La Vitola Katia — Classe $I^a B$

12) $3pq^2-[pq\cdot(3p+q)-3p^2\cdot(p+q)]-p\cdot(3p^2+2q^2)=$

$=3pq^2-[\cancel{3p^2q}+pq^2-3p^3-\cancel{3p^2q}]-3p^3-2pq^2=$

$=\cancel{3pq^2}-\cancel{pq^2}+\cancel{3p^3}-\cancel{3p^3}-\cancel{2pq^2}=0.$

16) $2xy\cdot(x+\frac{1}{2}y)+(x^3-y^3)-(2x^2y+xy^2)-x^2\cdot(x-y)+y\cdot(y^2-x^2)=$

$=\cancel{2x^2y}+\cancel{xy^2}+\cancel{x^3}-\cancel{y^3}-\cancel{2x^2y}-\cancel{xy^2}-\cancel{x^3}+\cancel{x^2y}+\cancel{y^3}-\cancel{x^2y}=0.$

20) $6\cdot(ax+3x^2+4x^3)-3x^2\cdot(a+9+13x)+5x\cdot(a+2x+3x^2)+x^2\cdot(3a-1)=$

$=6ax+\cancel{18x^2}+\cancel{24x^3}-\cancel{3ax^2}-\cancel{27x^2}-\cancel{39x^3}+5ax+\cancel{10x^2}+\cancel{15x^3}+\cancel{3ax^2}-\cancel{x^2}=$

$=11ax.$

24) $3x^3\cdot[4x^4-7x\cdot(9x^3-11x^2)+59x^3\cdot(x-1)]+2\cdot(-3x^2)^3=$

$=3x^3\cdot[\cancel{4x^4}-\cancel{63x^4}+77x^3+\cancel{59x^4}-59x^3]+2\cdot(-27x^6)=$

$=3x^3\cdot[+18x^3]-54x^6=$

$=\cancel{54x^6}-\cancel{54x^6}=0.$

28) $6x^3-\{-[y\cdot(-4y^2+x^2)-x^2\cdot(-3x+4y)]-y\cdot(2y^2-5x^2)\}+2y\cdot(4x^2+y^2)=$

$=6x^3-\{-[-4y^3+x^2y+3x^3-4x^2y]-2y^3+5x^2y\}+8x^2y+2y^3=$

$=6x^3-\{-[-4y^3-3x^2y+3x^3]-2y^3+5x^2y\}+8x^2y+2y^3=$

$=6x^3-\{+4y^3+3x^2y-3x^3-2y^3+5x^2y\}+8x^2y+2y^3=$

$=6x^3-\{+2y^3+8x^2y-3x^3\}+8x^2y+2y^3=$

$=6x^3-\cancel{2y^3}-\cancel{8x^2y}+3x^3+\cancel{8x^2y}+\cancel{2y^3}=9x^3.$

32) $(x-1)\cdot(x+2)=$

$= x^2+2x-x-2=$

$= x^2+x-2$.

$(a+1)\cdot(a-3)=$

$= a^2-3a+a-3=$

$= a^2-2a-3$.

$(-a-1)\cdot(a+b)=$

$= -a^2-ab-a-b$.

36) $(x^3-2x+1)\cdot(x^3-3x+2)=$

$= x^6-3x^4+2x^3-2x^4+6x^2-4x+x^3-3x+2=$

$= x^6-5x^4+3x^3+6x^2-7x+2$.

$(2a+3b-c)\cdot(b+2a+c)=$

$= 2ab+4a^2+\cancel{2ac}+3b^2+6ab+3bc-bc-\cancel{2ac}-c^2=$

$= 8ab+4a^2+3b^2+2bc-c^2$.

40) $(a+b)\cdot(a^2+b^2)\cdot(a-b)\cdot(a^4+b^4)\cdot(a^8+b^8)=$

$= a^{16}-b^{16}$.

44) $(x^{n-1}-x^{n-2}y+x^{n-3}y^2-x^{n-4}y^3+x^{n-5}y^4)\cdot(x+y)=$

$= x^{n\cancel{-1+1}}-x^{n-2+1}y+x^{n-3+1}y^2-x^{n-4+1}y^3+x^{n-5+1}y^4+x^{n-1}y-x^{n-2}y^2+$
$+x^{n-3}y^3-x^{n-4}y^4+x^{n-5}y^5=$

$= x^n-x^{n-1}y+x^{n-2}y^2-x^{n-3}y^3+x^{n-4}y^4+x^{n-1}y-x^{n-2}y^2+x^{n-3}y^3+$
$-x^{n-4}y^4+x^{n-5}y^5=$

$= x^n+x^{n-5}y^5$.

48) $(3a+2b)\cdot(4a-6b)-(2a-b)\cdot(6a+8b)+4b\cdot(5a+b)=$

$= 12a^2 - 18ab + 8ab - 12b^2 - (12a^2 + 16ab - 6ab - 8b^2) + 20ab + 4b^2 =$

$= \cancel{12a^2} - \cancel{18ab} + \cancel{8ab} - \cancel{12b^2} - \cancel{12a^2} - \cancel{16ab} + \cancel{6ab} + \cancel{8b^2} + \cancel{20ab} + \cancel{4b^2} =$

$= 0.$

52) $(a+b+c)\cdot(ab+bc+ca)-(a+b)\cdot(b+c)\cdot(c+a)=$

$= a^2b + abc + a^2c + ab^2 + b^2c + abc + abc + bc^2 + ac^2 - (ab + ac + b^2 + bc)\cdot(c+a) =$

$= a^2b + abc + a^2c + ab^2 + b^2c + abc + abc + bc^2 + ac^2 - (abc + a^2b + ac^2 + a^2c +$
$+ b^2c + ab^2 + bc^2 + abc) =$

$= \cancel{a^2b} + \cancel{abc} + \cancel{a^2c} + \cancel{ab^2} + \cancel{b^2c} + \cancel{abc} + abc + \cancel{bc^2} + \cancel{ac^2} - \cancel{abc} - \cancel{a^2b} - \cancel{ac^2} - \cancel{a^2c} +$
$- \cancel{b^2c} - \cancel{ab^2} - \cancel{bc^2} - \cancel{abc} =$

$= abc.$

56) $(a-c)\cdot[a\cdot(a-b)-c\cdot(b+c)]-b\cdot(a-b)\cdot(b+c)-(a^2-b^2-c^2)\cdot(a-b-c)=$

$= (a-c)\cdot[a^2 - ab - bc - c^2] - b\cdot(ab + ac - b^2 - bc) - (a^3 - a^2b - a^2c - ab^2 + b^3 +$
$+ b^2c - ac^2 + bc^2 + c^3) =$

$= (a-c)\cdot[a^2 - ab - bc - c^2] - ab^2 - abc + b^3 + b^2c - a^3 + a^2b + a^2c + ab^2 - b^3 +$
$- b^2c + ac^2 - bc^2 - c^3 =$

$= \cancel{a^3} - \cancel{a^2b} - \cancel{abc} - \cancel{ac^2} - \cancel{a^2c} + \cancel{abc} + \cancel{bc^2} + \cancel{c^3} - \cancel{ab^2} - abc + \cancel{b^3} + \cancel{b^2c} +$
$- \cancel{a^3} + \cancel{a^2b} + \cancel{a^2c} + \cancel{ab^2} - \cancel{b^3} - \cancel{b^2c} + \cancel{ac^2} - \cancel{bc^2} - \cancel{c^3} =$

$= -abc.$