

## Answer on Question #85195 – Math – Algebra

### Question

The 3<sup>rd</sup> term of Geometric progression is 63 and 5<sup>th</sup> term 567. Find the sum of 1<sup>st</sup> 6 terms.

### Solution

We know that for n-th term of a geometric progression with the initial value  $a$  and common ratio  $r$  is given by

$$a_n = ar^{n-1}.$$

From this formula we have

$$\begin{aligned}a_3 &= ar^2 = 63, \\a_5 &= ar^4 = 567.\end{aligned}$$

It is system of two equations. Solving it one can find  $a$  and  $r$ . To find  $r$ , we divide the second equation by the first:

$$\begin{aligned}r^2 &= 9, \\r &= \pm 3.\end{aligned}$$

From first equation we get  $a$ :

$$\begin{aligned}9a &= 63, \\a &= 7.\end{aligned}$$

Formula for the sum of  $n$  terms of geometric progression is given by

$$S_n = \frac{a(1-r^n)}{1-r}.$$

Then, the sum of 1<sup>st</sup> 6 terms for common ratio  $r = 3$  will be

$$S_6 = \frac{7(1-3^6)}{1-3} = 7 \frac{1-729}{-2} = 7 \cdot 364 = 2548.$$

For the common ratio  $r = -3$  we will have

$$S_6 = \frac{7(1-(-3)^6)}{1-(-3)} = -1274.$$

### Answer:

$s_6$  is equal to 2548 or -1274.