Complete the following assignment prior to Meeting #14:

C*. Express (in simplified form) the coefficient of x^2y^3 in the expansion of $(2x + 3y)^5$. Please display the computations in a pdf document uploaded to the appropriate Canvas assignment link.

Sample computation:

Let $u = 2x \wedge v = 3y$, then $(2x + 3y)^5 = (u + v)^5$. The coefficient u^2v^3 in the expansion of $(u + v)^5$ is $\binom{5}{3}$ and $u^2v^3 = (2^2 \cdot 3^3) \cdot x^2y^3$. Therefore the coefficient of x^2y^3 in the expansion of $(2x + 3y)^5$ is $\binom{5}{3} \cdot (2^2 \cdot 3^3) = 1080$.

D*. Express (in simplified form) the following; display the computations in a pdf document uploaded to the appropriate Canvas assignment link:

$$\binom{n}{0}+\binom{n}{1}+\binom{n}{2}+\binom{n}{3}+\ldots+\binom{n}{n}$$

Sample computation:

We may recall the following theorem we proved a previous life:

$A \in \{ \text{ finite sets } \} \Rightarrow |\{ \text{ subsets of } A \}| = 2^{|A|}$.

Since $\binom{n}{0}+\binom{n}{1}+\binom{n}{2}+\binom{n}{3}+\ldots+\binom{n}{n}$ is the total number of subsets of a set whose cardinality is n, we have $\binom{n}{0}+\binom{n}{1}+\binom{n}{2}+\binom{n}{3}+\ldots+\binom{n}{n} = 2^n$.

******

But for those of us who didn't enjoy a life previous to Math 571, here is an alternative computation:

Note that $\binom{n}{0}+\binom{n}{1}+\binom{n}{2}+\binom{n}{3}+\ldots+\binom{n}{n} = \sum_{i=0}^{n}\binom{n}{i}1^{n-i}1^i = (1+1)^n = 2^n$
