Násobení mnohočlenu mnohočlenem

1. Vynásob a výsledné mnohočleny uspořádej sestupně:

a) $(x+5)(x-2) =$ $x^2-2x+5x-10 = x^2+3x-10$

b) $(y+3)(y-4) =$ $y^2+3y-4y-12 = y^2-y-12$

c) $(z-4)(z+1) =$ $z^2+z-4z-4 = z^2-3z-4$

d) $(2t-5)(t+2) =$ $2t^2+4t-5t-10 = 2t^2-t-10$

e) $(u^2+3)(u-2) =$ u^3-2u^2+3u-6

f) $(-v+4)(v^2+5) =$ $-v^3-5v+4v^2+20 = -v^3+4v^2-5v+20$

g) $(3r-r^2)(r-2) =$ $3r^2-6r-r^3+2r^2 = -r^3+5r^2-6r$

h) $(3s^2-2s)(-4s-7) =$ $-12s^3-21s^2+8s^2+14s = -12s^3-13s^2+14s$

2. Vynásob mnohočleny:

a) $(r^2+2r-3)(r-1) =$ $r^3-r^2+2r^2-2r-3r+3 = r^3+r^2-5r+3$

b) $(s+2)(3s^2-s+5) =$ $3s^3-s^2+5s+6s^2-2s+10 = 3s^3+5s^2+3s+10$

c) $(3t^2-t+4)(2t^2-5) =$ $6t^4-2t^3+5t-15t^2+8t^2-20 = 6t^4-2t^3-7t^2+5t-20$

d) $(u^2+5u-4)(-u+3) =$ $-u^3+3u^2-5u^2+15u+4u-12 = -u^3-2u^2+19u-12$

$2u^3v^2+2uv^3+u^3v^2-5uv^2-5u^2v-2uv+6u$

e) $(2uv^2+uv-2)(u^2v+uv-3u) =$

f) $(3x^2+2x^2-x)(x-2) = 5x^3-11x^2+4x$

g) $(y^2+2y+4)(y-2) = y^3-8$

h) $(z^2-3z+9)(z+3) = z^3+27$

3. Vynásob mnohočleny:

a) $(3k+2l)(kl-2l) =$ $3k^2l-6kl^2+2kl^2-4l^2 =$
$= 3k^2l-4kl^2-4l^2$

* c) $(4n+1)\cdot 3n\cdot(2n+3) = (12n^2+3n)(2n+3) =$
$= 24n^3+6n^2+36n^2+9n = 24n^3+42n^2+9n$

e) $(7r - 3r^2)(-2r - 5r^2) = 15r^4 - 29r^3 - 14r^2$

f) $(s^2 - st)(st^2 + s) = s^3t^2 + s^3 - s^2t^3 - s^2t$

g) $(u^2 - v)(2uv - 2v) = 2u^3v - 2u^2v - 2uv^2 + 2v^2$

h) $(3z^2 - 1)(z^2 + 2z) = 3z^4 + 5z^3 - 2z$

4. Vynásob:

a) $(2ab + a)(b + 3ab) = 2ab^2 + 6a^2b^2 + ab + 3a^2b$

b) $(3c^2 - 2d)(-3c + 4d) = -9c^3 + 12c^2d + 6cd - 8d^2$

* c) $(2e - 3)(4 - 3e)(1 + e) = (8e - 6e^2 - 12 + 9e)(1+e) = (-6e^2 + 17e - 12)(1+e) =$
$= -6e^2 + 17e - 12 - 6e^3 + 17e^2 - 12e = -6e^3 + 11e^2 + 5e - 12$

* d) $(5ef + e)(f - 2e)(3e + f) = (15ef^2 + ef - 10e^2f - 2e^2)(3e + f) =$
$= 45e^2f^2 + 3ef - 30e^3f - 6e^3 + 15ef^2 + ef^2 - 10e^2f^2 - 2e^2f =$
$= 35e^2f^2 + e^2f - 30e^3f - 6e^3 + 15ef^2 + ef^2$

* e) $(k - 2)(3 - k)(1 + k) = -k^3 + 4k^2 - k - 6$

* f) $(2m - 3)(2 - 3m)(3 + 2m) = -12m^3 + 8m^2 + 27m - 18$

* g) $(y - 2)(y^2 + 4)(y + 2) = y^4 - 16$

* h) $(q^2 + 3)(2 - q)(4 - q^2) =$
$= q^5 - 2q^4 - q^3 + 2q^2 - 12q + 24$

5. Vypočítej součin součtu a rozdílu výrazů $(3a + 2b)$ a $(4a - b)$.

$[(3a + 2b) + (4a - b)] \cdot [(3a + 2b) - (4a - b)] =$
$= [7a + b] \cdot [-a + 3b] = -7a^2 - ab + 21ab + 3b^2 =$
$= -7a^2 + 3b^2 + 20ab$

* **6.** Vypočítej:

a) $(a + 3)(a - 2) + (a - 4)(a + 1) =$
$= a^2 - 2a + 3a - 6 + a^2 + a - 4a - 4 =$
$= 2a^2 - 2a - 10$

b) $(a + 3)[(a - 2) + (a - 4)(a + 1)] =$
$= (a+3) \cdot [a - 2 + a^2 + a - 4a - 4] = (a+3) \cdot [a^2 - 2a - 6] =$
$= a^3 - 2a^2 - 6a + 3a^2 - 6a - 18 = a^3 + a^2 - 12a - 18$

c) $(a + 3)[(a - 2) + (a - 4)](a + 1) = (a+3)[a - 2 + a - 4](a+1) =$
$= (a+3)(2a - 6)(a+1) = (2a^2 - 6a + 6a - 18)(a+1) =$
$= (2a^2 - 18)(a+1) = 2a^3 + 2a^2 - 18a - 18$

d) $[(a + 3)(a - 2) + (a - 4)](a + 1) = [a^2 - 2a + 3a - 6 + a - 4](a+1) =$
$= [a^2 + 2a - 10](a+1) = a^3 + 2a^2 - 10a + a^2 + 2a - 10 =$
$= a^3 + 3a^2 - 8a - 10$

$(a + 3) + (a - 2)[(a - 4) + (a + 1)] = a + 3 + (a-2)[a - 4 + a + 1] =$
$= a + 3 + (a-2)(2a - 3) = a + 3 + 2a^2 - 3a - 4a + 6 =$
$= 2a^2 - 6a + 9$

$(a-3)(a-2) - (a-4)(a+1) =$
$= a^2 - 2a - 3a + 6 - a^2 - a + 4a + 4 =$
$= 2a + 10$

h) $(a+3)[(a-2) - (a-4)(a+1)] =$
$= (a+3)[a - 2 - a^2 - a + 4a + 4] =$
$= (a+3)(-a^2 + 4a + 2) =$
$= -a^3 + 4a^2 + 2a - 3a^2 + 12a + 6 = -a^3 + a^2 + 14a + 6$