

Pascal's Triangle - used to expand binomials

$$\begin{array}{cccccc} & & 1 & & & \\ & & 1 & 1 & & -1^{\text{st}} \text{ row} \\ & & 1 & 2 & 1 & -2^{\text{nd}} \text{ row} \\ & & 1 & 3 & 3 & 1 & -3^{\text{rd}} \text{ row} \\ & & 1 & 4 & 6 & 4 & 1 & -4^{\text{th}} \text{ row} \\ & & 1 & 5 & 10 & 10 & 5 & 1 \end{array}$$

Ex)  $(x+y)^4$

$$\underline{1}x^4 + \underline{4}x^3y + \underline{6}x^2y^2 + \underline{4}xy^3 + \underline{1}y^4$$

Step 1: Write out all power possibilities.

Step 2: Fill in Pascal's row

Ex)  $(x+2)^3$

$$\underline{1}x^3 + \underline{3}x^2(2) + \underline{3}x(2)^2 + \underline{1}(2)^3$$
$$x^3 + 6x^2 + 12x + 8$$

Ex)  $(x-1)^3$

$$\underline{1}x^3 + \underline{3}x^2(-1) + \underline{3}x(-1)^2 + \underline{1}(-1)^3$$
$$x^3 - 3x^2 + 3x - 1$$

Ex)  $(2x-y)^5$

$$\underline{1}(2x)^5 + \underline{5}(2x)^4(-y) + \underline{10}(2x)^3(-y)^2 + \underline{10}(2x)^2(-y)^3 + \underline{5}(2x)(-y)^4 + \underline{1}(-y)^5$$
$$32x^5 - 80x^4y + 80x^3y^2 - 40x^2y^3 + 10xy^4 - y^5$$

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12-17

#17  $(3x-y)^5$