

What is an arithmetic series?

- An arithmetic series is a sequence in which the terms are summed together.
 - The terms are separated by a "+" sign instead of a comma.

Example 1: Find the sum for each arithmetic series.

a. $1+2+3+4+5+6+7+8+9+10$	b. $-5+(-11)+(-17)+(-23)+(-29)+(-35)+(-41)$
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Even with a calculator, finding the sum of any really long arithmetic series will take a long time. Again, let's see if we can find a pattern to make things simpler.

Example 2: Look at this arithmetic series and answer a couple of questions.

$$3+6+9+12+15+18+21+24+27+30$$

- Is there a consistent/constant value when adding any 2 numbers together?

- What is the maximum number of ways can you do obtain this value?

All arithmetic series must start with a number, 'a', and finish with another number, 'l or t_n '. They must all have a finite/predetermined # of terms, 'n', to find the sum.

Term value	_____	+	_____	+	_____	+	_____	+	_____	+	_____	+ ... +	_____
Term #	1 st		2 nd		3 rd		4 th		5 th		6 th		n th

Using the following variables and any pattern you see, can you develop a general formula to determine the sum of any arithmetic series?

'a' = value of 1 st term in sequence	'n' = number of terms in sequence
't _n ' = value of n th term in sequence	'S _n ' = sum of series with 'n' terms

or

Example 3: Determine the sum of this arithmetic series.

$$8+15+22+29+36+43+50+57+64+71$$

What do we do if we don't know the value of the last term in any arithmetic series?

- Logic would tell us that we should probably try and apply what we've learned from previous sections or know from prior knowledge.

Example 4: Apply one of the general formulas to find the following sums.

a) Determine S_{100} given the arithmetic series $25+31+37+43+49+\dots$	b) Determine S_{30} given the arithmetic series $21+15.1+9.2+3.3+(-2.6)+\dots$
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Example 5: Determine the sum of the following arithmetic series.

a. $6+10+14+\dots+82$	b. $20+14+8+\dots+(-40)$
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