

1.3 Geometric Sequences

Example 1:

Consider the sequence $\{1, 2, 4, 8, 16, \dots\}$

- Does this sequence have a common difference?
- Is this sequence an arithmetic sequence?
- Do you notice any patterns?

Geometric Sequence:

- a sequence formed by *multiplying* or *dividing* by a constant number to obtain new terms in the sequence

Example: $\{72, 36, 18, 9\}$

Example: $\{4, 8, 16, 32\}$

- there exists a *common ratio* r

Determine the General Term of a Geometric Sequence

Example 2: $\{4, 8, 16, 32, \dots\}$

- Write each element in terms of the first term and the ratio.

$$t_1 =$$

$$t_2 =$$

$$t_3 =$$

$$t_4 =$$

.

.

.

$$t_n =$$

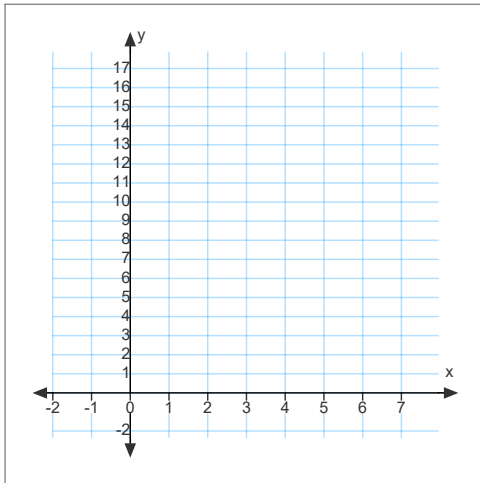
- Do you notice a pattern for the *general term* t_n ?

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Example 3: Given the sequence: $\{4, 20, 100, 500, \dots\}$

- a) Why is this a geometric sequence?
- b) What is the common ratio?
- c) What is the general term for this sequence?

Example 4: Graph the terms of the geometric sequence $\{1, 2, 4, 8, 16, \dots\}$



How does this graph differ from an arithmetic sequence?

Example 5:

Suppose there were three bacteria originally present in a sample. Determine the general term that relates the number of bacteria to the doubling period of the bacteria. State the values of t_1 and r in the geometric sequence formed.

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Example 6: Determine a particular term.

Determine the 9th term of the geometric sequence if $t_1=6$ and $t_5=486$.

Example 7: Determine n

If the first term of a geometric sequence is -2 and the common ratio is -3, what is n if $t_n = -1458$?

Example 8: Determine t_1 and r

In a geometric sequence, the third term is 54 and the sixth term is -1458. Determine the values of t_1 and r , and list the first three terms of the sequence.

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Example 9: Determine a Particular Term

Sometimes you use a photocopier to create enlargements or reductions. Suppose the actual length of a photograph is 25 cm and the smallest size that a copier can make is 67% of the original. What is the shortest possible length of the photograph after 5 reductions? Express your answer to the nearest tenth of a centimetre.



Key Ideas p. 39

Assign p. 39 - 45

1(ce), 3(ac), 4, 5(c), 6(ac), 7, 8, 9, 12, 16, 23, 26 (handout)