# ROZKLAD MNOHOČLENŮ - I.

**Př 1** Rozložte na součin:

a) $22ab^2 + 28a^2b^2 + 14a^4b = 2ab(11b + 14ab + 7a^3)$

b) $18a - 45a^2 + 63a^3 = 9a(2 - 5a + 7a^2)$

c) $a^3b + ab^3 = ab(a^2 + b^2)$

d) $6a^2b - 3a^2b^2 = 3a^2b(2 - b)$

e) $32ab^2x - 48a^2bx^3 + 64ab^2x^2 = 16abx(2b - 3ax^2 + 4bx)$

f) $33m^2v - 27mv^3 + 24m^2v^2 = 3mv(11m - 9v^2 + 8mv)$

g) $50a^2c^3 + 25ac^2 - 75a^4c^4 = 25ac^2(2ac + 1 - 3a^3c^2)$

**Př 2** Rozložte na součin:

a) $px + 7y - py - 7x = px - py - 7x + 7y =$

$= p(x-y) - 7(x-y) = (x-y)(p-7)$

b) $a^2 - b^2 + 9a + 9b = (a-b)(a+b) + 9(a+b) =$

$= (a+b)(a-b+9)$

c) $2x^5 - x^4 + y^4 - 2xy^4 = x^4(2x-1) + y^4(1-2x) =$

$= x^4(2x-1) - y^4(2x-1) = (2x-1)(x^4 - y^4) =$

$= (2x-1)(x^2-y^2)(x^2+y^2) = (2x-1)(x-y)(x+y)(x^2+y^2)$

d) $x^3 + x^2y + xy^2 + y^3 = x^2(x+y) + y^2(x+y) =$

$= (x+y)(x^2+y^2)$

e) $3ax + bx + 3ay + by = 3ax + 3ay + bx + by =$

$= 3a(x+y) + b(x+y) = (x+y)(3a+b)$

f) $5cm - cn - 15dm + 3dn = c(5m-n) - 3d(5m-n) =$

$= (5m-n)(c-3d)$

**Př 3** Rozložte na součin:

a) $x^5+x^4-2x^3-2x^2+x+1 =$

$= x^4(x+1) - 2x^2(x+1) + x+1 =$

$= (x+1)(x^4-2x^2+1) = (x+1)(x^2-1)^2 = (x+1)(x^2-1)(x^2-1) =$

$= (x+1)(x-1)(x+1)(x-1)(x+1) = \underline{(x+1)^3\cdot(x-1)^2}$

b) $(x+y)^3 - (x-y)^3 = [(x+y)-(x-y)]\cdot[(x+y)^2+(x+y)(x-y)+(x-y)^2] =$

$= [x+y-x+y]\cdot[x^2+2xy+y^2+x^2-y^2+x^2-2xy+y^2] =$

$= \underline{2y\cdot(3x^2+y^2)}$

c) $x^3-9x^2y+27xy^2-27y^3 = \underline{(x-3y)^3}$

d) $(2x-3y)^2-(4y+5x)^2 =$

$= [(2x-3y)-(4y+5x)]\cdot[(2x-3y)+(4y+5x)] =$

$= [2x-3y-4y-5x]\cdot[2x-3y+4y+5x] = \underline{(-3x-7y)\cdot(7x+y)}$

e) $a^2+2ab+b^2-ac-bc =$

$= (a+b)^2 - c(a+b) = \underline{(a+b)(a+b-c)}$

f) $m^2-2mn+n^2-t^2 =$

$= (m-n)^2-t^2 = [(m-n)-t][(m-n)+t] =$

$= \underline{[m-n-t][m-n+t]}$

g) $x^3+6x^2y+12xy^2+8y^3 = \underline{(x+2y)^3}$

h) $9a^2-12ab+4b^2 = \underline{(3a-2b)^2}$

i) $x^3-1-3x^2+3x = (x-1)(x^2+x+1)-3x(x-1) =$

$= (x-1)(x^2+x+1-3x) = (x-1)(x^2-2x+1) =$

$= (x-1)(x-1)^2 = \underline{(x-1)^3}$

nebo

$x^3-1-3x^2+3x = x^3-3x^2+3x-1 = \underline{(x-1)^3}$

j) $x^4y^2-16 = \underline{(x^2y-4)(x^2y+4)}$

k) $a^2b^4 - b^6 = b^4(a^2-b^2) = \underline{b^4(a-b)(a+b)}$

l) $4x^2 - 4xy + y^2 = \underline{(2x-y)^2}$

m) $p^2 - (q-r)^2 = [p-(q-r)][p+(q-r)] =$

$= \underline{(p-q+r)(p+q-r)}$