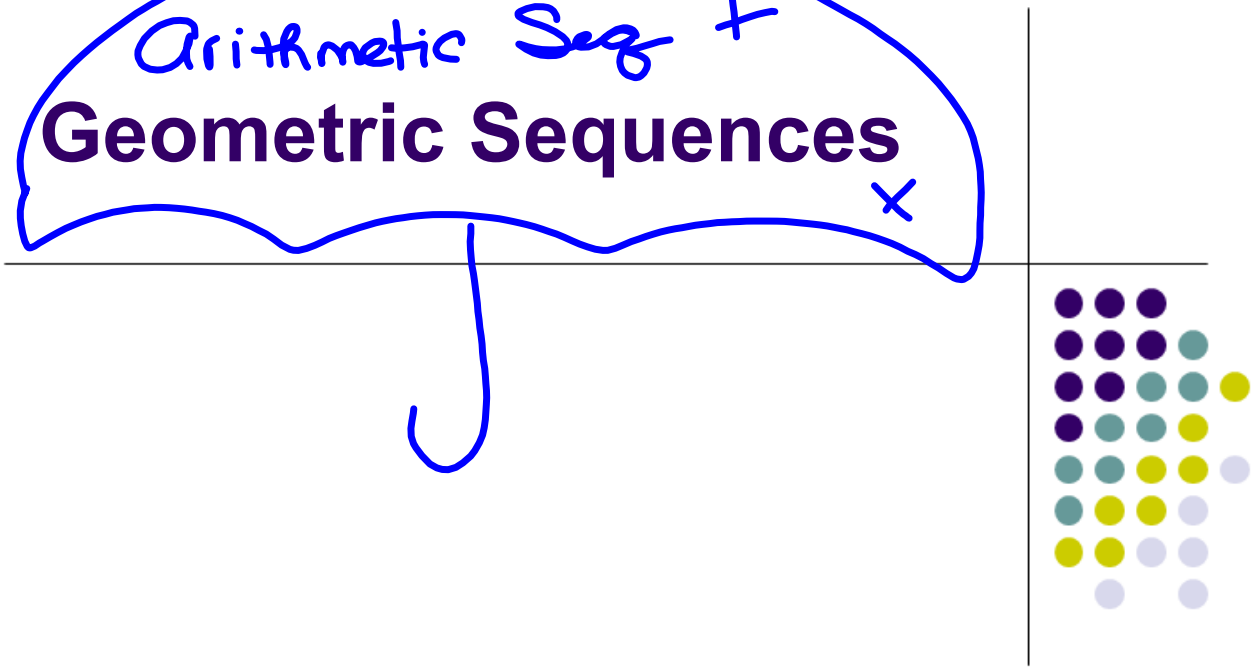

Geometric Sequence

- Each term, after the 1st, is the product of the preceding term and the common ratio, r.
- The common ratio can be found: $r = \frac{a_n}{a_{n-1}}$

Are the following Arithmetic, Geometric, or neither. If arithmetic, state d. If Geometric, state r.

- 4, 12, 36, … Geometric $r = 3$ (×3, ×3)
- 8, 4, 0, -4…. Arithmetic $d = -4$ (-4, -4, -4)
- 2, -4, 8, -16, 32,… Geometric $r = -2$ (-2, -2, -2)
- 1, 4, 9, 16, 25, … Neither (t_1, t_2, t_3, t_4, t_5; n^2)

Let's figure out the formula for a geometric sequence!

- 1st Term: a_1
- 2nd Term: $a_1 r$
- 3rd Term: $a_1 r \, r = a_1 r^2$
- 4th Term: $a_1 r^2 \, r = a_1 r^3$

- 10th Term: $a_1 r^9$

- nth Term:

$$a_n = a_1 r^{n-1}$$

Find the 10 term if $a_1 = 4$ and $r = -1/2$.

explicit

$a_n = a_1 r^{n-1}$

$a_n = 4\left(-\frac{1}{2}\right)^{n-1}$

explicit formula

$a_{10} = 4\left(-\frac{1}{2}\right)^{10-1}$

$= 4\left(-\frac{1}{2}\right)^{9}$

$= \frac{-1}{128}$ 10th term

Recursive formula

$a_n = a_{n-1} r$

Find a_{10} if ½, 1, 2, 4, …

$r = 2$

$a_n = a_1 r^{n-1}$

$a_n = \frac{1}{2}(2)^{n-1}$

explicit formula

$a_{10} = \frac{1}{2}(2)^{10-1}$

$a_{10} = 256$

Recursive formula

$a_n = a_{n-1}(2)$