Concepts and Formulas

Numerically Greatest Coefficients(NGC):

This is easy to get: just put a=1 and b=1

$$^nC_r \text{ is maximum at } r = \begin{cases} \frac{n}{2}, & \text{if } n \text{ is even} \\ \frac{n-1}{2}, \frac{n+1}{2}, & \text{if } n \text{ is odd.} \end{cases}$$

Note:

1.Depending on the question putting a=1, and b=1 can help in solving coefficient related problems.

2. Use of differentiation and integration to find the sum of binomial coefficients. Keep this point in mind.

Some important properties of binomial coefficients:

$$^nC_0 +^n C_1 +^n C_2 + \cdots +^n C_n = 2^n$$
$$^nC_0 -^n C_1 +^n C_2 - \cdots + (-1)^n \ ^nC_n = 0$$
$$^nC_1 - 2 \cdot^n C_2 + 3 \cdot^n C_3 - \cdots + (-1)^{n-1} n \cdot^n C_n = 0 \ \ (\text{for } n > 1).$$

Numerically Greatest Term(NGT):

Consider $(1+x)^n$

Also define p such that: $p = \frac{(n+1)|x|}{|x|+1}$.

Case-1: When p is an integer

NGT are T_n, T_{n+1}

Case-2: When p is not integer

NGT is T_{c+1}

here c is integer part of p.