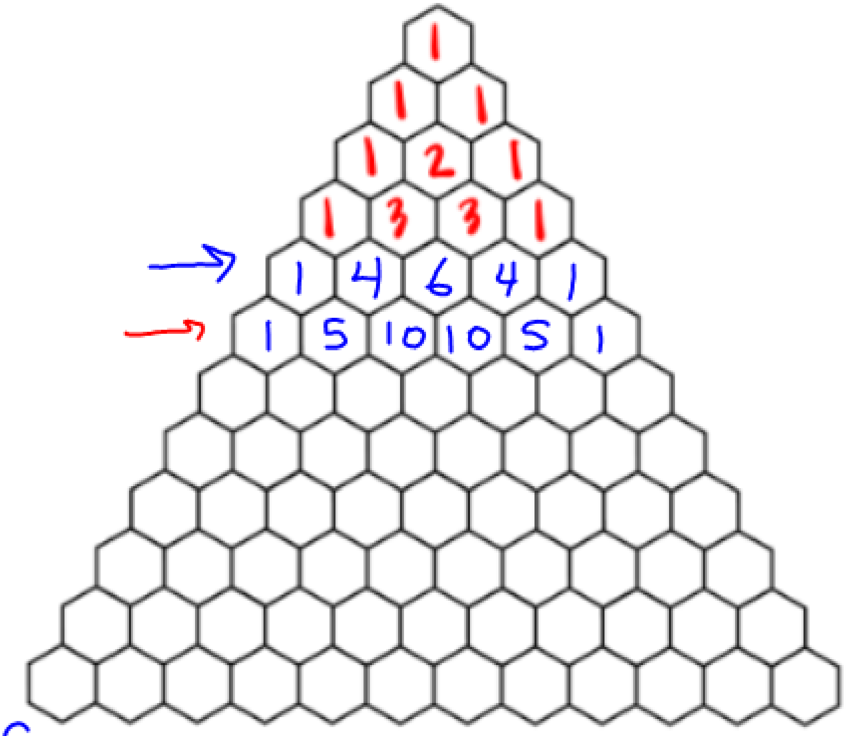
Pascal's Triangle

Use Pascal's Triangle to expand the following binomials:



1] $(y+1)^5$

$y^5 + 5y^4 + 10y^3 + 10y^2 + 5y + 1$

$5y^4 \cdot 1 \quad 10y^3 \cdot 1^2 \quad 10y^2 \cdot 1^3$

2] $(p+q)^4 = 1p^4 + 4p^3q + 6p^2q^2 + 4pq^3 + 1q^4$

1) $(n+1)^3$

$n^3 + 3n^2 + 3n + 1$

2) $(x+1)^4$

$x^4 + 4x^3 + 6x^2 + 4x + 1$

3) $(n+1)^5$

$n^5 + 5n^4 + 10n^3 + 10n^2 + 5n + 1$

4) $(x+1)^6$

$\underline{1}x^6 + \underline{6}x^5 + \underline{15}x^4 + \underline{20}x^3 + \underline{15}x^2 + \underline{6}x + \underline{1}$

5) $(x+1)^7$

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

6) $(x+y)^4$

$x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4$

7) $(x+y)^3$

$x^3 + 3x^2y + 3xy^2 + y^3$

9) $(a+b)^5$

$a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$

10) $(n+m)^4$

$n^4 + 4n^3m + 6n^2m^2 + 4nm^3 + m^4$

11) $(x+y)^6$

$x^6 + 6x^5y + 15x^4y^2 + 20x^3y^3 + 15x^2y^4 + 6xy^5 + y^6$

Yesterday we practiced only with coefficients of 1.

Today we will practice with coefficients other than 1 to make sure we can apply the Binomial Theorem and Pascal's Triangle together.

Let's apply that to when we have some values with coefficient's other than 1:

$(x + \boxed{2})^3 = \underbrace{1}\underbrace{x^2} \quad \underbrace{2}\underbrace{x}\cdot\underbrace{2^1} \quad \underbrace{1}\cdot\underbrace{2^2}$

$\underline{x^2} + \underline{4x} + \underline{4}$

$(a+b) = 1a^2 + 2a\cancel{b}_{2} + 1\cancel{b}_{2}^{2}$

$3 \cdot 4$

$(x+2)^3 = 1x^3 + 3x^2 \cdot 2^1 + 3x^1 \cdot 2^2 + 1 \cdot 2^3$

$x^3 + 6x^2 + 12x + 8$

$$(x+2)^4 = 1x^4 + 4x^3 \cdot 2 + 6x^2 \cdot 2^2 + 4x \cdot 2^3 + 1 \cdot 2^4$$

$$x^4 + 8x^3 + 24x^2 + 32x + 16$$

$(x+\boxed{2})^5 =$

$1x^5 + 5x^4 \cdot 2^1 + 10x^3 \cdot 2^2 + 10x^2 \cdot 2^3 + 5x \cdot 2^4 + 1 \cdot 2^5$

$x^5 + 10x^4 + 40x^3 + 80x^2 + 80x + 32$

Let's get a little more involved!!

$(\boxed{2x}+\boxed{3y})^3 =$

$1(2x)^3 + 3(2x)^2(3y)^1 + 3(2x)^1(3y)^2 + 1(3y)^3$

$1\cdot 2^3\cdot x^3 + 3\cdot 2^2\cdot x^2\cdot 3\cdot y + 3\cdot 2\cdot x\cdot 3^2\cdot y^2 + 1\cdot 3^3\cdot y^3$

$\boxed{8x^3 + 36x^2y + 54xy^2 + 27y^3}$

$(3x + 2y)^4 =$

$1(3x)^4 + 4(3x)^3(2y) + 6(3x)^2(2y)^2 + 4(3x)(2y)^3 + 1(2y)^4$

$81x^4 + 216x^3y + 216x^2y^2 + 96xy^3 + 16y^4$

$-2^2 = -1 \cdot 2^2$ $\quad$ $3 \cdot 2 \cdot (-2)^2$

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

$1(2x)^3 + \underbrace{3(2x)^2(-2y)^1}_{\text{Neg}} + \underbrace{3(2x)(-2y)^2}_{\text{Pos}} + \underbrace{1(-2y)^3}_{\text{Neg}}$

$8x^3 - 24x^2y + 24xy^2 - 8y^3$

-2^1 $\quad$ $(-2)^5 = -32$

$(-2)^2 = 4$ $\quad$ $(-2)^6 = 64$

$(-2)^3 = -8$

$(-2)^4 = 16$

$$(4a - 3b)^4 =$$

Binomial Expansion Activity!!

Homework #4: Binomial Expansion