

Answer on Question #52401 – Math – Combinatorics | Number Theory

If the natural numbers are written as sequence 12345678910111213141516... then the 2007th digit is?

Solution

1-digit numbers - take 9 digits.

2-digit numbers - take $90 \cdot 2 = 180$ digits.

$$A_1=10, a_n=99=a_1+(n-1)=10$$

3-digit numbers - take $900 \cdot 3 = 2700$ digits.

So let find the 3-digit number, which has 2007th digit of our sequence:

$$9 + 180 + x \cdot 3 = 2007 \Rightarrow x = 606$$

where x - number of three-digit number beginning with 100.

So our 3-digit number, which has 2007th digit of our sequence is $606+100-1=705$.

According to equation, x is integer, our digit is the last number of x , it is 5.

Answer: 5.