

BINOMIAL EXPANSION THEOREM

$$(x+y)^0 = 1$$

$$(x+y)^1 = x+y$$

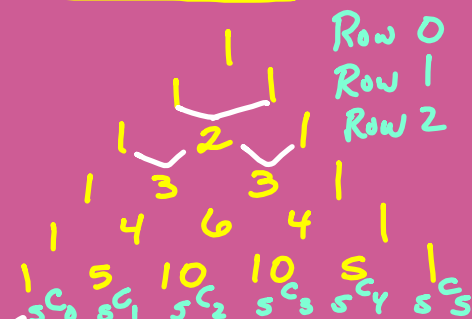
$$(x+y)^2 = x^2 + 2xy + y^2$$

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

$$(x+y)^4 = x^4 + 4x^3y + 6x^2y^2 + 4xy^3 + y^4$$

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

Pascal's Δ



$$(3x-2y)^4 = \cancel{1(3x)^4(-2)^0} + \cancel{4(3x)^3(-2)^1} + \cancel{6(3x)^2(-2)^2} + \boxed{4(3x)^1(-2)^3} + \cancel{1(3x)^0(-2)^4}$$

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

$$4 \cdot 3^3 \cdot 2 \quad 6 \cdot 3^2 \cdot 2^2 \quad 4 \cdot 3 \cdot 2^3$$

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

Find the 4th term of $(3x-2y)^4$.

$${}^4C_3 (3x)^1 (-2y)^3$$

← power on y is one less than number of term.

$$\text{Calculate: } {}^4C_3 \cdot 3^1 \cdot (-2)^3 = -96$$

$$= \boxed{-96x^1y^3}$$

Find the 7th term of $(5x-4y)^{10}$

$${}^{10}C_6 (5x)^4 (-4y)^6$$

$${}^{10}C_6 \cdot 5^4 \cdot (-4)^6$$

$$= \boxed{537,600,000 x^4 y^6}$$

BINOMIAL PROBABILITY

- 1) 2 possible outcomes
- 2) Independent Events — same chance every time the action is performed

Kirby Kicker — makes 65% of field goals under 40 yards.

What is the probability hits exactly 5 of his next 7 attempts?

$${}^7C_2 S^5 F^2$$

$${}^7C_2 (0.65)^5 (0.35)^2 \approx 0.298$$

10 Questions - Mult. Choice

What is prob of exactly 8 right?
A, B, C, D

$${}_{10}C_2 R^8 W^2$$

$${}_{10}C_2 (0.25)(0.75)^2 = 0.000386$$