

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

## POTPUNO RIJEŠENI ZADACI

PRIRUČNIK ZA SAMOSTALNO UČENJE

## 100 ELEMENTARNIH ZADATAKA

koje bi svatko trebao znati riješiti

## I

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

**M.I.M.-SRAGA**  
 $\sqrt{\alpha}$

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<b>Procijena i ocijena znanja ako se spremate :</b>	
<b>Za polaganje OSNOVNE razine</b>	<b>Za polaganje VIŠE razine</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 OZBILJNIJE zadatke**  
**ako ste dobili ocjenu 5 - odlično- vama osnovni zadaci na mature**  
**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

ako imaju namjeru položiti maturu !

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:

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

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

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

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

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

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

#### 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:

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

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

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



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:

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

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

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

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

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

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

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

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

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