Number of Terms in the Expansion of (a + b + c) ^{n} and (a + b + c + d) ^{n}.

$(a+b+c)^n$ can be expanded as : $(a+b+c)^n = \{(a+b)+c\}^n$

$$= (a+b)^n + {}^nC_1(a+b)^{n-1}(c)^1 + {}^nC_2(a+b)^{n-2}(c)^2 + ... + {}^nC_n\, c^n$$

$$= (n+1)\text{term} + n\,\text{term} + (n-1)\text{term} + ... + 1\,\text{term}$$

$\therefore$ Total number of terms $= (n+1)+(n)+(n-1)+..... +1 = \dfrac{(n+1)(n+2)}{2}$.

Similarly, Number of terms in the expansion of $(a+b+c+d)^n = \dfrac{(n+1)(n+2)(n+3)}{6}$.