



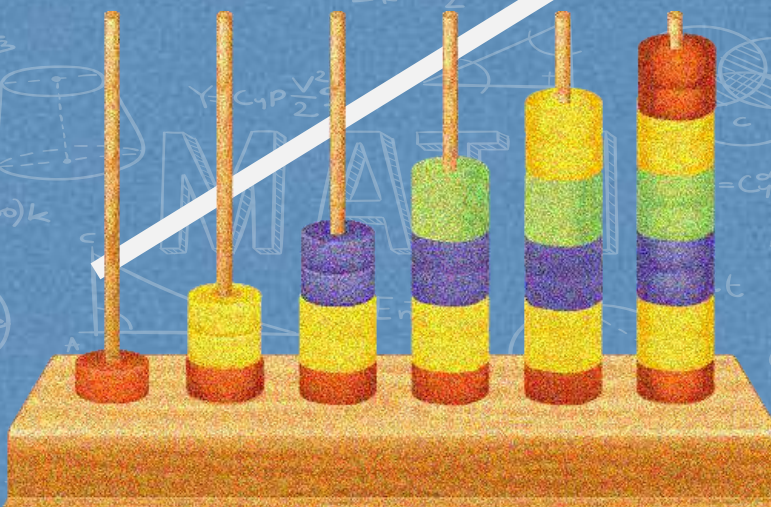
Arithmetic Progressions



Topics



- 1. Arithmetic progression
- 2. Types of an Arithmetic Progression
- 3. General form of an AP
- 4. n^{th} Term of an AP
- 5. Sum of first n terms of an AP
- 6. Arithmetic mean

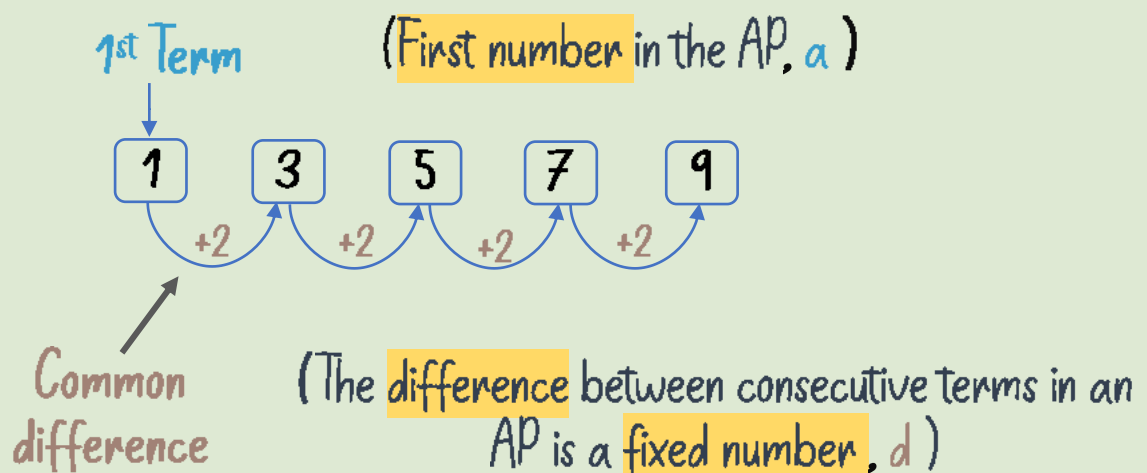


1. Arithmetic Progressions

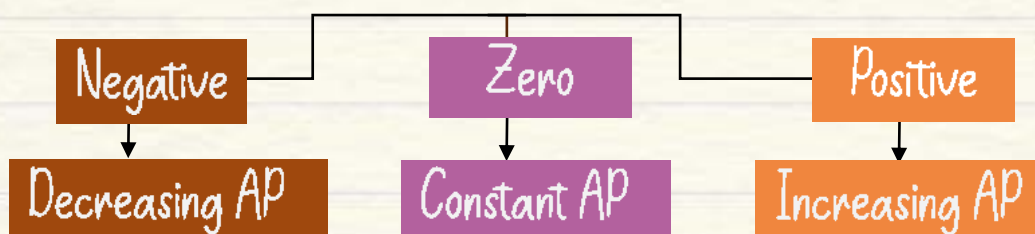
Definition

An arithmetic progression is a sequence of numbers in which each term is obtained by adding a fixed number to the preceding term, except the first term.

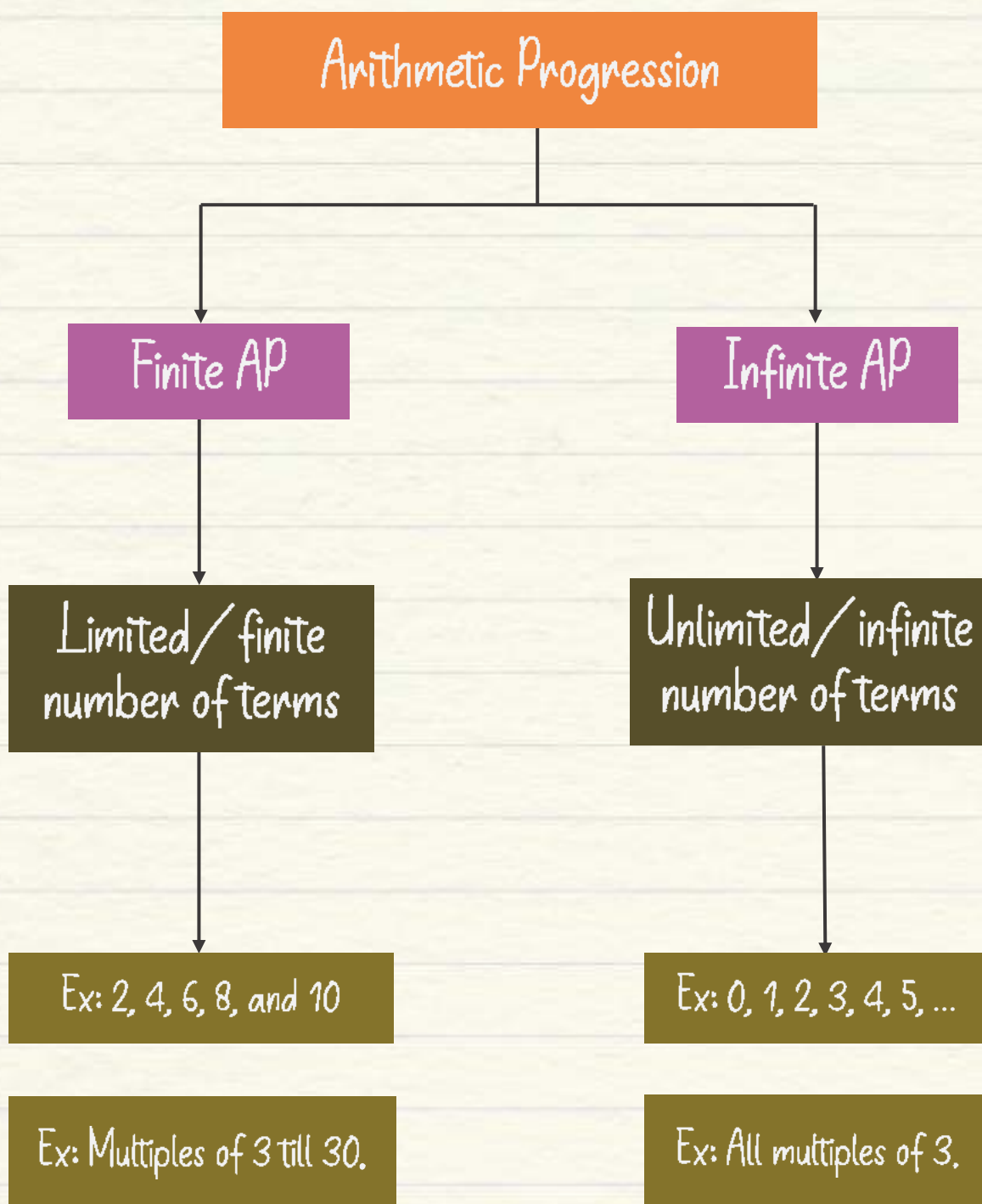
Example



The common difference can be



2. Types of an Arithmetic Progression



3. General Form of an AP




A sequence of the form

★ $a, a + d, a + 2d, a + 3d, a + 4d$ and so on,

where a is the first term and d is the common difference.

4. n^{th} Term of an AP


$$a_n = \{a + (n - 1)d\}$$

where a is the first term,

d is the common difference

n is the number of terms in the sequence and

a_n is the n th term.

5. Sum of First n Terms in an AP

$$S_n = \frac{n}{2} \{2a + (n-1)d\}$$

(When first term (a) and common difference (d) are known)

$$S_n = \frac{n}{2} (a + l)$$

(When first term (a) and last term (l) are known)

where n is the number of terms in the sequence and
 S_n is the sum of first n terms

6. Arithmetic Mean

$$b = \frac{a + c}{2}$$

If a , b and c are in AP, then,
 b is the arithmetic mean of a and c .



Important Formulae



n^{th} Term of an AP	$a_n = a + (n - 1)d$
Sum of first n terms in an AP (Where first term (a) and common difference (d) are known)	$S_n = \frac{n}{2} \{2a + (n - 1)d\}$
Sum of first n terms in an AP (Where first term (a) and last term (l) are known)	$S_n = \frac{n}{2} (a + l)$
Arithmetic Mean (b) (a , b and c are in AP)	$b = \frac{a + c}{2}$



Tips/Points to be Remembered

While solving questions containing consecutive terms, following assumptions can be made to simplify:

NUMBER OF TERMS	CONSECUTIVE TERMS	FIRST TERM	COMMON DIFFERENCE
3	$(a - d), a, (a + d)$	$(a - d)$	d
4	$(a - 3d), (a - d), (a + d), (a + 3d)$	$(a - 3d)$	$2d$
5	$(a - 2d), (a - d), a, (a + d), (a + 3d)$	$(a - 2d)$	d



Mind Map

