Teeming with a lot o' news!

Binomial Theorem

Name________________________________

Become "the very model of a modern Major-General", as referenced in the *Pirates of Penzance*.

Regarding: $(a+b)^n$

1. In terms of *n*, the number of terms in a binomial expansion is ________________.

2. In terms of *n* and *b*, the power of *a* in this binomial expansion is always ______________________.

3. The sum of the exponents in each term of this binomial expansion adds to ________________.

4. The coefficients of the first and last terms of this binomial expansion are each ________________.

5. To obtain the coefficients of the middle terms of this binomial expansion, a pattern may be employed. The coefficient is the product of the previous term's coefficient and *a*'s index (exponent), divided by the number of that previous term.

For example: $(a+b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$ The third term's coefficient is based upon $4a^3b$.

$$\frac{(coefficient)(index\ of\ \ a)}{number\ \ of\ \ term} = \frac{(4)(3)}{2} = 6$$

In the expansion of $(a+b)^5$, the third term is $10a^3b^2$. What is the coefficient of the fourth term?_____

6. Fill in the blanks: $\binom{n}{k} = {}_nC_k = \dfrac{\square!}{\square!\,\square!}$

7. Fill in the blanks: $(a+b)^n = \sum_{k=\square}^{\square} \binom{\square}{k} a^{\square} b^{\square}$

8. Fill in the blanks: The r^{th} term of the expansion of $(a+b)^n$ is: $\binom{\square}{r-1} a^{\square} b^{\square}$

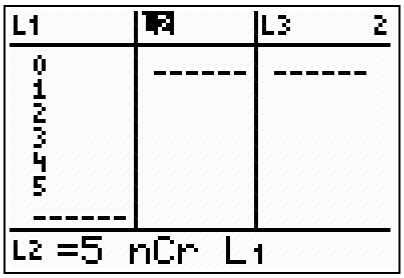
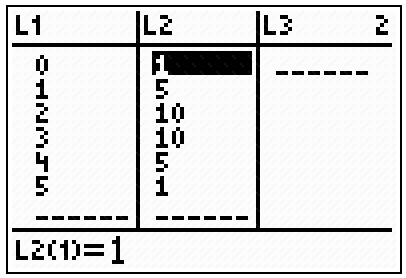
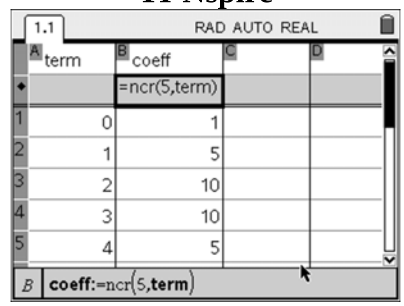
9. Expand: $(a+b)^6$

10. Find the 3rd term of $(a+b)^9$.

11. The coefficients $\binom{n}{k}$ of a binomial expansion form a portion of a famous triangle known as

____.

12. Consider the expansion of $(x+2)^5$. The graphing calculator can quickly produce the coefficients $\binom{n}{k}$ through use of the LISTS or Spreadsheet:

TI-84+		**TI-Nspire**
 In L1, enter the values 0 through the power to which the binomial is raised, in this case 5. In L2, enter the combination formula, using the power of the binomial as the starting value, and the entries from L1 as the ending values.	 The coefficients from the combinations will appear in L2.	 In A, enter the values 0 through 5, the power to which the binomial is raised. In B, enter the combination formula, using the power of the binomial as the starting value, and the entries from A as the ending values.

Using your graphing calculator as described above, prepare the expansion of $(x+y)^6$.

13. Find the 4th term of the expansion of $(3x-2)^5$.