

\*\*\*\* MLADEN SRAGA \*\*\*\*

## POTPUNO RIJEŠENI ZADACI

PRIRUČNIK ZA SAMOSTALNO UČENJE

## 100 ELEMENTARNIH ZADATAKA

koje bi svatko trebao znati riješiti

## I

ALGEBARSKI IZRAZI	POTENCIJE
$(a + b)^2 = (a + b) \cdot (a + b) = a^2 + 2ab + b^2$	$a^n \cdot a^m = a^{n+m}$
$(a + b)^2 = (b + a)^2$	$a^n : a^m = a^{n-m}$
$(a - b)^2 = (a - b) \cdot (a - b) = a^2 - 2ab + b^2$	$\frac{a^n}{a^m} = a^n : a^m = a^{n-m}$
$(a - b)^2 = (b - a)^2$	$(abc)^n = a^n b^n c^n$
$(-a - b)^2 = (a + b)^2$	$(a^n)^m = a^{n \cdot m}$
$(a - b) \cdot (a + b) = a^2 - b^2$	$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$
$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$	$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n = \frac{b^n}{a^n}$
$(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$	$a^0 = 1$
$a^3 - b^3 = (a - b) \cdot (a^2 + ab + b^2)$	$a^1 = a$
$a^3 + b^3 = (a + b) \cdot (a^2 - ab + b^2)$	$a^{-1} = \frac{1}{a}$
$(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2ac + 2bc$	$a^{-n} = \frac{1}{a^n}$
$x^2 + px + q = \begin{cases} m + n = p \\ m \cdot n = q \end{cases} = (x + m) \cdot (x + n)$	
$ax^2 + bx + c = \begin{cases} m + n = b \\ m \cdot n = a \cdot c \end{cases} = ax^2 + mx + nx + c = \dots$	

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 $\sqrt{\alpha}$

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Grafička obrada  
 MLADEN SRAGA

<b>Procijena i ocijena znanja            ako se spremate :</b>	
<b>Za prijemne na sve            EKONOMSKE fakultete</b>	<b>Za prijemne na sve            TEHNIČKE fakultete</b>
<b>0 – 50 = 0</b>	<b>0 – 50 = 0</b>
<b>51 – 75 = 1</b>	<b>51 – 81 = 1</b>
<b>76 – 85 = 2</b>	<b>82 – 86 = 2</b>
<b>86 – 91 = 3</b>	<b>87 – 90 = 3</b>
<b>92 – 95 = 4</b>	<b>91 – 94 = 4</b>
<b>96 – 100 = 5</b>	<b>95 – 100 = 5</b>

**Moj komentar:**  
**ako ste dobili ocjenu 0 - hitno tražite instruktora**  
**ako ste dobili ocjenu 1 - trebali bi ozbiljno početi vježbati**  
**ako ste dobili ocjenu 2 - Vi znate nešto ali ima tu puno rupa**  
**ako ste dobili ocjenu 3 - dobro možete krenut na pripreme**  
**ako ste dobili ocjenu 4 - vi ste spremni za zadatke sa prijemnih**  
**ako ste dobili ocjenu 5 - odlično- vama zadaci s prijemnog**  
**nebi trebali predstavljat problem**

Prvo riješite zadatke pa tek onda gledajte u rješenja jer su tamo kompletno riješeni....

Potpunu garanciju na zadatke i rješenja daje: centar za dopisnu poduku M.I.M.-SRAGA -dakle sve što vam se čini nejasno krivo ili sumnjivo - zovite **01-4578-431** ili **01-4579-130** i tražite dodatne upute i objašnjenja ...

Zadatci su u potpunosti naš autorski rad , ako se neki zadatak već pojavio u nekoj drugoj zbirci ...nije namjerno ponovljen s naše strane.

Centar za poduku M.I.M.-Sraga zadržava sva prava na komercijalno iskorištavanje ovih zadataka.

Svako kopiranje umnažanje za vlastite potrebe i potrebe poduke i nastave je dozvoljeno i dobrodošlo.

Cijena ovih zadataka je 0 kn tj. besplatni su ...i tako treba i ostati...

Sve kritike i dobre i loše rado ćemo saslušati ...  
 javite nam se na tel. 01-4578-431 ili e-mailom : [mim-sraga@zg.htnet.hr](mailto:mim-sraga@zg.htnet.hr)

# STO ELEMENTARNIH ZADATAKA

KOJE BI SVI TREBALI ZNATI RIJEŠITI

Koristeći ove formule trebali bi riješiti zadane zadatke:



**POTENCIJE**

$$a^n \cdot a^m = a^{n+m}$$

$$a^n : a^m = a^{n-m}$$

$$\frac{a^n}{a^m} = a^n : a^m = a^{n-m}$$

$$(abc)^n = a^n b^n c^n$$

$$(a^n)^m = a^{n \cdot m}$$

$$\left( (a^n)^m \right)^z = a^{n \cdot m \cdot z}$$

$$\left( \frac{a}{b} \right)^n = \frac{a^n}{b^n}$$

$$\left( \frac{a}{b} \right)^{-n} = \left( \frac{b}{a} \right)^n = \frac{b^n}{a^n}$$

$$a^0 = 1$$

$$a^1 = a$$

$$a^{-1} = \frac{1}{a}$$

$$a^{-n} = \frac{1}{a^n}$$

$$a^{\frac{1}{n}} = \sqrt[n]{a}$$

$$a^{-\frac{1}{n}} = \frac{1}{a^{\frac{1}{n}}} = \frac{1}{\sqrt[n]{a}}$$

$$a^{\frac{m}{n}} = \sqrt[n]{a^m}$$

$$a^{-\frac{m}{n}} = \frac{1}{a^{\frac{m}{n}}} = \frac{1}{\sqrt[n]{a^m}}$$

- 1)  $x^2 \cdot x^3 =$
- 2)  $x^2 \cdot x^4 \cdot x^6 =$
- 3)  $x^{\frac{2}{3}} \cdot x^2 \cdot x^{\frac{5}{2}} =$
- 4)  $x^4 : x^2 =$
- 5)  $x^7 : x^2 : x^3 =$
- 6)  $x^7 \cdot x^8 : x^9 =$
- 7)  $\frac{x^8}{x^3} =$
- 8)  $(x^2)^3 =$
- 9)  $\left( (x^3)^4 \right)^5 =$
- 10)  $\left( (x^2)^6 \right)^2 \cdot (x^2)^5 =$
- 11)  $\left( (x^2)^5 \right)^3 : (x^4)^5 =$
- 12)  $(2ab^2)^3 =$
- 13)  $\left( \frac{2}{3} x^2 y^3 \right)^4 =$
- 14)  $\left( \frac{2}{3} a^2 b^3 \right)^3 : (2ab^2)^2 =$
- 15)  $\left( \frac{x}{y} \right)^{-1} =$
- 16)  $\left( \frac{x}{y} \right)^{-2} \cdot \left( \frac{y}{x} \right)^3 =$

$$17) \left( \frac{a^2}{y^3} \right)^3 \cdot \left( \frac{y}{a^3} \right)^2 : \left( \frac{y^2}{a^4} \right)^2 =$$

$$18) \left( \frac{2}{3} \right)^{-1} + \left( \frac{1}{3} \right)^{-2} - \left( \frac{1}{2} \right)^{-3} =$$

$$19) 27^0 \cdot x^0 \cdot y^0 \cdot 2^1 \cdot \left( \frac{1}{3} \right)^{-1} =$$

$$20) y^0 \cdot 2^{-1} \cdot \left( \frac{1}{2} \right)^1 \cdot \left( \frac{1}{5} \right)^{-1} \cdot 2^{-3} =$$

**POTENCIJE**

$$a^n \cdot a^m = a^{n+m}$$

$$a^n : a^m = a^{n-m}$$

$$\frac{a^n}{a^m} = a^n : a^m = a^{n-m}$$

$$(abc)^n = a^n b^n c^n$$

$$(a^n)^m = a^{n \cdot m}$$

$$\left((a^n)^m\right)^z = a^{n \cdot m \cdot z}$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n = \frac{b^n}{a^n}$$

$$a^0 = 1$$

$$a^1 = a$$

$$a^{-1} = \frac{1}{a}$$

$$a^{-n} = \frac{1}{a^n}$$

$$a^{\frac{1}{n}} = \sqrt[n]{a}$$

$$a^{-\frac{1}{n}} = \frac{1}{a^{\frac{1}{n}}} = \frac{1}{\sqrt[n]{a}}$$

$$a^{\frac{m}{n}} = \sqrt[n]{a^m}$$

$$a^{-\frac{m}{n}} = \frac{1}{a^{\frac{m}{n}}} = \frac{1}{\sqrt[n]{a^m}}$$

**KORIJENI**

$$\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{a \cdot b}$$

$$\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{\frac{a}{b}}$$

21)  $x^{\frac{1}{2}} =$

22)  $x^{-\frac{1}{2}} =$

23)  $x^{\frac{2}{3}} =$

24)  $x^{-\frac{3}{4}} =$

25)  $36^{\frac{1}{2}} =$

26)  $16^{\frac{1}{4}} =$

27)  $\left(\frac{25}{49}\right)^{\frac{1}{2}} =$

28)  $\left(\frac{16}{81}\right)^{\frac{1}{4}} =$

29)  $\left(\frac{64}{49}\right)^{-\frac{1}{2}} =$

30)  $\left(\frac{9}{16}\right)^{-\frac{3}{2}} =$

31)  $\sqrt{10} \cdot \sqrt{10} =$

32)  $\sqrt[3]{3} \cdot \sqrt[3]{9} =$

33)  $\sqrt[4]{2} \cdot \sqrt[4]{8} =$

34)  $\sqrt[5]{x^2} \cdot \sqrt[5]{x^3} =$

35)  $\sqrt[6]{x^5} : \sqrt[6]{x^2} =$

Koristeći formule koje smo upravo obradili i ove nove koje vam dajem ovdje riješite sljedeće zadatke:

36)  $(x+3)^2 =$

37)  $(2x+3y)^2 =$

38)  $(3x-4y)^2 =$

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

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

41)  $(5x-6y)^{-2} =$

42)  $(-2a-3y)^2 =$

43)  $(2x-5) \cdot (2x+5) =$

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

45)  $(3x^2y^3z^4 - 4a^5b^6) \cdot (3x^2y^3z^4 - 4a^5b^6) =$

46)  $(x+3)^3 =$

47)  $(x+2)^2 \cdot (x+2) =$

48)  $(2y-3z)^3 =$

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

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

51)  $(3x^2y^3 - 2z^4)^3 =$

52)  $(x+y)^3 - (x-y)^3 =$

## ALGEBARSKI IZRAZI

$$(a+b)^2 = (a+b) \cdot (a+b) = a^2 + 2ab + b^2$$

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

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

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

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

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

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

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

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

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

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

Primjer:

$$27x^3 - 8y^6 = ?$$

rješenje:

$$27x^3 - 8y^6 = 3^3 x^3 - 2^3 (y^2)^3 = (3x)^3 - (2y^2)^3 = (3x - 2y^2) \cdot \left( (3x)^2 + 3x \cdot 2y^2 + (2y^2)^2 \right) =$$

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

$$a^3 = (3x)^3 \quad b^3 = (2y^2)^3$$

$$a = 3x \quad b = 2y^2$$

$$= (3x - 2y^2) \cdot (9x^2 + 6xy^2 + 4y^4)$$

Koristi gornji primjer i ove formule riješi sljedeće zadatke:

**ALGEBARSKI IZRAZI**

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

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

Rastavi na faktore:

53)  $x^3 - 8 =$

54)  $8y^3 - 27 =$

55)  $x^6 + 125 =$

56)  $x^6 - y^6 =$

57)  $\frac{1}{27}y^3 + 1 =$

58)  $64x^9y^6 + 125z^3 =$

Koristeći se formulom  
riješi sljedeće zadatke:

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

$$59) \quad (x + 2y + 3)^2 =$$

$$60) \quad (2x + 3y + 4z)^2 =$$

$$61) \quad (3x + y - 3)^2 =$$

Koristeći se formulom:

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

rastavi na faktore:

$$62) \quad x^2 - 16 =$$

$$63) \quad 4y^2 - 36x^2 =$$

$$64) \quad \frac{1}{4}x^4 - \frac{25}{49}y^6 =$$

$$65) \quad x^4 - y^4 =$$

$$66) \quad 4x^2y^4 - z^8 =$$

$$67) \quad (x + y)^2 - (x - 2y)^2 =$$

$$68) \quad 36(x + y^2) - 16(x - y)^2 =$$

Koristeći se formulama:

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

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

sljedeće zadatke zapiši u obliku kvadrata binoma:

69)  $9x^2 + 6y + y^2 =$

70)  $4x^2 - 20xy + 25y^2 =$

71)  $9x^6 - 12x^3y^4 + 4y^8 =$

72)  $x^4 + y^6 + 2x^2y^3 =$

73)  $-x^2 + 2xy^4 - y^8 =$

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

#### Kvadratni trinom

$$x^2 + px + q = \begin{cases} m + n = p \\ m \cdot n = q \end{cases} = (x + m) \cdot (x + n)$$

$$ax^2 + bx + c = \begin{cases} m + n = b \\ m \cdot n = a \cdot c \end{cases} = ax^2 + mx + nx + c = \dots$$

Koristeći se gornjim formulama rastavi na faktore sljedeće kvadratne trinome:

75)  $x^2 + 2x - 15 =$

76)  $3x^2 + x - 2 =$

77)  $x^2 - x - 12 =$

Skrati razlomke koristeći sve što smo izvježbali do sada:

$$78) \quad \frac{4x - 6y}{6x - 9y} =$$

$$79) \quad \frac{x^2 - y^2}{x^2 + 2xy + y^2} =$$

$$80) \quad \frac{a^4 - b^4}{a^2 - 2ab + b^2} =$$

$$81) \quad \frac{(x - y)^2}{y^2 - x^2} =$$

Pogledaj u formule za ove brojnike u 81) i 82)

$$82) \quad \frac{(y + x)^2}{x^4 - y^4} =$$

$$83) \quad \frac{x^3 - y^3}{3x^2 - 3y^2} =$$

$$84) \quad \frac{x^3 + y^3}{(x + y)^3} =$$

$$85) \quad \frac{3x^2 + 18x + 27}{2x^2 - 18} =$$

$$86) \quad \frac{2x^2 - xy + 3y^2}{3x^2 + 6xy + 3y^2} =$$

$$87) \quad \frac{x+3}{2} - \frac{x-2}{3} + \frac{x}{4} =$$

$$87) \quad \frac{1}{x+2} - \frac{2}{x-2} =$$

$$88) \quad \frac{2}{x-1} + \frac{3}{x+1} - \frac{3x-2}{x^2-1} =$$

$$89) \quad \frac{1}{y-3} - \frac{1}{(y-3)^2} =$$

$$90) \quad \frac{1}{x^2+y^2} - \frac{y^2}{x^4-y^4} =$$

$$91) \quad \frac{y}{x^2-y^2} - \frac{y}{(y-x)^2} =$$

Izračunaj:

$$92) \quad \frac{x^2-y^2}{x^3-y^3} \cdot \frac{4x^2+4xy+4y^2}{(y+x)^2} =$$

$$93) \quad \frac{x^4-y^4}{x^3+y^3} \cdot \frac{x^6+2x^3y^3+y^6}{x^4+x^2y^2} =$$

$$94) \quad \left( \frac{1}{x+1} + \frac{2}{x-1} \right) \cdot \frac{x^4-1}{9x^2-1} =$$

$$95) \quad \frac{3x^2y + 18xy + 27y}{6x^2y - 24y} : \frac{x^2 - 9}{x^2 + 4x + 4} =$$

$$96) \quad \frac{(x+y)^2 - y^2}{(x-y)^2 - z^2} : \frac{yx + 2y^2}{xz - yz - z^2} =$$

$$97) \quad \left( \frac{1}{x-1} - \frac{1}{x+1} + \frac{3x-2}{x^2-1} \right) \cdot \frac{x^3 + 2x^2 + x}{6x^2 - 9x} =$$

$$98) \quad \frac{1 + \frac{1}{y-1}}{1 - \frac{1}{y+1}} =$$

$$99) \quad \frac{1 - \frac{1+x}{1-2x}}{1 + \frac{1+x}{1-2x}} =$$

$$100) \quad \frac{\frac{x-y}{x+y} - \frac{x+y}{x-y}}{\frac{4x^2y^3 - 4xy}{xy - x + y^2 - y}} =$$

## Kompletna rješenja s postupkom

- 1)  $x^2 \cdot x^3 = x^{2+3} = x^5$
- 2)  $x^2 \cdot x^4 \cdot x^6 = x^{2+4+6} = x^{12}$
- 3)  $x^{\frac{2}{3}} \cdot x^2 \cdot x^{\frac{5}{2}} = x^{\frac{2}{3}+2+\frac{5}{2}} = x^{\frac{2 \cdot 2 + 2 \cdot 6 + 5 \cdot 3}{3 \cdot 2}} = x^{\frac{31}{6}}$
- 4)  $x^4 : x^2 = x^{4-2} = x^2$
- 5)  $x^7 : x^2 : x^3 = x^{7-2-3} = x^2$
- 6)  $x^7 \cdot x^8 : x^9 = x^{7+8-9} = x^6$
- 7)  $\frac{x^8}{x^3} = x^8 : x^3 = x^{8-3} = x^5$
- 8)  $(x^2)^3 = x^{2 \cdot 3} = x^6$
- 9)  $((x^3)^4)^5 = x^{3 \cdot 4 \cdot 5} = x^{60}$
- 10)  $((x^2)^6)^2 \cdot (x^2)^5 = x^{2 \cdot 6 \cdot 2} \cdot x^{2 \cdot 5} = x^{24} \cdot x^{10} = x^{24+10} = x^{34}$
- 11)  $((x^2)^5)^3 : (x^4)^5 = x^{2 \cdot 5 \cdot 3} : x^{4 \cdot 5} = x^{30} : x^{20} = x^{30-20} = x^{10}$
- 12)  $(2ab^2)^3 = 2^3 \cdot a^3 \cdot (b^2)^3 = 8 \cdot a^3 \cdot b^{2 \cdot 3} = 8a^3b^6$
- 13)  $\left(\frac{2}{3}x^2y^3\right)^4 = \frac{2^4}{3^4} \cdot (x^2)^4 \cdot (y^3)^4 = \frac{16}{81}x^8y^{12}$
- 14)  $\left(\frac{2}{3}a^2b^3\right)^3 : (2ab^2)^2 = \frac{2^3}{3^3} \cdot (a^2)^3 \cdot (b^3)^3 : (2^2 \cdot a^2 \cdot (b^2)^2) = \frac{8}{27} \cdot a^6 \cdot b^9 : (4 \cdot a^2 \cdot b^4) =$   
 $= \frac{8 \cdot a^6 \cdot b^9}{27} \cdot \frac{1}{4 \cdot a^2 \cdot b^4} = \frac{4 \cdot 2 \cdot a^2 \cdot a^4 \cdot b^4 \cdot b^5}{27} \cdot \frac{1}{4 \cdot a^2 \cdot b^4} = \frac{2 \cdot a^4 \cdot b^5}{27}$
- 15)  $\left(\frac{x}{y}\right)^{-1} = \frac{y}{x}$
- 16)  $\left(\frac{x}{y}\right)^{-2} \cdot \left(\frac{y}{x}\right)^3 = \left(\frac{y}{x}\right)^2 \cdot \frac{y^3}{x^3} = \frac{y^2}{x^2} \cdot \frac{y^3}{x^3} = \frac{y^{2+3}}{x^{2+3}} = \frac{y^5}{x^5}$
- 17)  $\left(\frac{a^2}{y^3}\right)^3 \cdot \left(\frac{y}{a^3}\right)^2 : \left(\frac{y^2}{a^4}\right)^2 = \frac{(a^2)^3}{(y^3)^3} \cdot \frac{y^2}{(a^3)^2} : \frac{(y^2)^2}{(a^4)^2} = \frac{a^6}{y^9} \cdot \frac{y^2}{a^6} : \frac{y^4}{a^8} = \frac{a^6}{y^9} \cdot \frac{y^2}{a^6} \cdot \frac{a^8}{y^4} =$   
 $= \frac{y^2 \cdot a^8}{y^9 \cdot y^2 \cdot y^2} = \frac{a^8}{y^{9+2}} = \frac{a^8}{y^{11}}$
- 18)  $\left(\frac{2}{3}\right)^{-1} + \left(\frac{1}{3}\right)^{-2} - \left(\frac{1}{2}\right)^{-3} = \frac{3}{2} + \left(\frac{3}{1}\right)^2 - \left(\frac{2}{1}\right)^3 = \frac{3}{2} + 9 - 8 = \frac{3}{2} + 1 = \frac{3+2}{2} = \frac{5}{2}$
- 19)  $27^0 \cdot x^0 \cdot y^0 \cdot 2^1 \cdot \left(\frac{1}{3}\right)^{-1} = 1 \cdot 1 \cdot 1 \cdot 2 \cdot \frac{3}{1} = 2 \cdot 3 = 6$
- 20)  $y^0 \cdot 2^{-1} \cdot \left(\frac{1}{2}\right)^1 \cdot \left(\frac{1}{5}\right)^{-1} \cdot 2^{-3} = 1 \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{5}{1} \cdot \frac{1}{2^3} = \frac{1 \cdot 5 \cdot 1}{2 \cdot 2 \cdot 8} = \frac{5}{32}$

$$21) \quad x^{\frac{1}{2}} = \sqrt{x}$$

$$22) \quad x^{-\frac{1}{2}} = \frac{1}{x^{\frac{1}{2}}} = \frac{1}{\sqrt{x}}$$

$$23) \quad x^{\frac{2}{3}} = x^{2 \cdot \frac{1}{3}} = (x^2)^{\frac{1}{3}} = \sqrt[3]{x^2}$$

$$24) \quad x^{-\frac{3}{4}} = \frac{1}{x^{\frac{3}{4}}} = \frac{1}{(x^3)^{\frac{1}{4}}} = \frac{1}{\sqrt[4]{x^3}}$$

$$25) \quad 36^{\frac{1}{2}} = \sqrt{36} = \sqrt{6^2} = 6$$

$$26) \quad 16^{\frac{1}{4}} = \sqrt[4]{16} = \sqrt[4]{2^4} = 2$$

$$27) \quad \left(\frac{25}{49}\right)^{\frac{1}{2}} = \sqrt{\frac{25}{49}} = \frac{\sqrt{25}}{\sqrt{49}} = \frac{5}{7}$$

$$28) \quad \left(\frac{16}{81}\right)^{\frac{1}{4}} = \sqrt[4]{\frac{16}{81}} = \sqrt[4]{\frac{2^4}{3^4}} = \sqrt[4]{\left(\frac{2}{3}\right)^4} = \frac{2}{3}$$

$$29) \quad \left(\frac{64}{49}\right)^{-\frac{1}{2}} = \left(\frac{49}{64}\right)^{\frac{1}{2}} = \sqrt{\frac{49}{64}} = \frac{\sqrt{49}}{\sqrt{64}} = \frac{7}{8}$$

$$30) \quad \left(\frac{9}{16}\right)^{-\frac{3}{2}} = \left(\frac{16}{9}\right)^{\frac{3}{2}} = \left(\frac{4^2}{3^2}\right)^{\frac{3}{2}} = \left(\left(\frac{4}{3}\right)^2\right)^{\frac{3}{2}} = \left(\frac{4}{3}\right)^{2 \cdot \frac{3}{2}} = \left(\frac{4}{3}\right)^3 = \frac{4^3}{3^3} = \frac{64}{27}$$

$$31) \quad \sqrt{10} \cdot \sqrt{10} = \sqrt{10 \cdot 10} = \sqrt{10^2} = 10$$

$$32) \quad \sqrt[3]{3} \cdot \sqrt[3]{9} = \sqrt[3]{3 \cdot 9} = \sqrt[3]{27} = \sqrt[3]{3^3} = 3$$

$$33) \quad \sqrt[4]{2} \cdot \sqrt[4]{8} = \sqrt[4]{2 \cdot 8} = \sqrt[4]{16} = \sqrt[4]{2^4} = 2$$

$$34) \quad \sqrt[5]{x^2} \cdot \sqrt[5]{x^3} = \sqrt[5]{x^2 \cdot x^3} = \sqrt[5]{x^5} = x$$

$$35) \quad \sqrt[6]{x^5} \cdot \sqrt[6]{x} = \sqrt[6]{x^5 \cdot x^1} = \sqrt[6]{x^{5+1}} = \sqrt[6]{x^6} = \sqrt[6]{x^3} = \sqrt[2 \cdot 3]{x^3} = \sqrt[2]{x} = \sqrt{x}$$

- 36)  $(x+3)^2 = x^2 + 2 \cdot x \cdot 3 + 3^2 = x^2 + 6x + 9$
- 37)  $(2x+3y)^2 = (2x)^2 + 2 \cdot 2x \cdot 3y + (3y)^2 = 2^2 x^2 + 12xy + 3^2 y^2 = 4x^2 + 12xy + 9y^2$
- 38)  $(3x-4y)^2 = (3x)^2 - 2 \cdot 3x \cdot 4y + (4y)^2 = 3^2 x^2 - 24xy + 4^2 y^2 = 9x^2 - 24xy + 16y^2$
- 39)  $\left(\frac{1}{2}x + \frac{2}{3}y^3\right)^2 = \left(\frac{1}{2}x\right)^2 + 2 \cdot \frac{1}{2}x \cdot \frac{2}{3}y^3 + \left(\frac{2}{3}y^3\right)^2 = \frac{1^2}{2^2}x^2 + \frac{2}{3}xy^3 + \frac{2^2}{3^2}(y^3)^2 = \frac{1}{4}x^2 + \frac{2}{3}xy^3 + \frac{4}{9}y^6$
- 40)  $\left(\frac{2}{3}x^3 - \frac{3}{4}y^4\right)^2 = \left(\frac{2}{3}x^3\right)^2 - 2 \cdot \frac{2}{3}x^3 \cdot \frac{3}{4}y^4 + \left(\frac{3}{4}y^4\right)^2 = \frac{2^2}{3^2}(x^3)^2 - \frac{2 \cdot 2 \cdot 3}{3 \cdot 4}x^3 \cdot y^4 + \frac{3^2}{4^2}(y^4)^2 =$   
 $= \frac{4}{9}x^6 - x^3y^4 + \frac{9}{16}y^8$
- 41)  $(5x-6y)^{-2} = \frac{1}{(5x-6y)^2} = \frac{1}{(5x)^2 - 2 \cdot 5x \cdot 6y + (6y)^2} = \frac{1}{25x^2 - 60xy + 36y^2}$
- 42)  $(-2a-3y)^2 = (-1 \cdot (2a+3y))^2 = (-1)^2 \cdot (2a+3y)^2 = 1 \cdot ((2a)^2 + 2 \cdot 2a \cdot 3y + (3y)^2) = 4a^2 + 12ay + 9y^2$
- 43)  $(2x-5) \cdot (2x+5) = (2x)^2 - 5^2 = 2^2 x^2 - 25 = 4x^2 - 25$
- 44)  $\left(\frac{2}{3}x^2 - \frac{4}{5}y^3\right) \cdot \left(\frac{2}{3}x^2 + \frac{4}{5}y^3\right) = \left(\frac{2}{3}x^2\right)^2 - \left(\frac{4}{5}y^3\right)^2 = \frac{2^2}{3^2}(x^2)^2 - \frac{4^2}{5^2}(y^3)^2 = \frac{4}{9}x^4 - \frac{16}{25}y^6$
- 45)  $(3x^2y^3z^4 - 4a^5b^6) \cdot (3x^2y^3z^4 - 4a^5b^6) = (3x^2y^3z^4)^2 - (4a^5b^6)^2 =$   
 $= 3^2(x^2)^2(y^3)^2(z^4)^2 - 4^2(a^5)^2(b^6)^2 = 9x^4y^6z^8 - 16a^{10}b^{12}$
- 46)  $(x+3)^3 = x^3 + 3 \cdot x^2 \cdot 3 + 3 \cdot x \cdot 3^2 + 3^3 = x^3 + 9x^2 + 3 \cdot 9 \cdot x + 27 = x^3 + 9x^2 + 27x + 27$
- 47)  $(x+2)^2 \cdot (x+2) = (x+2)^2 \cdot (x+2)^1 = (x+2)^{2+1} = (x+2)^3 = x^3 + 3 \cdot x^2 \cdot 2 + 3 \cdot x \cdot 2^2 + 2^3 = x^3 + 6x^2 + 12x + 8$
- 48)  $(2y-3z)^3 = (2y)^3 - 3 \cdot (2y)^2 \cdot 3z + 3 \cdot 2y \cdot (3z)^2 - (3z)^3 = 2^3 y^3 - 9 \cdot 2^2 \cdot y^2 \cdot z + 6 \cdot y \cdot 3^2 \cdot z^2 - 3^3 z^3 =$   
 $= 8y^3 - 36y^2z + 54yz^2 - 27z^3$
- 49)  $\left(\frac{1}{2} + \frac{1}{3}x\right)^3 = \left(\frac{1}{2}\right)^3 + 3 \cdot \left(\frac{1}{2}\right)^2 \cdot \frac{1}{3}x + 3 \cdot \frac{1}{2} \cdot \left(\frac{1}{3}x\right)^2 + \left(\frac{1}{3}x\right)^3 = \frac{1^3}{2^3} + 3 \cdot \frac{1}{4} \cdot \frac{1}{3} \cdot x + 3 \cdot \frac{1}{2} \cdot \frac{1}{9} \cdot x^2 + \frac{1^3}{3^3} x^3 =$   
 $= \frac{1}{8} + \frac{1}{4}x + \frac{1}{6}x^2 + \frac{1}{27}x^3$
- 50)  $\left(\frac{2}{3}x^2 - \frac{3}{2}y^3\right)^3 = \left(\frac{2}{3}x^2\right)^3 - 3 \cdot \left(\frac{2}{3}x^2\right)^2 \cdot \frac{3}{2}y^3 + 3 \cdot \frac{2}{3}x^2 \cdot \left(\frac{3}{2}y^3\right)^2 - \left(\frac{3}{2}y^3\right)^3 =$   
 $= \frac{2^3}{3^3}(x^2)^3 - 3 \cdot \frac{2^2}{3^2}(x^2)^2 \cdot \frac{3}{2}y^3 + 2 \cdot x^2 \cdot \frac{3^2}{2^2}(y^3)^2 - \frac{3^3}{2^3}(y^3)^3 =$   
 $= \frac{8}{27}x^6 - 2x^4y^3 + \frac{9}{2}x^2y^6 - \frac{27}{8}y^9$
- 51)  $(3x^2y^3 - 2z^4)^3 = (3x^2y^3)^3 - 3 \cdot (3x^2y^3)^2 \cdot 2z^4 + 3 \cdot 3x^2y^3 \cdot (2z^4)^2 - (2z^4)^3 =$   
 $= 3^3(x^2)^3(y^3)^3 - 3 \cdot 2 \cdot 9 \cdot (x^2)^2 \cdot (y^3)^2 \cdot z^4 + 9x^2y^3 \cdot 4 \cdot (z^4)^2 - 2^3(z^4)^3 =$   
 $= 27x^6y^9 - 54x^4y^6 + 36x^2y^3z^8 - 8z^{12}$
- 52)  $(x+y)^3 - (x-y)^3 = x^3 + 3x^2y + 3xy^2 + y^3 - (x^3 - 3x^2y + 3xy^2 - y^3) =$   
 $= x^3 + 3x^2y + 3xy^2 + y^3 - x^3 + 3x^2y - 3xy^2 + y^3 = 6x^2y + 2y^3$

Primjer:

$$27x^3 - 8y^6 = ?$$

rješenje:

$$27x^3 - 8y^6 = 3^3 x^3 - 2^3 (y^2)^3 = (3x)^3 - (2y^2)^3 = (3x - 2y^2) \cdot ((3x)^2 + 3x \cdot 2y^2 + (2y^2)^2) =$$

$$\left| \begin{array}{c} \downarrow \quad \downarrow \quad \uparrow \quad \uparrow \quad \uparrow \quad \uparrow \\ a^3 - b^3 = (a-b) \cdot (a^2 + a \cdot b + b^2) \\ \downarrow \quad \downarrow \\ a^3 = (3x)^3 \quad b^3 = (2y^2)^3 \\ a = 3x \quad b = 2y^2 \end{array} \right|$$

$$= (3x - 2y^2) \cdot (9x^2 + 6xy^2 + 4y^4)$$

Koristi gornji primjer i ove formule riješi sljedeće zadatke:

ALGEBARSKI IZRAZI
$a^3 - b^3 = (a - b) \cdot (a^2 + ab + b^2)$
$a^3 + b^3 = (a + b) \cdot (a^2 - ab + b^2)$

Rastavi na faktore:

$$53) \quad x^3 - 8 = \underset{\substack{\downarrow \\ A=x \\ A^3=x^3}}{x^3} + \underset{\substack{\downarrow \\ B=2 \\ B^3=2^3}}{2^3} = \left| A=x, B=2 \right| = (x+2) \cdot (x^2 - 2x + 2^2) = (x+2) \cdot (x^2 - 2x + 4)$$

$$54) \quad 8y^3 - 27 = \underset{\substack{\downarrow \\ A=2y \\ A^3=2^3 y^3}}{2^3 y^3} - \underset{\substack{\downarrow \\ B=3 \\ B^3=3^3}}{3^3} = \underset{\substack{\downarrow \\ A=2y \\ A^3=2^3 y^3}}{(2y)^3} - \underset{\substack{\downarrow \\ B=3 \\ B^3=3^3}}{3^3} = (2y-3) \cdot ((2y)^2 + 2y \cdot 3 + 3^2) =$$

$$= (2y-3) \cdot (4y^2 + 6y + 9)$$

$$55) \quad x^6 + 125 = \underset{\substack{\downarrow \\ A=x^2 \\ A^3=x^6}}{(x^2)^3} + \underset{\substack{\downarrow \\ B=5 \\ B^3=5^3}}{5^3} = (x^2+5) \cdot ((x^2)^2 - x^2 \cdot 5 + 5^2) =$$

$$= (x^2+5) \cdot (x^4 - 5x^2 + 25)$$

$$56) \quad x^6 - y^6 = \underset{\substack{\uparrow \\ A=x^2 \\ A^3=x^6}}{(x^2)^3} - \underset{\substack{\uparrow \\ B=y^2 \\ B^3=y^6}}{(y^2)^3} = (x^2 - y^2) \cdot ((x^2)^2 + x^2 y^2 + (y^2)^2) =$$

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

$$57) \quad \frac{1}{27} y^3 + 1 = \frac{1^3}{3^3} y^3 + 1^3 = \left( \frac{1}{3} y \right)^3 + 1^3 = \left( \frac{1}{3} y + 1 \right) \cdot \left( \left( \frac{1}{3} y \right)^2 - \frac{1}{3} y \cdot 1 + 1^2 \right) =$$

$$= \left( \frac{1}{3} y + 1 \right) \cdot \left( \frac{1}{9} y^2 - \frac{1}{3} y + 1 \right)$$

$$58) \quad 64x^9 y^6 + 125z^3 = \underset{\substack{\downarrow \\ A=4x^3 y^2 \\ A^3=4^3 x^9 y^6}}{4^3 (x^3)^3 (y^2)^3} + \underset{\substack{\downarrow \\ B=5z \\ B^3=5^3 z^3}}{5^3 z^3} = \underset{\substack{\downarrow \\ A=4x^3 y^2 \\ A^3=4^3 x^9 y^6}}{(4x^3 y^2)^3} + \underset{\substack{\downarrow \\ B=5z \\ B^3=5^3 z^3}}{(5z)^3} = (4x^3 y^2 + 5z) \cdot ((4x^3 y^2)^2 - 4x^3 y^2 \cdot 5z + (5z)^2) =$$

$$= (4x^3 y^2 + 5z) \cdot (16x^6 y^4 - 20x^3 y^2 z + 25z^2)$$

Koristeći se formulom riješi sljedeće zadatke:

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

$$59) \quad \begin{array}{c} (x+2y+3)^2 \\ \downarrow \quad \downarrow \quad \downarrow \\ a \quad b \quad c \end{array} = x^2 + (2y)^2 + 3^2 + 2 \cdot x \cdot 2y + 2 \cdot x \cdot 3 + 2 \cdot 2y \cdot 3 = \\ = x^2 + 4y^2 + 9 + 4xy + 6x + 12y$$

$$60) \quad (2x+3y+4z)^2 = (2x)^2 + (3y)^2 + (4z)^2 + 2 \cdot 2x \cdot 3y + 2 \cdot 2x \cdot 4z + 2 \cdot 3y \cdot 4z = \\ = 4x^2 + 9y^2 + 16z^2 + 12xy + 16xz + 24yz$$

$$61) \quad (3x+y-3)^2 = \begin{array}{c} (3x+y+(-3))^2 \\ \downarrow \quad \downarrow \quad \downarrow \\ a \quad b \quad c \end{array} = (3x)^2 + y^2 + (-3)^2 + 2 \cdot 3x \cdot y + 2 \cdot 3x \cdot (-3) + 2 \cdot y \cdot (-3) = \\ = 9x^2 + y^2 + 9 + 6xy - 18x - 6y$$

Koristeći se formulom:

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

rastavi na faktore:

$$62) \quad x^2 - 16 = x^2 - 4^2 = (x-4)(x+4)$$

$$63) \quad 4y^2 - 36x^2 = 2^2 y^2 - 6^2 x^2 = (2y)^2 - (6x)^2 = (2y-6x)(2y+6x) = \\ \rightarrow \text{ključno} = 4 \cdot (y^2 - 9x^2) = 4 \cdot (y-3x)(y+3x) = 4 \cdot (y-3x) \cdot (y+3x)$$

$$64) \quad \frac{1}{4}x^4 - \frac{25}{49}y^6 = \frac{1}{2^2}(x^2)^2 - \frac{5^2}{7^2}(y^3)^2 = \\ = \left(\frac{1}{2}x^2\right)^2 - \left(\frac{5}{7}y^3\right)^2 = \left(\frac{1}{2}x^2 - \frac{5}{7}y^3\right)\left(\frac{1}{2}x^2 + \frac{5}{7}y^3\right)$$

$$65) \quad x^4 - y^4 = (x^2)^2 - (y^2)^2 = \underset{\substack{\downarrow \\ \text{razlika kvadrata} \\ A^2 - B^2}}{(x^2 - y^2)} \cdot (x^2 + y^2) = (x-y)(x+y) \cdot (x^2 + y^2)$$

$$66) \quad 4x^2y^4 - z^8 = 2^2 x (y^2)^2 - (z^4)^2 = (2xy^2)^2 - (z^4)^2 = \\ = (2xy^2 - z^4)(2xy^2 + z^4)$$

$$67) \quad \begin{array}{c} (x+y)^2 - (x-2y)^2 \\ \downarrow \quad \downarrow \\ A^2 \quad B^2 \\ \downarrow \quad \downarrow \\ A=x+y \quad B=x-2y \end{array} = (x+y - (x-2y)) \cdot (x+y + (x-2y)) = \\ = (x+y-x+2y) \cdot (x+y+x-2y) = 3y \cdot (2x-y)$$

$$68) \quad 36(x+y)^2 - 16(x-y)^2 = 6^2(x+y)^2 - 4^2(x-y)^2 = (6 \cdot (x+y))^2 - (4 \cdot (x-y))^2 = \\ = (6x+6y)^2 - (4x-4y)^2 = \\ = (6x+6y - (4x-4y))(6x+6y + (4x-4y)) = \\ = (6x+6y-4x+4y)(6x+6y+4x-4y) = (2x+10y)(10x+10y) = \\ = 2 \cdot (x+5y) \cdot 10 \cdot (x+y) = 20(x+5y) \cdot (x+y)$$

Koristeći se formulama:

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

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

slijedeće zadatke zapiši u obliku kvadrata binoma:

$$69) \quad 9x^2 + 6y + y^2 = 3^2x^2 + 2 \cdot 3 \cdot y + y^2 = \underbrace{(3x)^2 + 2 \cdot 3 \cdot y + y^2}_{A^2 + 2 \cdot A \cdot B + B^2} = (3x + y)^2$$

$$70) \quad 4x^2 - 20xy + 25y^2 = 2^2x^2 - 2 \cdot 2 \cdot 5 \cdot xy + 5^2y^2 = \underbrace{(2x)^2 - 2 \cdot 2x \cdot 5y + (5y)^2}_{A^2 - 2 \cdot A \cdot B + B^2} = (2x - 5y)^2$$

$$71) \quad 9x^6 - 12x^3y^4 + 4y^8 = 3^2(x^2)^2 - 2 \cdot 3 \cdot 2 \cdot x^2y^4 + 2^2(y^4)^2 = (3x^2 - 2y^4)^2$$

$$72) \quad x^4 + y^6 + 2x^2y^3 = \underbrace{(x^2)^2 + 2 \cdot x^2 \cdot y^3 + (y^3)^2}_{A^2 + 2 \cdot A \cdot B + B^2} = (x^2 + y^3)^2$$

$$73) \quad -x^2 + 2xy^4 - y^8 = -1 \cdot \left( \underbrace{x^2 - 2xy^4 + (y^4)^2}_{A^2 - 2 \cdot A \cdot B + B^2} \right) = -1 \cdot (x - y^4)^2$$

$$74) \quad \frac{1}{4}a^2 - 3ab^2 + 9b^4 = \frac{1}{2}a^2 - 2 \cdot \frac{1}{2} \cdot a \cdot 3b^2 + 3^2(b^2)^2 = \left( \frac{1}{2}a - 3b^2 \right)^2$$

## Kvadratni trinom

$$x^2 + px + q = \begin{cases} m+n=p \\ m \cdot n=q \end{cases} = (x+m) \cdot (x+n)$$

$$ax^2 + bx + c = \begin{cases} m+n=b \\ m \cdot n=a \cdot c \end{cases} = ax^2 + mx + nx + c = \dots$$

Koristeći se gornjim formulama rastavi na faktore slijedeće kvadratne trinome:

$$75) \quad x^2 + 2x - 15 = \left. \begin{array}{l} u+v=2 \\ u \cdot v = 1 \cdot (-15) \end{array} \right\} \left. \begin{array}{l} u+v=2 \\ u \cdot v = -15 \end{array} \right\} \Rightarrow \left. \begin{array}{l} u=5 \\ v=-3 \end{array} \right| = \\ \text{pa je } x^2 + 2x - 15 = x^2 + 5x - 3x - 15 = x(x+5) - 3 \cdot (x+5) = (x+5)(x-3)$$

$$76) \quad 3x^2 + x - 2 = \left. \begin{array}{l} m+n=1 \\ m \cdot n = 3 \cdot (-2) \end{array} \right\} \left. \begin{array}{l} m+n=1 \\ m \cdot n = -6 \end{array} \right\} \left. \begin{array}{l} m=3 \\ n=-2 \end{array} \right| = 3x^2 + 3x - 2x - 2 = \\ = 3x(x+1) - 2 \cdot (x+1) = \\ = (x+1)(3x-2)$$

$$77) \quad x^2 - x - 12 = \left. \begin{array}{l} m+n=-1 \\ m \cdot n = 1 \cdot (-12) \end{array} \right\} \left. \begin{array}{l} m+n=-1 \\ m \cdot n = -12 \end{array} \right\} \left. \begin{array}{l} m=4 \\ n=3 \end{array} \right| = \\ = x^2 - 4x + 3x - 12 = x(x-4) + 3 \cdot (x-4) = (x-4)(x+3)$$

Skrati razlomke koristeći sve što smo izvježbali do sada:

$$78) \quad \frac{4x-6y}{6x-9y} = \frac{2(2x-3y)}{3 \cdot (2x-3y)} = \frac{2}{3}$$

$$79) \quad \frac{x^2-y^2}{x^2+2xy+y^2} = \frac{(x-y)(x+y)}{(x+y)^2} = \frac{(x-y)(x+y)}{(x+y)(x+y)} = \frac{x-y}{x+y}$$

$$80) \quad \frac{a^4-b^4}{a^2-2ab+b^2} = \frac{(a^2-b^2)(a^2+b^2)}{(a-b)^2} = \frac{(a-b)(a+b)(a^2+b^2)}{(a-b)(a-b)} = \frac{(a+b)(a^2+b^2)}{a-b}$$

$$81) \quad \frac{(x-y)^2}{y^2-x^2} = \frac{(x-y) \cdot (x-y)}{(y-x) \cdot (y-x)} = \frac{-1 \cdot \cancel{(y-x)} \cdot (x-y)}{\cancel{(y-x)} \cdot (y-x)} = \frac{-1 \cdot (x-y)}{y-x} = \frac{-x+y}{y-x} = \frac{y-x}{y-x} = 1$$

$$82) \quad \frac{(y+x)^2}{x^4-y^4} = \frac{(y+x)(y+x)}{(x^2-y^2)(x^2+y^2)} = \frac{(x+y) \cdot \cancel{(x+y)}}{\cancel{(x-y)} \cdot (x+y) \cdot (x^2+y^2)} = \frac{x+y}{(x+y)(x^2+y^2)}$$

$$83) \quad \frac{x^3-y^3}{3x^2-3y^2} = \frac{(x-y)(x^2+xy+y^2)}{3 \cdot (x^2-y^2)} = \frac{\cancel{(x-y)} \cdot (x^2+xy+y^2)}{3 \cdot \cancel{(x-y)} \cdot (x+y)} = \frac{x^2+xy+y^2}{3 \cdot (x+y)}$$

$$84) \quad \frac{x^3+y^3}{(x+y)^3} = \frac{(x+y)(x^2-xy+y^2)}{(x+y)^1 \cdot (x+y)^2} = \frac{x^2-xy+y^2}{(x+y)^2}$$

$$85) \quad \frac{3x^2+18x+27}{2x^2-18} = \frac{3 \cdot (x^2+6x+9)}{2 \cdot (x^2-9)} = \frac{3 \cdot (x+3)^2}{2 \cdot (x-3)(x+3)} = \frac{3 \cdot \cancel{(x+3)} \cdot (x+3)}{2 \cdot (x-3) \cdot \cancel{(x+3)}} = \frac{3 \cdot (x+3)}{2 \cdot (x-3)}$$

$$86) \quad \frac{2x^2-xy-3y^2}{3x^2+6xy+3y^2} = \frac{2x^2+2xy-3xy-3y^2}{3 \cdot (x^2+2xy+y^2)} = \frac{2x(x+y)-3y \cdot (x+y)}{3 \cdot (x+y)^2} = \frac{(x+y)(2x-3y)}{3 \cdot (x+y)(x+y)} = \frac{2x-3y}{3 \cdot (x+y)}$$

$$87) \quad \frac{x+3}{2} - \frac{x-2}{3} + \frac{x}{4} = \frac{2(x+3) - 4(x-2) + x \cdot 3}{12} = \frac{2x+6-4x+8+3x}{12} = \frac{x+14}{12}$$

$$87) \quad \frac{1}{x+2} - \frac{2}{x-2} = \frac{x-2-2(x+2)}{(x+2)(x-2)} = \frac{x-2-2x-4}{(x+2)(x-2)} = \frac{-x-6}{x^2-4} = \frac{-(x+6)}{-(4-x^2)} = \frac{x+6}{4-x^2}$$

$$88) \quad \frac{2}{x-1} + \frac{3}{x+1} - \frac{3x-2}{x^2-1} = \frac{2}{x-1} + \frac{3}{x+1} - \frac{3x-2}{(x-1)(x+1)} = \frac{2(x+1)+3(x-1)-(3x-2)}{(x-1)(x+1)}$$

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

$$89) \quad \frac{1}{y-3} - \frac{1}{(y-3)^2} = \frac{y-3-1}{(y-3)^2} = \frac{y-4}{(y-3)^2}$$

$$90) \quad \frac{1}{x^2+y^2} - \frac{y^2}{x^4-y^4} = \frac{1}{x^2+y^2} - \frac{y^2}{(x^2-y^2)(x^2+y^2)} = \frac{x^2-y^2-y^2}{(x^2-y^2)(x^2+y^2)} = \frac{x^2-2y^2}{(x-y)(x+y)(x^2+y^2)}$$

$$91) \quad \frac{y}{x^2-y^2} - \frac{y}{(y-x)^2} = \frac{y}{(x-y)(x+y)} - \frac{y}{(x-y)^2} = \frac{y(x-y) - y(x+y)}{(x-y)(x+y)(x-y)}$$

$$= \frac{xy-y^2-xy-y^2}{(x-y)(x+y)(x-y)} = \frac{-2y^2}{(x-y)(x+y)(x-y)}$$

Izračunaj:

$$92) \quad \frac{x^2-y^2}{x^3-y^3} \cdot \frac{4x^2+4xy+4y^2}{(y+x)^2} = \frac{(x-y)(x+y)}{(x-y)(x^2+xy+y^2)} \cdot \frac{4(x^2+xy+y^2)}{(x+y)(x+y)} = \frac{4}{x+y}$$

$$93) \quad \frac{x^4-y^4}{x^3+y^3} \cdot \frac{x^6+2x^3y^3+y^6}{x^4+x^2y^2} = \frac{(x^2-y^2)(x^2+y^2)}{x^3+y^3} \cdot \frac{(x^3)^2+2x^3y^3+(y^3)^2}{x^2(x^2+y^2)}$$

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

$$= \frac{(x-y)(x+y)(x+y)(x^2-xy+y^2)}{x^2}$$

$$94) \quad \left( \frac{1}{x+1} + \frac{2}{x-1} \right) \cdot \frac{x^4-1}{9x^2-1} = \frac{x-1+2(x+1)}{(x+1)(x-1)} \cdot \frac{(x^2-1)(x^2+1)}{(3x-1)(3x+1)} = \frac{x-1+2x+2}{(x^2-1)} \cdot \frac{(x^2+1)(x^2+1)}{(3x-1)(3x+1)}$$

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

$$95) \frac{3x^2y + 18xy + 27y}{6x^2y - 24y} \cdot \frac{x^2 - 9}{x^2 + 4x + 4} = \frac{3y(x^2 + 6x + 9)}{6y(x^2 - 4)} \cdot \frac{x^2 - 9}{x^2 + 4x + 4} = \frac{(x+3)^2}{2(x-2)(x+2)} \cdot \frac{(x+2)^2}{(x-3)(x+3)} =$$

$$= \frac{(x+3)(x+3)(x+2)(x+2)}{2(x-2)(x+2)(x-3)(x+3)} = \frac{(x+3)(x+2)}{2(x-2)(x-3)}$$

$$96) \frac{(x+y)^2 - y^2}{(x-y)^2 - z^2} \cdot \frac{yx + 2y^2}{xz - yz - z^2} = \frac{(x+y-y)(x+y+y)}{(x-y-z)(x-y+z)} \cdot \frac{y(x+2y)}{z(x-y-z)} = \frac{x \cdot (x+2y)}{(x-y-z)(x-y+z)} \cdot \frac{z(x+y+z)}{y(x+2y)} =$$

$$= \frac{x \cdot z}{y(x-y+z)}$$

$$97) \left( \frac{1}{x-1} - \frac{1}{x+1} + \frac{3x-2}{x^2-1} \right) \cdot \frac{x^3 + 2x^2 + x}{6x^2 - 9x} = \frac{x+1 - (x-1) + 3x-2}{(x-1)(x+1)} \cdot \frac{x(x^2+2x+1)}{3x(2x-3)} =$$

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

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

$$98) \frac{1 + \frac{1}{y-1}}{1 - \frac{1}{y+1}} = \frac{\frac{y-1+1}{y-1}}{\frac{y+1-1}{y+1}} = \frac{\frac{y}{y-1}}{\frac{y}{y+1}} = \frac{y(y+1)}{y(y-1)} = \frac{y+1}{y-1}$$

$$99) \frac{1 - \frac{1+x}{1-2x}}{1 + \frac{1+x}{1-2x}} = \frac{\frac{1-2x-(1+x)}{1-2x}}{\frac{1-2x+1+x}{1-2x}} = \frac{\frac{1-2x-1-x}{1-2x} \text{ broj}}{\frac{2-x}{1-2x} \text{ lrač}} = \frac{1-2x-1-x}{2-x} = \frac{-3x}{2-x} = \frac{-3x}{-(x-2)} = \frac{3x}{x-2}$$

$$100) \frac{\frac{x-y}{x+y} \cdot \frac{x+y}{x-y}}{\frac{4x^2y^3 - 4xy}{xy - x + y^2 - y}} = \frac{\frac{(x-y)(x-y) - (x+y)(x+y)}{(x+y)(x-y)}}{\frac{4xy(xy^2-1)}{x(y-1)+y(y-1)}} = \frac{\frac{(x-y)^2 - (x+y)^2}{(x+y)(x-y)}}{\frac{4xy(xy^2-1)}{(y-1)(x+y)}} = \frac{\frac{(x-y-(x+y))(x-y+(x+y))}{(x+y)(x-y)}}{\frac{4xy(xy^2-1)}{(y-1)(x+y)}} =$$

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

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Ovo su uglavnom zadaci iz PRVOG razreda gimnazije oni rijetko dolaze u ovom obliku, već su sastavni dio težih zadataka ali ako ih ne znate riješiti nećete znati niti riješiti zadatke kojih su oni dio...

Naš prijedlog provježbajte ih koristit će Vam !!!!!

U zadnjih 10-godina na Eko –prijemnom bio je barem po jedan zadatak ovog tipa....

Na TEH-fakultetima ovi zadatci dolaze uvijek u kombinaciji sa još nečim.....

Moguće da je jedan zadatak krivo riješen ako ga pronađete javite nam: [mim-sraga@zg.htnet.hr](mailto:mim-sraga@zg.htnet.hr)

**Ako ne vidite dobro tekst od 15-20 strane zum namjestite na 150%**