

Today's Learning Goal(s):

Date: _____

By the end of the class, I will be able to:

- understand the pattern in Pascal's triangle.
- use Pascal's triangle to expand binomials efficiently.

2 classes ago's work: pp. 452-453 #(1-7)ace, 11, 13 [15,16]

Last day's work: pp. 459-461 #(1-6)ace, 9, 11, 13 [16,18]

3c

7.7 Pascal's Triangle and Binomial Expansions

Ex.1 Expand and simplify each of the following:

Date: Jan. 5/16

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

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

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

$$= a^3 + 2a^2b + ab^2 + a^2b + 2ab^2 + b^3$$

$$= a^3 + 3a^2b + 3ab^2 + b^3$$

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

$$= a^4 + 3a^3b + 3a^2b^2 + ab^3 + a^3b + 3a^2b^2 + 3ab^3 + b^4$$

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

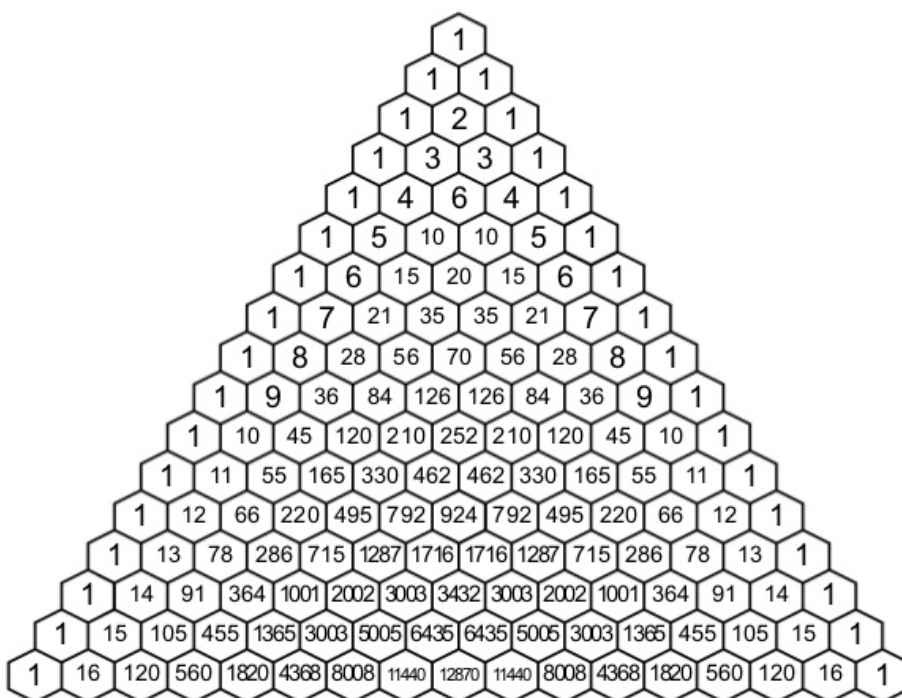
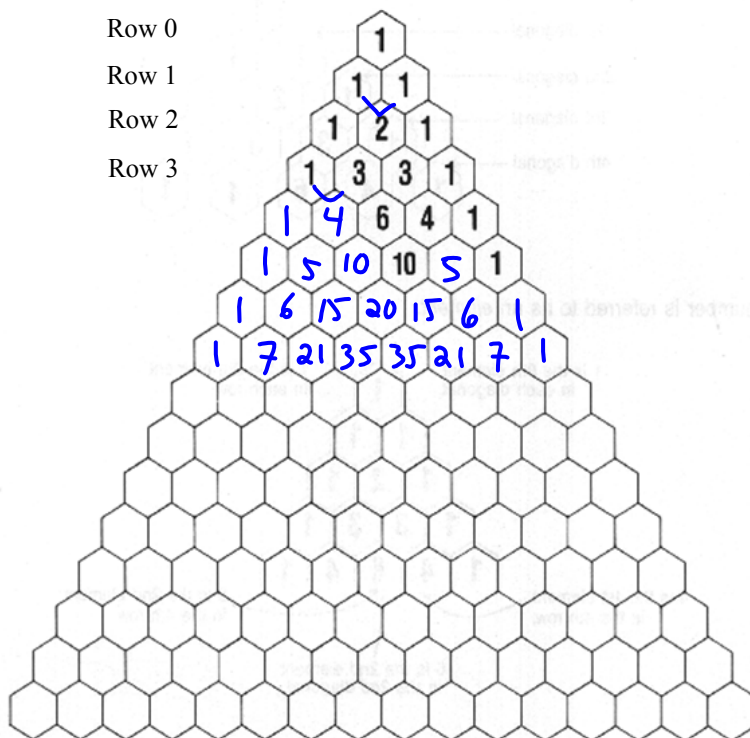
Before continuing, let's explore Pascal's Triangle!

Click on the paperclip to learn about Pascal's Triangle.



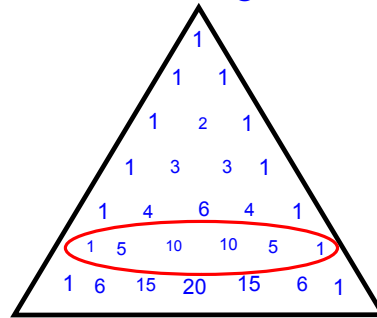
Pascal's Triangle

Row 0
Row 1
Row 2
Row 3



The **coefficients** for a binomial expansion are found in **Pascal's Triangle!!**
 The exponent on the x begins with the exponent of the binomial and progressively decreases to zero; the exponent on the y begins at zero and progresses to equal the exponent on the binomial.

So for $(x + y)^5$, the coefficients are in the 5th row of Pascal's Triangle, so the expansion is:

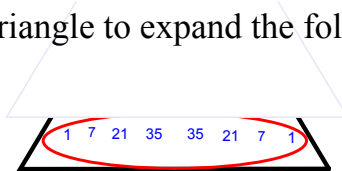


$$(x + y)^5 = 1x^5y^0 + 5x^4y^1 + 10x^3y^2 + 10x^2y^3 + 5x^1y^4 + 1x^0y^5$$

$$= x^5 + 5x^4y + 10x^3y^2 + 10x^2y^3 + 5xy^4 + y^5$$

Ex.2 Use Pascal's triangle to expand the following:

a) $(x + 3)^7$



$$= (x)^7 + 7(x)^6(3)^1 + 21(x)^5(3)^2 + 35(x)^4(3)^3 + 35(x)^3(3)^4 + 21(x)^2(3)^5 + 7(x)^1(3)^6 + (3)^7$$

$$= x^7 + 21x^6 + 189x^5 + 945x^4 + 2835x^3 + 5103x^2 + 5103x + 2187$$

b) $(2x - 5y)^5$ 1, 5, 10, 10, 5, 1

$$= (2x)^5 + 5(2x)^4(-5y)^1 + 10(2x)^3(-5y)^2 + 10(2x)^2(-5y)^3 + 5(2x)^1(-5y)^4 + (-5y)^5$$

$$= 32x^5 - 400x^4y^1 + 2000x^3y^2 - 5000x^2y^3 + 6250xy^4 - 3125y^5$$

Ex.3 If time, show "my" patterning method.

$(x - 1)^8$

$$= x^8 - 8x^7y + 28x^6y^2 - 56x^5y^3 + 70x^4y^4 - 56x^3y^5 + 28x^2y^6 - 8xy^7 + y^8$$

Are there any Homework Questions you would like to see on the board?

Last day's work: pp. 459-461 #(1 – 6)ace, 9, 11, 13 [16,18]

Today's Homework Practice includes:

p. 466 #1 – 3, (4 – 5)ace, 6, 8, 10

Attachments

PascalsTriangle.notebook