



<p>3. The <math>n</math>th term of an arithmetic progression is given by <math>T_n = 3n + 1</math>. Find</p> <p>(a) the first term,</p> <p>(b) the common difference.</p>	<p>4. The <math>n</math>th term of an arithmetic progression is given by <math>T_n = 4n - 9</math>. Find</p> <p>(a) the first term,</p> <p>(b) the common difference.</p>
<p>5. Given an arithmetic progression 2, 6, 10, 14, ..., find the smallest value of <math>n</math> such that the <math>n</math>th term is greater than 100.</p>	<p>6. Given an arithmetic progression -12, -9, -6, -3, ..., find the greatest value of <math>n</math> such that the <math>n</math>th term is smaller than 200.</p>

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

Find the sum of the first 20 terms of each of the following arithmetic progressions

<p>1. 2, 6, 10, 14, ...</p> <p style="text-align: right;">[800]</p>	<p>2. 21, 18, 15, 12, ...</p> <p style="text-align: right;">[-150]</p>
<p>3. -6, 1, 8, 15, ...</p> <p style="text-align: right;">[1210]</p>	<p>4. -12, -9, -6, -3, ...</p> <p style="text-align: right;">[330]</p>

**(c) Sum of a specific number of consecutive terms**

<p>1. Given an arithmetic progression 2, 6, 10, 14, ... find the sum from fifth term to the sixteenth term.</p>	<p>2. Given an arithmetic progression 21, 18, 15, 12, ... find the sum from seventh term to the eighteenth term.</p>
<p>3. Given an arithmetic progression -6, 1, 8, 15, ... find the sum from ninth term to the twentieth term.</p>	<p>4. Given an arithmetic progression -12, -9, -6, -3, ... find the sum from eleventh term to the twenty-eighth term.</p>

When summing from  $T_n$  to  $T_{n1} =$  is equal to  $s_{n+1} - S_{n-1}$

Example : Sum from 5<sup>th</sup> Term to 10<sup>th</sup> Term

$$T_5 - T_{10} = S_{10} - S_4 \quad ; \text{ Look we minus the } S_4$$

**Further Practice**

<p>1. Given an arithmetic progression 2, 6, 10, 14, ..., find the value of n for which the sum of the first n terms is 800.</p>	<p>2. Given an arithmetic progression 21, 18, 15, 12, ... find the value of n for which the sum of the first n terms is -81.</p>
<p>3. The sum of the first n terms of an arithmetic progression is given by <math>S_n = 2n^2 + n</math>. Find (a) the first term, (b) the common difference.</p>	<p>4. The sum of the first n terms of an arithmetic progression is given by <math>S_n = 2n^2 - 5n</math>. Find (a) the first term, (b) the common difference.</p>

<p style="text-align: right;">[3 ; 4]</p>	<p style="text-align: right;">[-3; 4]</p>
<p>5. Given an arithmetic progression 2, 6, 10, 14, ... find the smallest value of <math>n</math> such that the sum of the first <math>n</math> terms is greater than 200.</p> <p style="text-align: right;">[11]</p>	<p>6. Given an arithmetic progression -12, -9, -6, -3, ... find the smallest value of <math>n</math> such that the sum of the first <math>n</math> terms is greater than 243.</p> <p style="text-align: right;">[19]</p>

**d) Further Practice**

<p>1. Given an arithmetic progression 2, 6, 10, 14, ..., find the value of <math>n</math> for which the sum of the first <math>n</math> terms is 800.</p> <p style="text-align: right;">[20]</p>	<p>2. Given an arithmetic progression 21, 18, 15, 12, ... find the value of <math>n</math> for which the sum of the first <math>n</math> terms is -81.</p> <p style="text-align: right;">[18]</p>
<p>3. The sum of the first <math>n</math> terms of an arithmetic progression is given by <math>S_n = 2n^2 + n</math>. Find</p> <p>(a) the first term,</p> <p>(b) the common difference.</p> <p style="text-align: right;">[3 ; 4]</p>	<p>4. The sum of the first <math>n</math> terms of an arithmetic progression is given by <math>S_n = 2n^2 - 5n</math>. Find</p> <p>(a) the first term,</p> <p>(b) the common difference.</p> <p style="text-align: right;">[-3; 4]</p>





**b) Find the fifth term and the tenth term of the following geometric progressions**

<p>1. 2, 6, 18, 54, ...</p> <p style="text-align: right;">[162 ; 39366]</p>	<p>2. 3, 12, 48, 192, ...</p> <p style="text-align: right;">[768 ; 786432]</p>
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**d) Further Practice**

<p>1. The first three terms of a geometric progression are <math>k</math>, <math>k + 3</math>, <math>k + 9</math>. Find the value of <math>k</math>.</p> <p style="text-align: right;">[3]</p>	<p>2. The first three terms of a geometric progression are <math>k-1</math>, <math>k + 2</math>, <math>k + 8</math>. Find the value of <math>k</math>.</p> <p style="text-align: right;">[4]</p>
<p>3. The <math>n</math>th term of a geometric progression is given by <math>T_n = 2^{2n-1}</math>. Find</p> <p>(a) the first term,</p> <p>(b) the common ratio.</p> <p style="text-align: right;">[2 ; 3]</p>	<p>4. The <math>n</math>th term of a geometric progression is given by <math>T_n = 3^{3n-2}</math>. Find</p> <p>(a) the first term,</p> <p>(b) the common ratio.</p> <p style="text-align: right;">[3 ; 27]</p>

## Geometry Summation

$$S_n = \frac{a(r^n - 1)}{r - 1} \quad \text{given that } r > 1$$

$$S_n = \frac{a(1 - r^n)}{1 - r} \quad \text{given that } r < 1$$

$$S_{inf} = \frac{a}{1 - r} \quad \text{given that } -1 < r < 1$$

### Example:

The geometric progression is shown below

3, 6, 12, 24...

Find the sum of progression for the first 10 terms

**Solution:**

$$r = \frac{6}{3} = 2$$

$$S_n = \frac{a(r^n - 1)}{r - 1} = \frac{3(2^{10} - 1)}{2 - 1} = 3069$$

**Answer: 3069**

### Sum of a specific number of consecutive terms

1. Given a geometric progression 2, 6, 18, 54, ...  
find the sum from fifth term to the ninth term.

2. Given a geometric progression 3, 12, 48, 192, ...  
find the sum from sixth term to the tenth term.

