

Tutorial 1

1. Determine whether each of the following sequence is increasing, decreasing, non-increasing or non-decreasing.
 - (i) 5, 55, 555, 555, 606, 1001, 2002, 2020, 2020
 - (ii) 5, -55, -555, -606, -1001, -2020, -2020, -3000
 - (iii) 10, 22, 35, 100, 201, 500, 2000
 - (iv) 5, 5
 2. Find the value of each of the expression below without using a calculator.
 - (i) $\lg 64$
 - (ii) $\lg 2^{1000}$
 3. Compute $\lfloor x \rfloor$ and $\lceil x \rceil$ for each of the following values of x :
 - (i) 37.99
 - (ii) $10/3$
 4. Prove that $\binom{n}{r} = \binom{n}{n-r}$
 5. Use mathematical induction to prove that each equation is true for every positive integer n .
 - (i) $\sum_{i=1}^n i(i!) = (n+1)! - 1$
 - (ii) $(1+x)^n \geq 1+nx$, where $x \geq -1$
 6. Write an algorithm that returns the sum of first m elements of an array S .
 7. Write an algorithm that outputs the smallest and largest values in the array S which has m unique elements.
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