March 28, 2023

BINOMIAL EXPANSION THM.

$(x+y)^0 = 1$

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

$(x+y)^2 = 1x^2 + 2xy + 1y^2$

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

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

Pascal's Δ

Row 0	1
Row 1	1 1
Row 2	1 2 1
Row 3	1 3 3 1
Row 4	1 4 6 4 1
Row 5	1 5 10 10 5 1
	${}_5C_0$ ${}_5C_1$ ${}_5C_2$ ${}_5C_3$ ${}_5C_4$ ${}_5C_5$

${}_5C_2 = \dfrac{5!}{3! \cdot 2!}$

${}_5C_3 = \dfrac{5!}{2!\,3!}$

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

$1\cdot 3^4\cdot \cancel{(-2)^0} \quad 4\cdot 3^3\cdot -2 \quad 6\cdot 3^2\cdot(-2)^2 \quad 4\cdot 3\cdot(-2)^3 \quad \cancel{1\cdot 3^0}\cdot(-2)^4$

$= 81x^4y^0 - 216x^3y^1 + 216x^2y^2 - 96xy^3 + 16y^4$

1st 2nd 3rd 4th 5th

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

${}_4C_3(3x)^1(-2y)^3$

${}_4C_3\cdot 3^1\cdot(-2)^3$

$\boxed{-96xy^3}$

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

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

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

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

BINOMIAL PROBABILITY

1) 2 possible outcomes.
2) Independent Event = same chance every time

Kirby Kicker - makes 65% of his field goals under 40 yds

What is the prob. he makes exactly 5 of his next 7 attempts?

$_7C_2 H^5 M^2$

$_7C_2 (0.65)^5 (0.35)^2 \simeq 0.298$

10 Question - Mult Choice - A - D

What is prob exactly 8 right?

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

${}_{10}C_2 (0.25)^8 (0.75)^2 \simeq 0.000386$