Find nth term of an Geometric Progression in Java

Given first term (a), common ratio (r), and an integer n of the Geometric Progression series, the task is to find the n^{th}term of the series.

Examples:

Input: a = 2, r = 2, n = 4
Output: The 4th term of the series is : 16
Explanation: The 4th term is calculated using $T_n = a * r^{(n - 1)}$ yielding $T_4 = 16$.

Input: a = 2, r = 3, n = 5
Output: The 5th term of the series is : 162.
Explanation: The 5th term is calculated using $T_n = a * r^{(n - 1)}$ yielding $T_5 = 162$.

Approach: To solve the problem follow the below idea:

We know the Geometric Progression series is like = 2, 4, 8, 16, 32 …. …
In this series 2 is the stating term of the series .
Common ratio = 4 / 2 = 2 .
so we can write the series as :

$t_1 = a$
$t_2 = a * r^{(2-1)}$
$t_3 = a * r^{(3 - 1)}$
$t_4 = a * r^{(4 - 1)}$
.
.
.

.

$t_n = a * r^{(n - 1)}$

To find the n_{th} term in the Geometric Progression series we use the simple formula as shown below as follows:

$T_n = a * r^{(n - 1)}$

Below is the implementation of the above approach:

```
// Java program to find nth term
// of geometric progression
import java.io.*;
import java.lang.*;

class GfG {
    public static void main(String[] args) {
        // starting number
        int a = 2;

        // Common ratio
        int r = 3;

        // N th term to be find
        int n = 5;

        int term = a * (int)(Math.pow(r, n - 1));
        // Function call
        System.out.print(n + "th term of the series is : "
                         + term);
    }
}
```

Output

```
5th term of the series is : 162
```

Time complexity: O(log N) due to the inbuilt pow function.
Auxiliary Space: O(1).