

ARITHMETIC Series

Arithmetic Series – the sum of the terms of an arithmetic sequence

examples 1) $1+3+5+7+9+\dots$

2) $8+11+14+17+\dots$

3) $7+3-1-5\dots$

t_n and S_n formula for each arithmetic sequence examples

find t_{19} and S_{12} for each arithmetic sequence examples

Ex.1 Find the sum of the following series

(a) $13+18+23+28+\dots+63$

(b) $-1+8+17+26+\dots+143$

Practise

A

1. Find the sum of the first 100 terms of each arithmetic series.

- a) $1 + 5 + 9 + \dots$ b) $2 + 5 + 8 + \dots$
c) $10 + 8 + 6 + \dots$ d) $0 - 3 - 6 - \dots$

2. Find the indicated sum for each arithmetic series.

- a) S_{10} for $2 + 4 + 6 + \dots$
b) S_{20} for $10 + 15 + 20 + \dots$
c) S_{30} for $-2 + 4 + 10 + \dots$
d) S_{18} for $40 + 38 + 36 + \dots$
e) S_{15} for $80 + 76 + 72 + \dots$
f) S_{18} for $1.5 + 2.5 + 3.5 + \dots$

3. Find the sum of each arithmetic series.

- a) $4 + 6 + 8 + \dots + 200$
b) $3 + 7 + 11 + \dots + 479$
c) $100 + 90 + 80 + \dots - 50$
d) $-8 - 5 - 2 + \dots + 139$

e) $18 + 12 + 6 + \dots - 216$

f) $-7 - 11 - 15 - \dots - 171$

g) $\frac{5}{2} + 4 + \frac{11}{2} + \dots + 100$

h) $6 - \frac{16}{3} - \frac{14}{3} - \dots - 12$

4. Given the first and last terms, find the sum of each arithmetic series.

a) $a = 6, t_9 = 24$

b) $a = 3, t_{12} = 36$

c) $f(1) = 5, f(10) = -13$

d) $a = -4, t_{22} = -46$

e) $a = 4.5, t_{11} = 19.5$

f) $f(1) = 20, f(31) = 110$

g) $a = -5, t_{45} = 17$

h) $a = -0.3, t_{51} = -10.3$

Apply, Solve, Communicate

5. Find the sum of

- a) the first 50 positive integers b) the first 100 odd positive integers
c) the first 75 positive multiples of 3 d) the first 100 even positive integers

6. Theatre seats A theatre has 30 seats in the front row, 31 seats in the second row, 32 seats in the third row, and so on. If there are 20 rows of seats, how many seats are there?

B

7. Find the sum of

- a) the positive multiples of 5 up to 500
b) the positive multiples of 7 up to 245

8. Communication Show that the right-hand side of the formula

$S_n = \frac{n}{2}[2a + (n-1)d]$ represents the product of the number of terms and the average of the first and last terms of an arithmetic series.