

Definition: **progression** from *The Penguin Dictionary of Mathematics*

A simple sequence of numbers in which there is a constant relation between two consecutive terms. The most common progressions are the arithmetic, geometric, and harmonic sequences.

Summary Article: **progression**

From *The Columbia Encyclopedia*

in mathematics, sequence of quantities, called terms, in which the relationship between consecutive terms is the same. An arithmetic progression is a sequence in which each term is derived from the preceding one by adding a given number, d , called the common difference. It has the general form $a, a+d, a+2d, \dots, a+(n-1)d, \dots$, where a is some number and $a+(n-1)d$ is the n th, or general, term; e.g., the progression 3, 7, 11, 15, ... is arithmetic with $a=3$ and $d=4$. The value of the 20th term, i.e., when $n=20$, is found by using the general term: for $a=3$, $d=4$, and $n=20$, its value is $3+(20-1)4=79$. An arithmetic series is the indicated sum of an arithmetic progression, and its sum of the first n terms is given by the formula $[2a+(n-1)d]n/2$; in the above example the arithmetic series is $3+7+11+15+\dots$, and the sum of the first 5 terms, i.e., when $n=5$, is $[2\cdot 3+(5-1)4] 5/2=55$. A geometric progression is one in which each term is derived by multiplying the preceding term by a given number r , called the common ratio; it has the general form $a, ar, ar^2, \dots, ar^{n-1}, \dots$, where a and n have the same meanings as above; e.g., the progression 1, 2, 4, 8, ... is geometric with $a=1$ and $r=2$. The value of the 10th term, i.e., when $n=10$, is given as $1\cdot 2^{10-1}=2^9=512$. The sum of the geometric progression is given by the formula $a(1-r^n)/(1-r)$ for the first n terms. A harmonic progression is one in which the terms are the reciprocals of the terms of an arithmetic progression; it therefore has the general form $1/a, 1/(a+d), \dots, 1/[a+(n-1)d]$. This type of progression has no general formula to express its sum.

APA

Chicago

Harvard

MLA

progression. (2018). In P. Lagasse, & Columbia University, *The Columbia encyclopedia* (8th ed.). New York, NY: Columbia University Press. Retrieved from <https://search.credoreference.com/content/topic/progression>



The Columbia Encyclopedia, © Columbia University Press 2018



The Columbia Encyclopedia, © Columbia University Press 2018

APA

progression. (2018). In P. Lagasse, & Columbia University, *The Columbia encyclopedia* (8th ed.). New York, NY: Columbia University Press. Retrieved from <https://search.credoreference.com/content/topic/progression>

Chicago

"progression." In *The Columbia Encyclopedia*, by Paul Lagasse, and Columbia University. 8th ed. Columbia University Press, 2018. <https://search.credoreference.com/content/topic/progression>

Harvard

progression. (2018). In P. Lagasse & Columbia University, *The Columbia encyclopedia*. (8th ed.). [Online]. New York: Columbia University Press. Available from: <https://search.credoreference.com/content/topic/progression> [Accessed 15 November 2019].

MLA

"progression." *The Columbia Encyclopedia*, Paul Lagasse, and Columbia University, Columbia University Press, 8th edition, 2018. *Credo Reference*, <https://search.credoreference.com/content/topic/progression>. Accessed 15 Nov. 2019.