43. Zapiši u obliku kvadrata dvočlanog izraza (binoma):

1) x^2+4x+4 2) x^2-6x+9 3) $x^2-10x+25$

4) $a^2+8a+16$ 5) $36a^2-12a+1$ 6) $4a^2-28a+49$

7) x^4-10x^2+25 8) $x^6-2x^3y^2+y^4$ 9) $a^8+2a^4b^5+b^{10}$

10) $4x^2+12xy+9y^2$ 11) $4x^2-20xy+25y^2$ 12) $9a^2-30ab+25b^2$

13) $9x^6-18x^3y^4+4y^8$ 14) $a^6b^6+9c^4-6a^3b^2c^2$ 15) $a^{10}b^4+49c^6-14a^5b^2c^3$

16) $100a^2+260ab+169b^2$ 17) $x^2-0.2x+0.01$ 18) $x^4+0.6x^2+0.09$

19) $0.09a^2+1.2ab+4b^2$ 20) $0.01a^4-0.6a^2b^3+9b^6$ 21) $2.25x^2+6xy+4y^2$

22) $1.44x^2-0.12xy+0.01y^2$ 23) $6.25a^8+a^4b^3+0.04b^6$ 24) $4a^2-a+\frac{1}{16}$

25) $x^2+x+\frac{1}{4}$ 26) $x^6-\frac{2}{3}x^3+\frac{1}{9}$ 27) $\frac{9}{4}a^2-3a+1$

28) $2x^3-2x^2+\frac{1}{2}x$ 29) $3x^2+2x+\frac{1}{3}$ 30) $27a^3-\frac{36}{5}a^2b+\frac{12}{25}ab^2$

31) $\frac{9}{16}a^2+ab+\frac{4}{9}b^2$ 32) $\frac{4}{9}x^4-\frac{28}{3}x^2y^2+49y^4$ 33) $\frac{9}{16}x^2+\frac{3}{5}xy+\frac{4}{25}y^2$

34) $10x+x^2+25$ 35) $-6xy+x^2+9y^2$ 36) $16x^2+25y^2-40xy$

37) $x^8+2x^5y^2+x^2y^4$ 38) $2a^5-12a^4b+18a^3b^2$ 39) $x^4y^{10}z^2+4z^{12}-4x^2y^5z^7$

40) $25(x-1)^2+30(x-1)+9$ 41) $4(x+1)^2-28(x+1)+49$

42) $(a-b)^2+4c(a-b)+4c^2$ 43) $25(x-1)^2-30y(x-1)+9y^2$

44) $-x^2-2x-1$ 45) $-4x^2-20x-25$ 46) $-a^4+2a^2b-b^2$

47) $-9a^2+12ab-4b^2$ 48) $-16a^2-40ab-25b^2$ 49) $-25x^2+70xy-49y^2$

50) $-a^4b+2a^3b^2-a^2b^3$ 51) $-9a^4c^{10}+24a^2b^4c^5-16b^8$ 52) $-50x^3y+20x^2y-2xy$

53) $18x-x^2-81$ 54) $20xy-4x^2-25y^2$ 55) $10ab-a^2-25b^2$

56) $-x^2+x-\frac{1}{4}$ 57) $-\frac{4}{9}x^2+4xy-9y^2$ 58) $-\frac{16}{25}x^4-\frac{12}{5}x^2y^3-\frac{9}{4}y^6$

59) $-0.01x^2-0.04x-0.04$ 60) $-0.25a^2+0.3ab-0.09b^2$ 61) $-8x^3+2x^2-\frac{x}{8}$

43. Trinome $\left\{ \begin{array}{l} A^2+2AB+B^2 \\ A^2-2AB+B^2 \end{array} \right\}$ možemo zapisati kao kvadrate binoma.

Pogledajmo primjer:

$x^2-6xy+9y^2=$ uočimo dva potpuna kvadrata: x^2 *i* $9y^2$

Potpuni kvadrati idu na prvo i treće mjesto.

Ako se radi o kvadratu binoma srednji član bi trebao biti $=2\cdot A\cdot B$

Predznak srednjeg člana nam govori da li se radi o kvadratu zbroja ili kvadratu razlike.

$$x^2-6xy+9y^2=x^2-2\cdot 3\cdot x\cdot y+3^2\cdot y^2=$$
$$=x^2-2\cdot x\cdot(3y)+(3y)^2=(x-3y)^2$$
$$\downarrow\ \downarrow\downarrow\ \downarrow\quad\downarrow\quad\uparrow\ \uparrow$$
$$=A^2-2\cdot A\cdot B\ +\ B^2\ =(A-B)^2$$
$$\downarrow$$

Predznak $(-)$ nam govori da se radi o kvadratu razlike.

$$x^2-6xy+9y^2=x^2-2\cdot 3\cdot x\cdot y+3^2\cdot y^2=$$
$$=x^2-2\cdot x\cdot(3y)+(3y)^2=$$
$$\downarrow\qquad\rightarrow \text{Predznak } (-) \text{ nam govori da se radi o kvadratu razlike.}$$
$$=(x-3y)^2$$

1) $x^2+4x+4=x^2+2\cdot 2\cdot x+2^2=x^2+2\cdot x\cdot 2+2^2=(x+2)^2$

Uputa:

$$x^2+4x+4=x^2+2\cdot 2\cdot x+2^2=x^2+2\cdot x\cdot 2+2^2=(x+2)^2$$
$$\downarrow\ \downarrow\downarrow\ \downarrow\quad\uparrow\ \uparrow$$
$$A^2+2\cdot A\cdot B+B^2=(A+B)^2$$

Još jednom taj zadatak samo sada korake potpisujem jedan pod drugi:

$$x^2+4x+4=x^2+2\cdot 2\cdot x+2^2=$$
$$=x^2+2\cdot x\cdot 2+2^2=$$
$$\downarrow\qquad\rightarrow \text{Predznak } (+) \text{ nam govori da se radi o kvadratu zbroja.}$$
$$=(x+2)^2$$

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43. $A^2+2AB+B^2=(A+B)^2$ $A^2-2AB+B^2=(A-B)^2$

2) $x^2-6x+9=x^2-2\cdot3\cdot x+3^2=x^2-2\cdot x\cdot3+3^2=(x-2)^2$

Uputa:

$$x^2-6x+9=x^2-2\cdot3\cdot x+3^2=x^2-2\cdot x\cdot3+3^2=(x-2)^2$$
$$\downarrow\ \downarrow\ \downarrow\ \downarrow\ \downarrow\quad\uparrow\ \uparrow$$
$$A^2-2\cdot A\cdot B+B^2=(A-B)^2$$

Još jednom taj zadatak samo sada korake potpisujem jedan pod drugi:

$$x^2-6x+9=x^2-2\cdot3\cdot x+3^2=$$
$$=x^2-2\cdot x\cdot3+3^2=$$
$$\downarrow \qquad \rightarrow \text{Predznak } (-) \text{ nam govori da se radi o kvadratu razlike.}$$
$$=(x-2)^2$$

3) $x^2-10x+25=x^2-2\cdot5\cdot x+5^2=x^2-2\cdot x\cdot5+5^2=(x-5)^2$

ili ovako:

$$x^2-10x+25=x^2-2\cdot5\cdot x+5^2=$$
$$=x^2-2\cdot x\cdot5+5^2=$$
$$=(x-5)^2$$

4) $a^2+8a+16=a^2+2\cdot4\cdot a+4^2=a^2+2\cdot a\cdot4+4^2=(a+2)^2$

ili ovako: $a^2+8a+16=a^2+2\cdot4\cdot a+4^2=$
$$=a^2+2\cdot a\cdot4+4^2=$$
$$=(a+2)^2$$

5) $36a^2-12a+1=6^2\cdot a^2-2\cdot6\cdot a+1^2=(6a)^2-2\cdot6a\cdot1+1^2=(6a-2)^2$

ili ovako:

$$36a^2-12a+1=6^2\cdot a^2-2\cdot6\cdot a+1^2=$$
$$=(6a)^2-2\cdot6a\cdot1+1^2=$$
$$=(6a-2)^2$$

43. $A^2+2AB+B^2=(A+B)^2$ $A^2-2AB+B^2=(A-B)^2$

6) $4a^2-28a+49=2^2\cdot x^2-2\cdot 2\cdot 7\cdot a+7^2=$

$=(2x)^2-2\cdot 2a\cdot 7+7^2=$

$=(2x-7)^2$

7) $x^4-10x^2+25=x^{2\cdot 2}-2\cdot 5\cdot x^2+5^2=$ $\rightarrow$ $x^4=x^{2\cdot 2}=(x^2)^2$

$=(x^2)^2-2\cdot x^2\cdot 5+5^2=(x^2-5)^2$

$\downarrow \quad \downarrow \quad \downarrow \quad \uparrow \quad \uparrow$

$A^2 - 2\cdot A\cdot B+B^2=(A-B)^2$

Još jednom isti zadatak bez upute:

$x^4-10x^2+25=x^{2\cdot 2}-2\cdot 5\cdot x^2+5^2=$

$=(x^2)^2-2\cdot x^2\cdot 5+5^2=$

$=(x^2-5)^2$

8) $x^6-2x^3y^2+y^4=x^{3\cdot 2}-2\cdot x^3\cdot y^2+y^{2\cdot 2}=$ $\rightarrow x^6=x^{3\cdot 2}=(x^3)^2$, $y^4=y^{2\cdot 2}=(y^2)^2$

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

$=(x^3-y^2)^2$

Još jednom isti zadatak :

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

$\downarrow \quad \downarrow \quad \downarrow \quad \uparrow \quad \uparrow$

$A^2 - 2\cdot A\cdot B + B^2 = (A-B)^2$

9) $a^8+2a^4b^5+b^{10}=a^{4\cdot 2}+2\cdot a^4\cdot b^5+b^{5\cdot 2}=$

$=(a^4)^2+2\cdot a^4\cdot b^5+(b^5)^2=$

$=(a^4+b^5)^2$

43. $A^2+2AB+B^2=(A+B)^2$ $A^2-2AB+B^2=(A-B)^2$

10) $4x^2+12xy+9y^2=2^2\cdot x^2+2\cdot 2\cdot 3\cdot x\cdot y+3^2\cdot y^2=$
$=(2x)^2+2\cdot 2x\cdot 3y+(3y)^2=$
$=(2x+3y)^2$

11) $4x^2-20xy+25y^2=2^2\cdot x^2-2\cdot 2\cdot 5\cdot x\cdot y+5^2\cdot y^2=$
$=(2x)^2-2\cdot 2x\cdot 5y+(5y)^2=$
$=(2x-5y)^2$

12) $9a^2-30ab+25b^2=3^2\cdot a^2-2\cdot 3\cdot 5\cdot a\cdot b+5^2\cdot b^2=$
$=(3a)^2-2\cdot 3a\cdot 5b+(5b)^2=$
$=(3a-5b)^2$

13) $9x^6-18x^3y^4+4y^8=3^2\cdot x^{3\cdot 2}-2\cdot 3\cdot x^3\cdot y^4+2^2\cdot y^{4\cdot 2}=$
$=3^2\cdot\left(x^3\right)^2-2\cdot 3\cdot x^3\cdot y^4+2^2\cdot\left(y^4\right)^2=$
$=\left(3x^3\right)^2-2\cdot 3x^3\cdot y^4+\left(2y^4\right)^2=$
$=\left(3x^3-2y^4\right)^2$

Još jednom isti zadatak sa dodatnim uputama:

$9x^6-18x^3y^4+4y^8=3^2\cdot x^{3\cdot 2}-2\cdot 3\cdot x^3\cdot y^4+2^2\cdot y^{4\cdot 2}=$

$=\underbrace{3^2\cdot\left(x^3\right)^2}_{\substack{\text{po pravilu:}\\ a^m\cdot b^m=(ab)^m\\ \downarrow}}-2\cdot 3\cdot x^3\cdot y^4+\underbrace{2^2\cdot\left(y^4\right)^2}_{\substack{\text{po pravilu:}\\ a^m\cdot b^m=(ab)^m\\ \downarrow}}=$

$=\left(3x^3\right)^2-2\cdot 3x^3\cdot y^4+\left(2y^4\right)^2=\left(3x^3-2y^4\right)^2$

$\downarrow\quad\downarrow\quad\downarrow\quad\uparrow\quad\uparrow$

$A^2-2\cdot A\cdot B+B^2=(A-B)^2$

$\downarrow\qquad\qquad\downarrow$

$A^2=\left(3x^3\right)^2\quad/\sqrt{}\qquad B^2=\left(2y^4\right)^2\quad/\sqrt{}$

$\Downarrow\qquad\qquad\Downarrow$

$A=3x^2\qquad\qquad B=2y^4$

43. $A^2+2AB+B^2=(A+B)^2$ $\qquad A^2-2AB+B^2=(A-B)^2$

14) $a^6b^6+9c^4-6a^3b^3c^2=$ } → prvi i drugi član su potpuni kvadrati,
$=a^6b^6-6a^3b^3c^2+9c^4=$ } → treći član izraza je: $-2\cdot A\cdot B$ njega stavljamo u sredinu

$=a^{3\cdot2}\cdot b^{3\cdot2}-2\cdot3\cdot a^3b^3\cdot c^2+3^2\cdot c^{2\cdot2}=$

$=\left(a^3\right)^2\cdot\left(b^3\right)^2-2\cdot a^3b^3\cdot3c^2+3^2\cdot\left(c^2\right)^2=$

$=\left(a^3b^3\right)^2-2\cdot a^3b^3\cdot3c^2+\left(3c^2\right)^2=$

$=\left(a^3b^3-3c^2\right)^2$

Još jednom isti zadatak sa dodatnim uputama:

$a^6b^6+9c^4-6a^3b^3c^2=a^6b^6-6a^3b^3c^2+9c^4=$

$=a^{3\cdot2}\cdot b^{3\cdot2}-2\cdot3\cdot a^3b^3\cdot c^2+3^2\cdot c^{2\cdot2}=$

$=\underbrace{\left(a^3\right)^2\cdot\left(b^3\right)^2}_{\substack{\text{po pravilu:}\\ a^m\cdot b^m=(ab)^m\\ \downarrow}}-2\cdot a^3b^3\cdot3c^2+\underbrace{3^2\cdot\left(c^2\right)^2}_{\substack{\text{po pravilu:}\\ a^m\cdot b^m=(ab)^m\\ \downarrow}}=$

$=\left(a^3b^3\right)^2-2\cdot a^3b^3\cdot3c^2+\left(3c^2\right)^2=\left(a^3b^3-3c^2\right)^2$

$\downarrow\quad\downarrow\quad\downarrow\quad\uparrow\quad\uparrow$

$A^2-2\cdot A\cdot B+B^2=(A-B)^2$

15) $a^{10}b^4+49c^6-14a^5b^2c^3=a^{10}b^4-14a^5b^2c^3+49c^6=$

$=a^{5\cdot2}\cdot b^{2\cdot2}-2\cdot7\cdot a^5\cdot b^2\cdot c^3+7^2\cdot c^{3\cdot2}=$

$=\left(a^5\right)^2\cdot\left(b^2\right)^2-2\cdot a^5b^2\cdot7c^3+7^2\cdot\left(c^3\right)^2=$

$=\left(a^5b^2\right)^2-2\cdot a^5b^2\cdot7c^3+\left(7c^3\right)^2=$

$=\left(a^5b^2-7c^3\right)^2$

16) $100a^2+260ab+169b^2=10^2\cdot a^2+2\cdot10a\cdot13b+13^2\cdot b^2=$

$=\left(10a\right)^2+2\cdot10a\cdot13b+\left(13b\right)^2=$

$=\left(10a+13b\right)^2$

17) $x^2-0.2x+0.01=x^2-2\cdot0.1\cdot x+0.1^2=$

$=x^2-2\cdot x\cdot0.1+0.1^2=$

$=\left(x-0.1\right)^2$

43. $A^2+2AB+B^2=(A+B)^2$ $A^2-2AB+B^2=(A-B)^2$

18) $x^2+0.6x+0.09=x^2+2\cdot0.3\cdot x+0.3^2=$
$=x^2+2\cdot x\cdot0.3+0.3^2=$
$=(x+0.3)^2$

19) $0.09a^2+1.2ab+4b^2=0.3^2\cdot a^2+2\cdot0.3\cdot2\cdot a\cdot b+2^2\cdot b^2=$
$=(0.3a)^2+2\cdot0.3a\cdot2b+(2b)^2=$
$=(0.3a+2b)^2$

20) $0.01a^4-0.6a^2b^3+9b^6=0.1^2\cdot a^{2\cdot2}-2\cdot0.1\cdot3\cdot a^2\cdot b^3+3^2\cdot b^{3\cdot2}=$
$=0.1^2\cdot(a^2)^2-2\cdot0.1\cdot a^2\cdot3\cdot b^3+3^3\cdot(b^3)^2=$
$=(0.1a^2)^2-2\cdot0.1a^2\cdot3b^3+(3b^3)^2=$
$=(0.1a^2-3b^3)^2$

21) $2.25x^2+6xy+4y^2=1.5^2\cdot x^2+2\cdot1.5\cdot2\cdot x\cdot y+2^2\cdot y^2=$
$=(1.5x)^2+2\cdot1.5x\cdot2y+(2y)^2=$
$=(1.5x+2y)^2$

22) $1.44x^2-0.12xy+0.01y^2$
$=1.2^2\cdot x^2-2\cdot1.2\cdot0.1\cdot x\cdot y+0.1^2\cdot y^2=$
$=(1.2x)^2-2\cdot1.2x\cdot0.1y+(0.1y)^2=$
$=(1.2x-0.1y)^2$

23) $6.25a^8+a^4b^3+0.04b^6=$
$=2.5^2\cdot a^{4\cdot2}-1\cdot a^4\cdot b^3+0.2^2\cdot b^{3\cdot2}=$
$=\underbrace{2.5^2\cdot(a^4)^2}-2\cdot2.5\cdot0.2\cdot a^4\cdot b^3+\underbrace{0.2^2\cdot(b^3)^2}=$
$=(2.5a^4)^2-2\cdot2.5a^4\cdot0.2b^3+(0.2b^3)^2=$
$=(2.5a^4-0.2b^3)^2$

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43. $A^2+2AB+B^2=(A+B)^2$ $A^2-2AB+B^2=(A-B)^2$

24) $4a^2-a+\frac{1}{16}=$

$=2^2\cdot a^2-2\cdot 2\cdot\frac{1}{4}\cdot a+\frac{1^2}{4^2}=$

$=(2a)^2-2\cdot 2a\cdot\frac{1}{4}+\left(\frac{1}{4}\right)^2=$

$=\left(2a-\frac{1}{4}\right)^2$

25) $x^2+x+\frac{1}{4}=$

$=x^2+2\cdot\frac{1}{2}\cdot x+\frac{1^2}{2^2}=$

$=x^2+2\cdot x\cdot\frac{1}{2}+\left(\frac{1}{2}\right)^2=$

$=\left(x^2+\frac{1}{2}\right)^2$

26) $x^6-\frac{2}{3}x^3+\frac{1}{9}=$

$=x^{3\cdot 2}-2\cdot\frac{1}{3}\cdot x^3+\frac{1^2}{3^2}=$

$=\left(x^3\right)^2-2\cdot x^3\cdot\frac{1}{3}+\left(\frac{1}{3}\right)^2=$

$=\left(x^3-\frac{1}{3}\right)^2$

27) $\frac{9}{4}a^2-3a+1=$

$=\frac{3^2}{2^2}\cdot a^2-2\cdot\frac{3}{2}\cdot a+1^2=$

$=\left(\frac{3}{2}a\right)^2-2\cdot\frac{3}{2}a\cdot 1+1^2=$

$=\left(\frac{3}{2}a-1\right)^2$

43. $A^2+2AB+B^2=(A+B)^2$ $A^2-2AB+B^2=(A-B)^2$

28) $2x^3-2x^2+\frac{1}{2}x=2\cdot x^2\cdot x^1-2\cdot x^1\cdot x^1+2\cdot\frac{1}{4}\cdot x=$

$=2\cdot x\cdot x^2-2\cdot x\cdot x+2\cdot x\cdot\frac{1}{4}=$

$=2\cdot x\cdot\left(x^2-x+\frac{1}{4}\right)=$

$=2x\cdot\left(x^2-2\cdot\frac{1}{2}\cdot x+\frac{1^2}{2^2}\right)=$

$=2x\cdot\left(x^2-2\cdot x\cdot\frac{1}{2}+\left(\frac{1}{2}\right)^2\right)=$

$=2x\cdot\left(x-\frac{1}{2}\right)^2$

A sada uputa kako se to radi:

Ovdje prvi put imamo varijantu da je prvo potrebno izlučiti zajednički faktor

$2x^3-2x^2+\frac{1}{2}x=$ → prvo sve članove rastavimo na faktore $\frac{1}{2}x=2\cdot\frac{1}{4}\cdot x$

$=2\cdot x^1\cdot x^2-2\cdot x^1\cdot x^1+2\cdot\frac{1}{4}\cdot x=$ → $2x^3=2\cdot x^{1+2}=2\cdot x^1\cdot x^2=2\cdot x\cdot x^2$

$=2\cdot x\cdot x^2-2\cdot x\cdot x+2\cdot x\cdot\frac{1}{4}=$ → zajednički faktor je $2x$ pa njega izlučimo

$=2\cdot x\cdot\left(x^2-x+\frac{1}{4}\right)=$ → u $(\ )$ je kvadrat razlike, $-x=-1\cdot x=-2\cdot\frac{1}{2}\cdot x$

$=2x\cdot\left(x^2-2\cdot\frac{1}{2}\cdot x+\frac{1^2}{2^2}\right)=$

$=2x\cdot\left(x^2-2\cdot x\cdot\frac{1}{2}+\left(\frac{1}{2}\right)^2\right)=$

$=2x\cdot\left(x-\frac{1}{2}\right)^2$

43. $A^2+2AB+B^2=(A+B)^2$ $A^2-2AB+B^2=(A-B)^2$

29) $3x^2+2x+\frac{1}{3}=3\cdot x^2+2\cdot 3\cdot\frac{1}{3}\cdot x+3\cdot\frac{1}{9}=$ → ovdje je z.f.= 3 ,dalje: $2x=2\cdot 1\cdot x=2\cdot 3\cdot\frac{1}{3}\cdot x$

$=3\cdot\left(x^2+2\cdot\frac{1}{3}\cdot x+\frac{1}{9}\right)=$ → nakon što izlučimo z.f. u( )ostaje $(A+B)^2$

$=3\cdot\left(x^2+2\cdot x\cdot\frac{1}{3}+\frac{1^2}{3^2}\right)$

$=3\cdot\left(x^2+2\cdot x\cdot\frac{1}{3}+\left(\frac{1}{3}\right)^2\right)=3\cdot\left(x+\frac{1}{3}\right)^2$

$\frac{1}{3}=3\cdot\frac{1}{9}$ jer je: $3\cdot\frac{1}{9}=\cancel{3}\cdot\frac{1}{\cancel{3}\cdot 3}=\frac{1}{3}$

↑

Dodatna uputa: $3x^2+2x+\frac{1}{3}=3\cdot x^2+2\cdot 3\cdot\frac{1}{3}\cdot x+3\cdot\frac{1}{9}=$ zajednički faktor (z.f.) je 3

ali on je "skriven": ↓

$2x=2\cdot 1\cdot x=2\cdot\underbrace{3\cdot\frac{1}{3}}_{=1}\cdot x$

Kako otkriti što je zajednički faktor (z.f.): prvo treba odrediti prvi član, to je kod nas: $3x^3$

sada odredimo šta je "višak" da bi on bio kvadrat nečega: višak je 3 jer x^2 je kvadrat od x

30) $27a^3-\frac{36}{5}a^2b+\frac{12}{25}ab^2=$ ovdje je prvi član $=27a^3$ odredimo "višak":

↓

$27a^3=3\cdot 9\cdot a^1a^2=3\cdot a^1\cdot 9a^2=3a\cdot(3a)^2$

tako otkriven "višak" je ustvari z.f. koj treba izlučiti

Pa imamo:

$27a^3-\frac{36}{5}a^2b+\frac{12}{25}ab^2=3\cdot 9\cdot a^1\cdot a^2-3\cdot\frac{12}{5}\cdot a^1\cdot a^1\cdot b+3\cdot\frac{4}{25}\cdot a\cdot b^2=$

$=3a\cdot 9a^2-3a\cdot\frac{12}{5}ab+3a\cdot\frac{4}{25}b^2=$

$=3a\cdot\left(9a^2-\frac{12}{5}ab+\frac{4}{25}b^2\right)=$

$=3a\cdot\left(3^2\cdot a^2-2\cdot 3\cdot\frac{2}{5}\cdot a\cdot b+\frac{2^2}{5^2}b^2\right)=$

$=3a\cdot\left((3a)^2-2\cdot 3a\cdot\frac{2}{5}b+\left(\frac{2}{5}b\right)^2\right)=3a\cdot\left(3a-\frac{2}{5}b\right)^2$

43. $A^2+2AB+B^2=(A+B)^2$ $A^2-2AB+B^2=(A-B)^2$

31) $\frac{9}{16}a^2+ab+\frac{4}{9}b^2=$

$=\frac{3^2}{4^2}\cdot a^2+2\cdot\frac{3}{4}\cdot\frac{2}{3}\cdot a\cdot b+\frac{2^2}{3^2}\cdot b^2=$

$=\left(\frac{3}{4}a\right)^2+2\cdot\frac{3}{4}a\cdot\frac{2}{3}+\left(\frac{2}{3}b\right)^2=$

$=\left(\frac{3}{4}a+\frac{2}{3}b\right)^2$

32) $\frac{4}{9}x^4-\frac{28}{3}x^2y^2+49y^4=$

$=\frac{2^2}{3^2}\cdot x^{2\cdot 2}-2\cdot\frac{2}{3}\cdot 7\cdot x^2\cdot y^2+7^2\cdot y^{2\cdot 2}=$

$=\frac{2^2}{3^2}\cdot\left(x^2\right)^2-2\cdot\frac{2}{3}x^2\cdot 7y^2+7^2\cdot\left(y^2\right)^2=$

$=\left(\frac{2}{3}x^2\right)^2-2\cdot\frac{2}{3}x^2\cdot 7y^2+\left(7y^2\right)^2=$

$=\left(\frac{2}{3}x^2-7y^2\right)^2$

33) $\frac{9}{16}x^2+\frac{3}{5}xy+\frac{4}{25}y^2=$

$=\frac{3^2}{4^2}\cdot x^2+2\cdot\frac{3}{4}\cdot\frac{2}{5}\cdot x\cdot y+\frac{2^2}{5^2}\cdot y^2=$

$=\left(\frac{3}{4}x\right)^2+2\cdot\frac{3}{4}x\cdot\frac{2}{5}y+\left(\frac{2}{5}y\right)^2=$

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

34) $10x+x^2+25=$ ovdje nam nije poredano po redu pa malo "ispremještamo"

$=x^2+10x+25=$

$=x^2+2\cdot 5\cdot x+5^2=$

$=x^2+2\cdot x\cdot 5+5^2=$

$=(x+5)^2$

43. $A^2+2AB+B^2=(A+B)^2$ $A^2-2AB+B^2=(A-B)^2$

35) $-6xy+x^2+9y^2=x^2-6xy+9y^2=$
$=x^2-2\cdot3\cdot x\cdot y+3^2\cdot y^2=$
$=x^2-2\cdot x\cdot 3y+(3y)^2=$
$=(x-3y)^2$

36) $16x^2+25y^2-40xy=16x^2-40xy+25y^2=$
$=4^2\cdot x^2-2\cdot4\cdot5\cdot x\cdot y+5^2\cdot y^2=$
$=(4x)^2-2\cdot4x\cdot5y+(5y)^2=$
$=(4x-5y)^2$

37) $x^8+2x^5y^2+x^2y^4=x^{2+6}+2\cdot x^{2+3}y^2+x^2\cdot y^4=$ $\rightarrow$ $x^8=x^{2+6}=x^2\cdot x^6$
$=x^2\cdot x^6+2\cdot x^2\cdot x^3\cdot y^2+x^2\cdot y^4=$
$=x^2\cdot(x^6+2\cdot x^3\cdot y^2+y^4)=$
$=x^2\cdot(x^{3\cdot2}+2\cdot x^3\cdot y^2+y^{2\cdot2})=$
$=x^2\cdot\left[(x^3)^2+2\cdot x^2\cdot y^3+(y^2)^2\right]=$
$=x^2\cdot(x^3+y^2)^2$

Ako vas zbunjuje ovoliko puno korake evo i skraćena varijanta:

$x^8+2x^5y^2+x^2y^4=x^2\cdot x^6+2\cdot x^2\cdot x^3\cdot y^2+x^2\cdot y^4=$
$=x^2\cdot(x^6+2\cdot x^3\cdot y^2+y^4)=$
$=x^2\cdot\left[(x^3)^2+2\cdot x^2\cdot y^3+(y^2)^2\right]=$
$=x^2\cdot(x^3+y^2)^2$

38) $2a^5-12a^4b+18a^3b^2=2\cdot a^{3+2}-2\cdot6\cdot a^{3+1}\cdot b+2\cdot9\cdot a^3\cdot b^2=$
$=2\cdot a^3\cdot a^2-2\cdot6\cdot a^3\cdot a^1\cdot b+2\cdot a^3\cdot9\cdot b^2=$
$=2\cdot a^3\cdot(a^2-6\cdot a\cdot b+9\cdot b^2)=$
$=2a^3\cdot(a^2-2\cdot3\cdot a\cdot b+3^2\cdot b^2)=$
$=2a^3\cdot\left[a^2-2\cdot a\cdot3b+(3b)^2\right]=$
$=2a^3\cdot(a-3b)^2$

43. $A^2+2AB+B^2=(A+B)^2$ $A^2-2AB+B^2=(A-B)^2$

39) $x^4y^{10}z^2+4z^{12}-4x^2y^5z^7=x^4y^{10}z^2-4x^2y^5z^7+4z^{12}=$ $\rightarrow$ promjenimo redosljed

$$=x^4y^{10}\cdot z^2-4x^2y^5z^2\cdot z^5+4\cdot z^2\cdot z^{10}=$$
$$=z^2\cdot\left(x^4y^{10}-4x^2y^5\cdot z^5+4\cdot z^{10}\right)=$$
$$=z^2\cdot\left(x^{2\cdot2}\cdot y^{5\cdot2}-2\cdot2\cdot x^2\cdot y^5\cdot z^5+2^2\cdot z^{5\cdot2}\right)=$$
$$=z^2\cdot\left[\left(x^2\right)^2\cdot\left(y^5\right)^2-2\cdot x^2\cdot y^5\cdot2\cdot z^5+2^2\cdot\left(z^5\right)^2\right]=$$
$$=z^2\cdot\left[\left(x^2y^5\right)^2-2\cdot x^2y^5\cdot2z^5+\left(2z^5\right)^2\right]=$$
$$=z^2\cdot\left(x^2y^5-2z^5\right)^2$$

40) $25(x-1)^2+30(x-1)+9=5^2\cdot(x-1)^2+2\cdot5\cdot3\cdot(x-1)+3^2=$

$$=\left[5\cdot(x-1)\right]^2+2\cdot5\cdot(x-1)\cdot3+3^2=$$
$$=\left[5\cdot(x-1)+3\right]^2=$$
$$=(5x-5+3)^2=$$
$$=(5x-2)^2$$

II način

$25(x-1)^2+30(x-1)+9=$ uvedemo novu nepoznanicu: $t=(x-1)$

pa imamo: $=25\cdot t^2+30\cdot t+9=$

$$=5^2\cdot t^2+2\cdot5\cdot t\cdot3+3^2=$$
$$=(5t)^2+2\cdot5t\cdot3+3^2=$$
$$=(5t+3)^2=$$ sada vratimo: $t=(x-1)$
$$=\left[5\cdot(x-1)+3\right]^2=$$
$$=(5x-5+3)^2=$$
$$=(5x-2)^2$$

43. $A^2+2AB+B^2=(A+B)^2$ $A^2-2AB+B^2=(A-B)^2$

41) $4(x+1)^2-28(x+1)+49=2^2\cdot(x+1)^2-2\cdot2\cdot7\cdot(x+1)+7^2=$

$=\left[2\cdot(x+1)\right]^2-2\cdot2\cdot(x+1)\cdot7+7^2=$

$=\left[2\cdot(x+1)-7\right]^2=$

$=(2x+2-7)^2=$

$=(2x-5)^2$

II način

$4(x+1)^2-28(x+1)+49=$ uvedemo novu nepoznanicu: $t=(x+1)$

pa imamo: $=4\cdot t^2-28\cdot t+49=$

$=2^2\cdot t^2-2\cdot2\cdot7\cdot t+7^2=$

$=(2t)^2-2\cdot2t\cdot7+7^2=$

$=(2t-7)^2=$ sada vratimo: $t=(x+1)$

$=\left[2\cdot(x+1)-7\right]^2=$

$=(2x+2-7)^2=$

$=(2x-5)$

42) $(a-b)^2+4c(a-b)+4c^2=(a-b)^2+2\cdot2\cdot c\cdot(a-b)+2^2\cdot c^2=$

$=(a-b)^2+2\cdot(a-b)\cdot2c+(2c)^2=$

$=\left[(a-b)+2c\right]^2=$

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

43) $25(x-1)^2-30y(x-1)+9y^2=5^2\cdot(x-1)^2-2\cdot5\cdot3\cdot y\cdot(x-1)+3^2\cdot y^2=$

$=\left[5\cdot(x-1)\right]^2-2\cdot5\cdot(x-1)\cdot3y+(3y)^2=$

$=\left[5\cdot(x-1)-3y\right]^2=$

$=(5x-5-3y)^2=$

$=(5x-3y-5)^2$

43. $A^2+2AB+B^2=(A+B)^2$ $A^2-2AB+B^2=(A-B)^2$

43) II način

$25(x-1)^2-30y(x-1)+9y^2$ uvedemo novu nepoznanicu: $t=(x-1)$

pa imamo: $=25\cdot t^2-30y\cdot t+3^2y^2=$

$=5^2\cdot t^2-2\cdot5\cdot3\cdot y\cdot t+(3y)^2=$

$=(5t)^2-2\cdot5t\cdot3y+(3y)^2=$

$=(5t-3y)^2=$ sada vratimo: $t=(x-1)$

$=\left[5\cdot(x-1)-3y\right]^2=$

$=(5x-5-3y)^2=$

$=(5x-3y-5)^2$

44) $-x^2-2x-1=-1\cdot(x^2+2x+1)=$ $\rightarrow$ izlzčimo z.f. koji je $=(-1)$

$=-1\cdot(x^2+2\cdot x\cdot1+1^2)=$

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

$=-(x+1)^2$

45) $-4x^2-20x-25=-1\cdot(4x^2+20x+25)=$

$=-1\cdot(2^2\cdot x^2+2\cdot2\cdot5\cdot x+5^2)=$

$=-1\cdot((2x)^2+2\cdot2x\cdot5+5^2)=$

$=-1\cdot(2x+5)^2=$

$=-(2x+5)^2$

46) $-a^4+2a^2b-b^2=-1\cdot(a^4-2a^2b+b^2)=$ $\rightarrow a^4=a^{2\cdot2}=(a^2)^2$

$=-1\cdot\left[(a^2)^2-2\cdot a^2\cdot b+b^2\right]=$

$=-1\cdot(a^2-b)^2=$

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

43. $A^2+2AB+B^2=(A+B)^2 \qquad A^2-2AB+B^2=(A-B)^2$

47) $-9a^2+12ab-4b^2=-1\cdot(9a^2-12ab+4b^2)=$

$=-1\cdot(3^2\cdot a^2-2\cdot 3\cdot 2\cdot a\cdot b)=$

$=-1\cdot((3a)^2-2\cdot 3a\cdot 2b+(2b)^2)=$

$=-1\cdot(3a-2b)^2$

48) $-16a^2-40ab-25b^2=-1\cdot(16a^2+40ab+25b^2)=$

$=-1\cdot(4^2\cdot a^2+2\cdot 4\cdot 5\cdot a\cdot b+5^2\cdot b^2)=$

$=-1\cdot((4a)^2+2\cdot 4a\cdot 5b+(5b)^2)=$

$=-1\cdot(4a+5b)^2$

49) $-25x^2+70xy-49y^2=-1\cdot(25x^2-70x+49y^2)=$

$=-1\cdot(5^2\cdot x^2-2\cdot 5\cdot 7+7^2\cdot y^2)=$

$=-1\cdot((5x)^2-2\cdot 5x\cdot 7y+(7y)^2)=$

$=-1\cdot(5x-7y)^2=$

$=-(5x-7y)^2$

50) $-a^4b+2a^3b^2-a^2b^3=-1\cdot(a^4b-2a^3b^2+a^2b^3)=$ $\rightarrow$ izlučimo prvo (-1)

$=-1\cdot(a^{2+2}\cdot b-2\cdot a^{2+1}\cdot b\cdot b+a^2\cdot b^{1+2})=$

$=-1\cdot[a^2\cdot a^2\cdot b-2\cdot a^2\cdot a^1\cdot b\cdot b+a^2\cdot b\cdot b^2]=$

$=-1\cdot[a^2\cdot b\cdot(a^2-2\cdot a\cdot b+b^2)]=$

$=-1\cdot a^2\cdot b^2\cdot(a^2-2\cdot a\cdot b+b^2)=$

$=-a^2b^2\cdot(a-b)^2$

43. $A^2+2AB+B^2=(A+B)^2 \qquad A^2-2AB+B^2=(A-B)^2$

51) $-9a^4c^{10}+24a^2b^4c^5-16b^8=-1\cdot\left(9a^4c^{10}-24a^2b^4c^5+16b^8\right)=$

$=-1\cdot\left(3^2\cdot a^{2\cdot2}\cdot c^{5\cdot2}-2\cdot3\cdot4\cdot a^2\cdot b^4\cdot c^5+4^2\cdot b^{4\cdot2}\right)=$

$=-1\cdot\left[3^2\cdot\left(a^2\right)^2\cdot\left(c^5\right)^2-2\cdot2a^2c^5\cdot4b^4+4^2\cdot\left(b^4\right)^2\right]=$

$=-1\cdot\left[\left(3a^2c^5\right)^2-2\cdot2a^2c^5\cdot4b^4+\left(4b^4\right)^2\right]=$

$=-1\cdot\left(3a^2c^5-4b^4\right)^2=$

$=-\left(3a^2c^5-4b^4\right)^2$

52) $-50x^3y+20x^2y-2xy=-1\cdot\left(50x^3y-20x^2y+2xy\right)=$ $\rightarrow$ prvo izlučimo (-1)

$=-1\cdot\left(2\cdot25\cdot x^1\cdot x^2\cdot y-2\cdot10\cdot x\cdot x\cdot y+2\cdot x\cdot y\cdot1\right)=$

$=-1\cdot\left(2xy\cdot25\cdot x^2-2xy\cdot10\cdot x+2xy\cdot1\right)=$

$=-1\cdot2xy\cdot\left(25x^2-10x+1\right)=$

$=-2xy\cdot\left[5^2x^2-2\cdot5x+1^2\right]=$

$=-2xy\cdot\left[\left(5x\right)^2-2\cdot5x+1^2\right]=$

$=-2xy\cdot\left(5x-1\right)^2$

Ako vam je previše koraka, evo taj isti zadatak u kračoj varijanti:

$-50x^3y+20x^2y-2xy=-1\cdot\left(2xy\cdot25\cdot x^2-2xy\cdot10\cdot x+2xy\cdot1\right)=$

$=-2xy\cdot\left[5^2x^2-2\cdot5x+1^2\right]=$

$=-2xy\cdot\left[\left(5x\right)^2-2\cdot5x+1^2\right]=$

$=-2xy\cdot\left(5x-1\right)^2$

Ili još krače: $-50x^3y+20x^2y-2xy=-2xy\cdot\left(25x^2-10x+1\right)=$

$=-2xy\cdot\left[\left(5x\right)^2-2\cdot5x+1^2\right]=$

$=-2xy\cdot\left(5x-1\right)^2$

43. $A^2+2AB+B^2=(A+B)^2$ $A^2-2AB+B^2=(A-B)^2$

53) $18x-x^2-81=-x^2+18x-81=$

$=-1\cdot(x^2-18x+81)=$

$=-1\cdot(x^2-2\cdot x\cdot 9+9^2)=$

$=-1\cdot(x-9)^2=$

$=-(x-9)^2$

54) $20xy-4x^2-25y^2=-4x^2+20xy-25y^2=$

$=-1\cdot(4x^2-20xy+25y^2)=$

$=-1\cdot(2^2\cdot x^2-2\cdot 2\cdot 5\cdot x\cdot y+5^2\cdot y^2)=$

$=-1\cdot((2x)^2-2\cdot 2x\cdot 5y+(5y)^2)=$

$=-1\cdot(2x-5y)^2$

55) $10ab-a^2-25b^2=-a^2+10ab-25b^2=$

$=-1\cdot(a^2-10ab+25b^2)=$

$=-1\cdot(a^2-2\cdot 5\cdot a\cdot b+5^2\cdot b^2)=$

$=-1\cdot(a^2-2\cdot a\cdot 5b+(5b)^2)=$

$=-1\cdot(a-5b)^2=$

$=-(a-5b)^2$

56) $-x^2+x-\frac{1}{4}=-1\cdot\left(x^2-x+\frac{1}{4}\right)=$

$=-1\cdot\left(x^2-2\cdot\frac{1}{2}\cdot x+\frac{1^2}{2^2}\right)=$

$=-1\cdot\left(x^2-2\cdot x\cdot\frac{1}{2}+\left(\frac{1}{2}\right)^2\right)=$

$=-1\cdot\left(x-\frac{1}{2}\right)^2=$

$=-\left(x-\frac{1}{2}\right)^2$

43. $A^2+2AB+B^2=(A+B)^2$ $A^2-2AB+B^2=(A-B)^2$

57) $-\frac{4}{9}x^2+4xy-9y^2=-1\cdot\left(\frac{4}{9}x^2-4xy+9y^2\right)=$

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

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

$=-1\cdot\left(\frac{2}{3}x-3y\right)^2=$

$=-\left(\frac{2}{3}x-3y\right)^2$

58) $-\frac{16}{25}x^2-\frac{12}{5}xy-\frac{9}{4}y^2=-1\cdot\left(\frac{16}{25}x^4+\frac{12}{5}x^2y^3+\frac{9}{4}y^6\right)=$

$=-1\cdot\left[\frac{4^2}{5^2}\cdot\left(x^2\right)^2+2\cdot\frac{4}{5}\cdot\frac{3}{2}\cdot x^2\cdot y^3+\frac{3^2}{2^2}\cdot\left(y^3\right)^2\right]=$

$=-1\cdot\left[\left(\frac{4}{5}x^2\right)^2+2\cdot\frac{4}{5}x^2\cdot\frac{3}{2}y^3+\left(\frac{3}{2}y^3\right)^2\right]=$

$=-1\cdot\left(\frac{4}{5}x^2+\frac{3}{2}y^3\right)^2$

$=-\left(\frac{4}{5}x^2+\frac{3}{2}y^3\right)^2$

59) $-0.01x^2-0.04x-0.04=-1\cdot\left(0.01x^2+0.04x+0.04\right)=$

$=-1\cdot\left(0.1^2\cdot x^2+2\cdot 0.1\cdot 0.2\cdot x+0.2^2\right)=$

$=-1\cdot\left((0.1x)^2+2\cdot 0.1x\cdot 0.2+0.2^2\right)=$

$=-1\cdot(0.1x+0.2)^2=$

$=-(0.1x+0.2)^2$

43. $A^2+2AB+B^2=(A+B)^2 \qquad A^2-2AB+B^2=(A-B)^2$

60) $-0.25a^2+0.3ab-0.09b^2=-1\cdot(0.25a^2-0.3ab+0.09b^2)=$

$=-1\cdot(0.5^2\cdot a^2-2\cdot 0.5\cdot 0.3\cdot a\cdot b+0.3^2\cdot b^2)=$

$=-1\cdot((0.5a)^2-2\cdot 0.5a\cdot 0.3b+(0.3b)^2)=$

$=-1\cdot(0.5a-0.3b)^2=$

$=-(0.5a-0.3b)^2$

61) $-8x^3+2x^2-\frac{x}{8}=-1\cdot\left(8x^3-2x^2+\frac{x}{8}\right)=$

$=-1\cdot\left(2\cdot 4\cdot x^1\cdot x^2-2\cdot x\cdot x+2\cdot\frac{1}{16}\cdot x\right)=$

$=-1\cdot\left(2x\cdot 4x^2-2x\cdot x+2x\cdot\frac{1}{16}\right)=$

$=-1\cdot 2x\cdot\left(4x^2-x+\frac{1}{16}\right)=$ $\quad\rightarrow\quad -x=-4\cdot\frac{1}{4}\cdot x=-2\cdot 2\cdot\frac{1}{4}\cdot x$

$=-2x\cdot\left(2^2\cdot x^2-2\cdot 2\cdot\frac{1}{4}\cdot x+\frac{1^2}{4^2}\right)=$

$=-2x\cdot\left[(2x)^2-2\cdot 2x\cdot\frac{1}{4}+\left(\frac{1}{4}\right)^2\right]=$

$=-2x\cdot\left(2x-\frac{1}{4}\right)^2$