Binomial Theorem

$$(a+b)^n = \binom{n}{0}a^{n-0}b^0 + \binom{n}{1}a^{n-1}b^1 + \binom{n}{2}a^{n-2}b^2 + \cdots + \binom{n}{n}a^{n-n}b^n$$

$$(a-b)^n = \text{"}\ - \text{"}\ + \text{"}\ - \text{"}\ \cdots$$

3) $(n-m)^4 = \binom{4}{0} n^4 m^0 - \binom{4}{1} n^3 m^1 + \binom{4}{2} n^2 m^2 - \binom{4}{3} n^1 m^3 + \binom{4}{4} n^0 m^4$

$= n^4 - 4n^3m + 6n^2m^2 - 4nm^3 + m^4$

1) $(y+2)^5$

$= \binom{5}{0} y^5 2^0 + \binom{5}{1} y^4 2^1 + \binom{5}{2} y^3 2^2 + \binom{5}{3} y^2 2^3 + \binom{5}{4} y^1 2^4 + \binom{5}{5} y^0 2^5$

$= y^5 + 5y^4 2 + 10y^3 4 + 10y^2 8 + 5y^1 16 + 32$

$= \boxed{y^5 + 10y^4 + 40y^3 + 80y^2 + 80y + 32}$

기! $(y^4 - 3x)^5$

$= \binom{5}{0}(y^4)^5(3x)^0 - \binom{5}{1}(y^4)^4(3x)^1 + \binom{5}{2}(y^4)^3(3x)^2 - \binom{5}{3}(y^4)^2(3x)^3 + \binom{5}{4}(y^4)^1(3x)^4$

$- \binom{5}{5}(y^4)^0(3x)^5$

$= y^{20} - 15y^{16}x + 90y^{12}x^2 - 270y^8x^3 + 405y^4x^4 - 243x^5$

13) 2nd term of $(2y+x)^3$

$\binom{3}{1}(2y)^2 x^1$

$= 12y^2x$

111th term of $(a+b)^{184}$

$\binom{184}{74} a^{90} b^{74}$