

## Kubiranje binoma – zadaci:

### Jednostavniji zadaci:

a)  $(a - 2b)^3 =$   
 $= a^3 - 3 \cdot a^2 \cdot (2b) + 3 \cdot a \cdot (2b)^2 - (2b)^3 = a^3 - 3 \cdot a^2 \cdot 2b + 3 \cdot a \cdot 4b^2 - 8b^3 = a^3 - 6a^2b + 12ab^2 - 8b^3$

b)  $(4x + 1)^3 =$   
 $= (4x)^3 - 3 \cdot (4x)^2 \cdot 1 + 3 \cdot (4x) \cdot 1^2 + 1^3 = 64x^3 + 3 \cdot 16x^2 \cdot 1 + 3 \cdot 4x \cdot 1 + 1 = 64x^3 + 48x^2 + 12x + 1$

c)  $(2c - 3)^3 =$   
 $= (2c)^3 - 3 \cdot (2c)^2 \cdot 3 + 3 \cdot (2c) \cdot 3^2 - 3^3 = 8c^3 - 3 \cdot 4c^2 \cdot 3 + 3 \cdot 2c \cdot 9 - 27 = 8c^3 - 36c^2 + 54c - 27$

### Teži zadaci:

a)  $(2a^2 - 5b^4)^3 =$   
 $=$   
 $(2a^2)^3 - 3 \cdot (2a^2)^2 \cdot (5b^4) + 3 \cdot (2a^2) \cdot (5b^4)^2 - (5b^4)^3 = 8a^6 - 3 \cdot 4a^4 \cdot 5b^4 + 3 \cdot 2a^2 \cdot 25b^8 - 125b^{12} = 8a^6 - 60a^4b^4 + 150a^2b^8 - 125b^{12}$

b)  $(3x^3 - 2)^3 =$   
 $= (3x^3)^3 - 3 \cdot (3x^3)^2 \cdot 2 + 3 \cdot (3x^3) \cdot 2^2 - 2^3 = 27x^9 - 3 \cdot 9x^6 \cdot 2 + 3 \cdot 3x^3 \cdot 4 - 8 = 27x^9 - 54x^6 + 36x^3 - 8$

c)  $(a^2 + 2b^3)^3 =$   
 $= (a^2)^3 + 3 \cdot (a^2)^2 \cdot (2b^3) + 3 \cdot a^2 \cdot (2b^3)^2 + (2b^3)^3 = a^6 - 3 \cdot a^4 \cdot 2b^3 + 3 \cdot a^2 \cdot 4b^6 + 8b^9 = a^6 - 6a^4b^3 + 12a^2b^6 + 8b^9$

### Složeniji zadaci:

a)  $\left(\frac{2}{3}a^2b^2 - \frac{3}{2}c^4\right)^3 =$   
 $=$   
 $\left(\frac{2}{3}a^2b^2\right)^3 - 3 \cdot \left(\frac{2}{3}a^2b^2\right)^2 \cdot \left(\frac{3}{2}c^4\right) + 3 \cdot \left(\frac{2}{3}a^2b^2\right) \cdot \left(\frac{3}{2}c^4\right)^2 - \left(\frac{3}{2}c^4\right)^3 = \frac{8}{27}a^6b^6 + 3 \cdot \frac{4}{9}a^4b^4 \cdot \frac{3}{2}c^4 + 3 \cdot \frac{2}{3}a^2b^2 \cdot \frac{9}{4}c^8 - \frac{27}{8}c^{12} = \frac{8}{27}a^6b^6 + 2a^4b^4c^4 + \frac{9}{2}a^2b^2c^8 - \frac{27}{8}c^{12}$

b)  $\left(\frac{1}{4}x^2 + \frac{1}{3}y^3\right)^3 =$   
 $= \left(\frac{1}{4}x^2\right)^3 + 3 \cdot \left(\frac{1}{4}x^2\right)^2 \cdot \left(\frac{1}{3}y^3\right) + 3 \cdot \left(\frac{1}{4}x^2\right) \cdot \left(\frac{1}{3}y^3\right)^2 + \left(\frac{1}{3}y^3\right)^3 = \frac{1}{64}x^6 + 3 \cdot \frac{1}{16}x^4 \cdot \frac{1}{3}y^3 + 3 \cdot \frac{1}{4}x^2 \cdot \frac{1}{9}y^6 + \frac{1}{27}y^9 = \frac{1}{64}x^6 + \frac{1}{16}x^4y^3 + \frac{1}{12}x^2y^6 + \frac{1}{27}y^9$

c)  $\left(c^3 + \frac{2}{5}d^2\right)^3 =$   
 $= (c^3)^3 + 3 \cdot (c^3)^2 \cdot \left(\frac{2}{5}d^2\right) + 3 \cdot c^3 \cdot \left(\frac{2}{5}d^2\right)^2 + \left(\frac{2}{5}d^2\right)^3 = c^9 + 3 \cdot c^6 \cdot \frac{2}{5}d^2 + 3 \cdot c^3 \cdot \frac{4}{25}d^4 + \frac{8}{125}d^6 = c^9 + \frac{6}{5}c^6d^2 + \frac{12}{25}c^3d^4 + \frac{8}{125}d^6$

### Dodatni zadaci:

a) Pojednostavi  $(2a^2 - b)^3 - (2a^2 + b)^3 + 2b(a - b)^2$ .  
Rj:  $-24a^4b + 2a^2b - 4ab^2$

b) Izračunaj  $(2x - y)^5$ .  
Rj:  $32x^5 - 80x^4y + 80x^3y^2 - 40x^2y^3 + 10xy^4 - y^5$

c) Za koje je cijele brojeve  $a$  i  $b$  izraz  $27x^3 + ax^2 + bx - 64$  kub binoma?  
Rj:  $a = -108$   
 $b = 144$