

SOLUCIONES DEL BINOMIO DE NEWTON

1. Desarrolla $(x^2 + 3x)^5$

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

$$= 1 \cdot x^{10} \cdot 1 + 5 \cdot x^8 \cdot 3x + 10 \cdot x^6 \cdot 9x^2 + 10 \cdot x^4 \cdot 27x^3 + 5 \cdot x^2 \cdot 81x^4 + 1 \cdot 1 \cdot 243x^5 =$$

$$= x^{10} + 15x^9 + 90x^8 + 270x^7 + 405x^6 + 243x^5$$

2. Desarrolla $(2\sqrt{5} - 3)^4$

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

$$= 1 \cdot 2025 \cdot 1 - 4 \cdot 135\sqrt{5} \cdot 2y + 6 \cdot 45 \cdot 4y^2 - 4 \cdot 3\sqrt{5} \cdot 8y^3 + 1 \cdot 1 \cdot 16y^4 =$$

$$= 2025 - 1080\sqrt{5}y + 1080y^2 - 96\sqrt{5}y^3 + 16y^4$$

3. Desarrolla $(4x + \frac{3}{y})^6$

$$\left(4x + \frac{3}{y}\right)^6 = \binom{6}{0}(4x)^6\left(\frac{3}{y}\right)^0 + \binom{6}{1}(4x)^5\left(\frac{3}{y}\right)^1 + \binom{6}{2}(4x)^4\left(\frac{3}{y}\right)^2 + \binom{6}{3}(4x)^3\left(\frac{3}{y}\right)^3 + \binom{6}{4}(4x)^2\left(\frac{3}{y}\right)^4 + \binom{6}{5}(4x)^1\left(\frac{3}{y}\right)^5 + \binom{6}{6}(4x)^0\left(\frac{3}{y}\right)^6 =$$

$$= 1 \cdot 4096x^6 \cdot 1 + 6 \cdot 1024x^5 \cdot \frac{3}{y} + 15 \cdot 256x^4 \cdot \frac{9}{y^2} + 20 \cdot 64x^3 \cdot \frac{27}{y^3} + 15 \cdot 16x^2 \cdot \frac{81}{y^4} + 6 \cdot 4x \cdot \frac{243}{y^5} + 1 \cdot 1 \cdot \frac{729}{y^6} =$$

$$= 4096x^6 + 18432 \frac{x^5}{y} + 34560 \frac{x^4}{y^2} + 34560 \frac{x^3}{y^3} + 19440 \frac{x^2}{y^4} + 5832 \frac{x}{y^5} + 729 \frac{1}{y^6}$$