

$$1. (2 + 3x)^4 -$$

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

$$= 16 + 96x + 216x^2 + 216x^3 + 81x^4$$

$$2. (2 - 3y)^4 -$$

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

$$= 16 - 96y + 216y^2 - 216y^3 + 81y^4$$

$$3. (4 - x)^7 -$$

$$-\binom{7}{0}4^7 - \binom{7}{1}4^6 x + \binom{7}{2}4^5 x^2 - \binom{7}{3}4^4 x^3 + \binom{7}{4}4^3 x^4 - \binom{7}{5}4^2 x^5 + \binom{7}{6}4 - \binom{7}{7}x^7 -$$

$$= -16384 - 28672x + 21504x^2 - 8960x^3 + 2240x^4 - 336x^5 + 28x^6 - x^7$$

$$4. (x - 3)^6 =$$

$$= (3 - x)^6 =$$

$$-\binom{6}{0}x^6 - \binom{6}{1}x^5 \cdot 3 + \binom{6}{2}x^4 \cdot 3^2 - \binom{6}{3}x^3 \cdot 3^3 + \binom{6}{4}x^2 \cdot 3^4 - \binom{6}{5}x \cdot 3^5 + \binom{6}{6}3^6 -$$

$$5. (x - 2y)^4 =$$

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

$$= x^4 - 8x^3y + 24x^2y^2 - 32xy^3 + 16y^4$$

6. Hallar el término cuarto del desarrollo de  $(x + 2y)^5$ .

$$T_4 = \binom{5}{4}x \cdot (2y)^4 = 80xy^4$$

7. Calcular el término cuarto del desarrollo de  $(2-3y)^4$ .

$$T_4 = (-1)^3 \binom{4}{3} 2 \cdot (3y)^3 = -216y^3$$

8. Encontrar el término quinto del desarrollo de  $\left(x - \frac{1}{x}\right)^7$ .

$$T_5 = (-1)^4 \cdot \binom{7}{4} \cdot x^3 \cdot \left(\frac{1}{x}\right)^4 = \frac{35}{x}$$

9. Buscar el término octavo del desarrollo de  $(x^2 - 3y^3)^{10}$ .

$$T_8 = (-1)^7 \binom{10}{7} (x^2)^3 (3y^3)^7 = -262440x^6y^{21}$$

10. Hallar el término independiente del desarrollo de

$$\left(a^3 - \frac{2}{a}\right)^{21}$$

$$T_k = (-1)^{k-1} \cdot \binom{20}{k-1} \cdot (a^3)^{21-k} \cdot \left(\frac{2}{a}\right)^{k-1}$$

El exponente de  $a$  con el término independiente es 0, por tanto tomamos sólo la parte literal y la igualamos a  $a^0$ .

$$(a^3)^{21-k} \cdot (a^{-1})^{k-1} = a^0$$

$$a^{63-3k-k+1} = a^0 \quad 64-4k=0 \quad k=16$$

$$T_{16} = (-1)^{15} \cdot \binom{20}{15} \cdot (a^3)^5 \cdot \left(\frac{2}{a}\right)^{15} = -15504$$