Pre-Calculus 12 The Binomial Theorem

$(x+y)^n = {}_nC_0 x^n y^0 + {}_nC_1 x^{n-1} y^1 + {}_nC_2 x^{n-2} y^2 + \ldots + {}_nC_{n-1} x^1 y^{n-1} + {}_nC_n x^0 y^n$

Ex. 1) Expand and simplify

a.) $(2x + y)^3$

$n = 3 \longrightarrow$ 4 terms

${}_3C_0(2x)^3 y^0 + {}_3C_1(2x)^2 y^1 + {}_3C_2(2x)^1 y^2 + {}_3C_3(2x)^0 y^3$

$1(8x^3) + 3(4x^2)y + 3(2x)y^2 + 1y^3$

$8x^3 + 12x^2y + 6xy^2 + y^3$

b.) $(4a^2 + 2b)^4$ $n = 4 \longrightarrow$ 5 terms

${}_4C_0(4a^2)^4(2b)^0 + {}_4C_1(4a^2)^3(2b)^1 + {}_4C_2(4a^2)^2(2b)^2 + {}_4C_3(4a^2)^1(2b)^3 + {}_4C_4(4a^2)^0(2b)^4$

$1(256a^8) + 4(64a^6)(2b) + 6(16a^4)(4b^2) + 4(4a^2)(8b^3) + 1(16b^4)$

$256a^8 + 512a^6b + 384a^4b^2 + 128a^2b^3 + 16b^4$

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Assignment: ~~Pg 743: #3a,b; 4; 5a,c; 8a; b iii~~