

## 12-2 Pascal's Triangle and Binomial Theorem

Expand  $(a + b)^n$

terms = n + 1

$$(a + b)^0 =$$

1

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

$1a^1 + 1b^1$

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

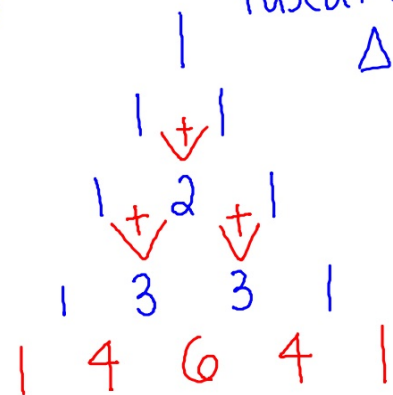
$1a^2 + 2a^1b^1 + 1b^2$

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

$1a^3 + 3a^2b^1 + 3a^1b^2 + 1b^3$

$$(a + b)^4 = 1a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + 1b^4$$

Pascal's  
△





## BINOMIAL THEOREM

$$(a+b)^n = \sum_{r=0}^n {}_n C_r a^{n-r} b^r$$

$n+1$  terms  $\frac{n!}{r!(n-r)!}$

Pascal #

$n!$

2

Find the coefficient of  $x^7$  in  $(2 - 3x)^{10}$

$$\frac{10!}{3!7!} (2)^3 (-3x)^7 = \underline{\underline{-2,099,520x^7}}$$

$$3 \cdot 2 \cdot 120 (8) (-2187x^7) =$$

3 Find the 5th term of  $(2 - 3x)^{10}$

$$\frac{10!}{6!4!} (2)^6 (-3x)^4$$
$$\frac{10 \cdot 9 \cdot 8 \cdot 7}{4 \cdot 3 \cdot 2} (64)(81x^4)$$
$$210 (64)(81x^4)$$