General formula for an arithmetic series:

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

General formula for a geometric series:

\[ S_n = \frac{a(1 - r^n)}{1 - r} \]

1) Find the designated sum of the arithmetic series

a) \( S_{14} \) of \( 3 + 7 + 11 + 15 + \cdots \)  
   b) \( S_{11} \) of \( -13 - 11 - 9 - 7 - \cdots \)

   c) \( S_9 \) of \( 22 + 20 + 18 + 16 + \cdots \)  
   d) \( S_{35} \) of \( -2 - 5 - 8 - 11 - \cdots \)

2) Determine the sum of each arithmetic series

a) \( 6 + 13 + 20 + \cdots + 69 \)  
   b) \( 4 + 15 + 26 + \cdots + 213 \)

   c) \( 5 - 8 - 21 - \cdots - 190 \)  
   d) \( 100 + 90 + 80 + \cdots - 100 \)
3) Find the designated sum of the geometric series

a) $S_7$ of $4 + 8 + 16 + 32 + \cdots$

b) $S_{13}$ of $1 - 6 + 36 - 216 + \cdots$

c) $S_{17}$ of $486 + 162 + 54 + 18 + \cdots$

d) $S_6$ of $3 + 15 + 75 + 375 + \cdots$

4) Determine $S_n$ for each geometric series

a) $a = 6, r = 2, n = 9$

b) $f(1) = 2, r = -2, n = 12$

c) $f(1) = 729, r = -3, n = 15$

d) $f(1) = 2700, r = 10, n = 8$

5) If the first term of an arithmetic series is 2, the last term is 20, and the increase constant is $+2 \ldots$

a) Determine the number of terms in the series

b) Determine the sum of all the terms in the series
6) A geometric series has a sum of 1365. Each term increases by a factor of 4. If there are 6 terms, find the value of the first term.

**Answers**

1) a) 406   b) -33   c) 126   d) -1855

2) a) 375   b) 2170   c) -1480   d) 0

3) a) 508   b) 1 865 813 431   c) 729   d) 11 718

4) a) 3066   b) -2730   c) 2 615 088 483   d) 2.999 999 97 × 10^{10}

5) a) \( n = 10 \)   b) \( S_{10} = 110 \)

6) \( t_1 = 1 \)