

**SAT**  $\rightarrow x^2 + 2xy + y^2$

If  $(x + y)^2 = x^2 + y^2$ , which of the following statements must also be true?

I.  $x = 0$

II.  $(x - y)^2 = x^2 + y^2$   $\rightarrow x^2 - 2xy + y^2$

III.  $xy = 0$

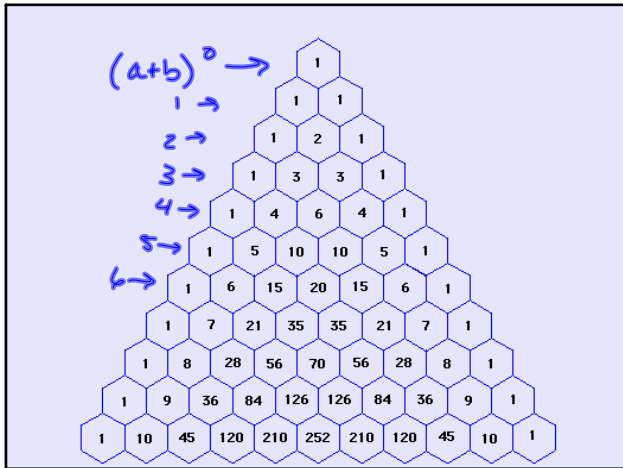
Dec 11-1:12 PM

	Final Expansion	Coefficients
$(a+b)^0$	$= 1$	$1$
$(a+b)^1$	$= a + b$	$1 \quad 1$
$(a+b)^2 = (a+b)(a+b)$	$= a^2 + 2ab + b^2$	$1 \quad 2 \quad 1$
$(a+b)^3 = (a+b)(a+b)^2$	$= a^3 + 3a^2b + 3ab^2 + b^3$	$1 \quad 3 \quad 3 \quad 1$
$(a+b)^4 = (a+b)(a+b)^3$	$= a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$	$1 \quad 4 \quad 6 \quad 4 \quad 1$
$(a+b)^5 = (a+b)(a+b)^4$	$= a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$	$1 \quad 5 \quad 10 \quad 10 \quad 5 \quad 1$

Make some observations about each row of the binomial expansion:

- The exponents of the a: decreasing
- The exponents of the b: increasing
- The sum of the exponents of a and b:  $(a+b)^n \rightarrow n$
- The coefficients of the terms: Pascal's  $\Delta$
- The number of terms in the expansion:  $n+1$

Dec 11-1:12 PM



Dec 11-1:12 PM

1) Write the binomial expansion of  $(x+4)^6$ .

7<sup>th</sup> Row  $\rightarrow 1 \quad 6 \quad 15 \quad 20 \quad 15 \quad 6 \quad 1$

$$= x^6 + 6x^5(4) + 15x^4(4^2) + 20x^3(4^3) + 15x^2(4^4) + 6x(4^5) + 4^6$$

$$= x^6 + 24x^5 + 240x^4 + 1280x^3 + 3840x^2 + 6144x + 4096$$

Jan 4-7:49 AM

2) Write the binomial expansion of  $(x-2)^3$ .

4<sup>th</sup> Row  $\rightarrow 1 \quad 3 \quad 3 \quad 1$

$$x^3 + 3x^2(-2) + 3x(-2)^2 + (-2)^3$$

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

Jan 4-7:49 AM

3) Write the binomial expansion of  $(2x+y)^7$ .

8<sup>th</sup> Row:  $1 \quad 7 \quad 21 \quad 35 \quad 35 \quad 21 \quad 7 \quad 1$

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

$$= 128x^7 + 448x^6y + 672x^5y^2 + 560x^4y^3 + 280x^3y^4 + 84x^2y^5 + 14xy^6 + y^7$$

Jan 4-7:49 AM

4) Write the binomial expansion of  $(4x - 3y)^5$ .

6<sup>th</sup> Row: 1 5 10 10 5 1

$$1024x^5 - 3840x^4y + 5760x^3y^2 - 4320x^2y^3 + 1620xy^4 - 243y^5$$

Jan 4-7:49 AM

5) Find the  $a^8$  term of  $(2a + 5)^{15}$ .

15 nCr 8

$$6435 (2a)^8 (5)^7 = 1.287 \times 10^{11} a^8$$

15 nCr 8	6435
----------	------

Jan 4-7:49 AM

6) Find the 15th term of  $(a - 2)^{20}$ .

$a^{20} a^{19} a^{18} \dots$

$38740 a^6 (-2)^{14}$       20 nCr 6

$$= 635043840 a^6$$

$\binom{20}{6} = 20 nCr 6$

$C_{20,6}$

Jan 23-1:54 PM

**Homework Assignment:**  
page 765 (13-35 odd, 45, 46, 49)

Jan 3-11:43 AM