ALBERT

Name _____ Date _____

Binomial Theorem Worksheet

Algebra 2 · Common Core HSA-APR.C.5

> (+) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.

Practice

Builds the skill step by step.

1. Row 4 of Pascal's Triangle is 1, 4, 6, 4, 1. What is its middle number?

2. What is the coefficient of xy in $(x + y)^2$?

3. What is the coefficient of x^2 in $(x + 1)^3$?

4. How many terms are in the expansion of $(x + y)^6$?

5. Which are the coefficients of $(a + b)^4$?

   A. 1, 3, 3, 1

   B. 1, 4, 4, 1

   C. 1, 4, 6, 4, 1

   D. 1, 5, 10, 10, 5, 1

6. What is the coefficient of x^2y^2 in $(x + y)^4$?

7. Evaluate C(5, 2), the number of ways to choose 2 from 5.

8. What is the sum of the coefficients of $(x + y)^5$?

9. What is the constant term of $(x + 2)^2$?

10. What is the coefficient of x^4y in $(x + y)^5$?

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On Level

Grade-level practice.

1. What is the coefficient of x^2 in $(x + 2)^4$?

2. What is the coefficient of x^3 in $(2x + 1)^5$?

3. What is the constant term of $(x - 3)^4$?

4. What is the coefficient of x in $(x - 1)^5$?

5. What is the coefficient of x^2y^3 in $(x + y)^5$?

6. In the expansion of $(a + b)^n$, which term has the coefficient $C(n, k)$?

   A. $a^k b^k$

   B. $a^n b^k$

   C. $a^{n+k} b^k$

   D. $a^{n-k} b^k$

7. Use the Binomial Theorem on $(1 + 0.1)^4$ to find 1.1^4 exactly.

8. Explain how to find the coefficient of x^3 in $(x + 2)^5$.

9. What is the coefficient of x^2y^2 in $(x - y)^4$?

10. What is the coefficient of x in $(3x - 1)^3$?

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Challenge

Multi-step and word problems that stretch it.

1. What is the coefficient of x^5 in $(x + 2)^7$?

2. What is the coefficient of x^2y^4 in $(2x - y)^6$?

3. What is the constant term of $(x + \frac{1}{x})^6$?

4. Use the Binomial Theorem to find 1.01^5 to the nearest ten-thousandth.

5. What is the coefficient of x^3 in $(1 - 2x)^6$?

6. Which row of Pascal's Triangle gives the coefficients of $(a + b)^7$?

   A. 1, 7, 21, 35, 35, 21, 7, 1

   B. 1, 6, 15, 20, 15, 6, 1

   C. 1, 7, 14, 21, 21, 14, 7, 1

   D. 1, 8, 28, 56, 70, 56, 28, 8, 1

7. What is the sum of the coefficients of $(2x - 1)^8$?

8. Explain why the numbers in row n of Pascal's Triangle add up to 2^n.

9. What is the coefficient of x^2 in $(x + 3)^5$?

10. The coefficient of x^2 in $(1 + x)^n$ is 28. What is n?