Name_____

The Binomial Theorem

Definition of a Binomial Coefficient

A Formula for Expanding Binomials: The Binomial Theorem

Finding a Particular Term in a Binomial Expansion

Blitzer Bonus || **The Universality of Mathematics**

Pascal's triangle is an array of numbers showing coefficients of the terms in the expansions of $(a + b)^n$. Although credited to French mathematician Blaise Pascal (1623–1662), the triangular array of numbers appeared in a Chinese document printed in 1303. The Binomial Theorem was known in Eastern cultures prior to its discovery in Europe. The same mathematics is often discovered/invented by independent researchers separated by time, place, and culture.

Binomial Expansions	**Pascal's Triangle**	**Chinese Document: 1303**
	Coefficients in the Expansions	

$(a + b)^0 = 1$

$(a + b)^1 = a + b$

$(a + b)^2 = a^2 + 2ab + b^2$

$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$
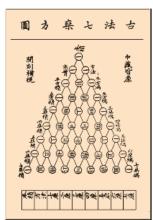
$(a + b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$

$(a + b)^5 = a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$

```
              1
            1   1
          1   2   1
        1   3   3   1
      1   4   6   4   1
    1   5  10  10   5   1
  1   6  15  20  15   6   1
1   7  21  35  35  21   7   1
1  8  28  56  70  56  28  8  1
```

$$\binom{7}{2} =$$

$$\binom{5}{0} =$$

$$\binom{7}{7} =$$

$$\binom{8}{3} =$$

$$(x+5)^4 =$$

$$(2x-3y)^5$$

The fifth term of $(2x+y)^9$