

Pascal's and Binomial Expansion Review

Day 5

1. Describe 3 patterns found within pascal's triangle.

2. What is the relationship between pascal's triangle and binomial expansion?

coefficients

3. How many terms are in the expansion of $(x + y)^{13}$?

14

For #4-8 expand the binomials:

4. $(a + b)^9$

$$1a^9 + 9a^8b + 36a^7b^2 + 84a^6b^3 + 126a^5b^4 + 126a^4b^5 + 84a^3b^6 + 36a^2b^7 + 9ab^8 + 1b^9$$

5. $(2 + x)^5$

$$1 \cdot 2^5 x^0 + 5 \cdot 2^4 x^1 + 10 \cdot 2^3 x^2 + 10 \cdot 2^2 x^3 + 5 \cdot 2^1 x^4 + 1 \cdot 2^0 x^5$$

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

6. $(x - 2y)^6$

$$1(x)^6(-2y)^0 + 6(x)^5(-2y)^1 + 15(x)^4(-2y)^2 + 20(x)^3(-2y)^3 + 15(x)^2(-2y)^4 + 6(x)^1(-2y)^5 + 1(x)^0(-2y)^6$$

$$1 \cdot x^6 \cdot 1 + 6 \cdot x^5 \cdot -2y + 15 \cdot x^4 \cdot 4y^2 + 20 \cdot x^3 \cdot -8y^3 + 15 \cdot x^2 \cdot 16y^4 + 6 \cdot x \cdot -32y^5 + 1 \cdot 1 \cdot 64y^6$$

$$x^6 - 12x^5y + 60x^4y^2 - 160x^3y^3 + 240x^2y^4 - 192xy^5 + 64y^6$$

7. $(y + 4)^7$

$$1 \cdot y^7 \cdot 4^0 + 7 \cdot y^6 \cdot 4^1 + 21 \cdot y^5 \cdot 4^2 + 35 \cdot y^4 \cdot 4^3 + 35 \cdot y^3 \cdot 4^4 + 21 \cdot y^2 \cdot 4^5 + 7 \cdot y^1 \cdot 4^6 + 1 \cdot y^0 \cdot 4^7$$

$$1y^7 + 28y^6 + 336y^5 + 2240y^4 + 8960y^3 + 21504y^2 + 28672y + 16384$$

8. $(-x + 4y)^4$

$$1(-x)^4(4y)^0 + 4(-x)^3(4y)^1 + 6(-x)^2(4y)^2 + 4(-x)^1(4y)^3 + 1(-x)^0(4y)^4$$

$$1x^4 - 16x^3y + 96x^2y^2 - 256xy^3 + 256y^4$$

For #9-12 use the binomial $(r + s)^{12}$ to answer the questions.

You don't need to write out the whole expansion!

9. What is the exponent of r in the term that contains s^8 ?

$r^{\boxed{4}} s^8$ Need total of 12, so the exponent of r is 4.

10. What is the exponent of s in the terms that contains r^5 ?

$r^5 s^{\boxed{7}}$ (Total of 12)

11. What are the exponents for r and s in the term that has a coefficient of 924?

$12 \ 11 \ 10 \ 9 \ 8 \ 7 \ 6$
 $\boxed{924 r^6 s^6}$

12. What is the coefficient of the term with s^3 ?

$\boxed{220}$

$$1 r^{12} s^0 + 12 r^{11} s^1 + 66 r^{10} s^2 + \underline{\underline{220 r^9 s^3}} + \dots$$

13. What is the sum of the 7th row in pascals triangle? The 12th? The 20th?

$$2^7 = \boxed{128}$$

$$2^{12} = \boxed{4096}$$

$$2^{20} = \boxed{1,048,576}$$