Pascals Triangle & Binomial Expansion

1

1 1

1 2 1

1 3 3 1

1 4 6 4 1

1 5 10 10 5 1

1 6 15 20 15 6 1

1 7 21 35 35 21 7 1

1 8 28 56 70 56 28 8 1

Binomfall Expansion

$(a+b)^n$

$1a^2b^0 + 2a^1b^1 + 1a^0b^2$

$a^2 + 2ab + b^2$

$(x+3)^5$

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

$x^5 + 15x^4 + 90x^3 + 270x^2 + 405x + 243$

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

$1(2x)^4 -y^{3\,0} \quad 4(2x)^3(-y^3)^1 \quad 6(2x)^2(-y^3)^2 \quad 4(2x)^1(-y^3)^3 \quad (2x)^0(-y^3)^4$

$16x^4 \quad -32x^3y^3 + 24x^2y^6 - 8xy^9 \quad + y^{12}$

Composition

A composit function is a function with another function inside of it

$(f \circ g)(x) = f(g(x))$

usually $f(g(x)) \neq g(f(x))$

$\{ x$ $f(x) = x^2+1$ $\quad g(x) = \sqrt{x} \}$

$f(g(x)) = \sqrt{x}^2+1 \quad x+1$

$g(f(x)) = \sqrt{x^2+1}$

Ex $f(x) = 2x^3+3x-4 \quad g(x) = 2^x$

$f(g(x)) = 2(\quad)^3+3(2^x)-4$

$g(f(x)) = 2^{2x^3+3x-4}$