Zadatak 681 (Dora, gimnazija)

Pojednostavnite: $\left(1+\frac{1}{a}\cdot\sqrt[3]{a\cdot b^2}+\frac{1}{b}\cdot\sqrt[3]{a^2\cdot b}\right)\cdot\left(\sqrt[3]{\frac{a}{b}}-\sqrt[3]{\frac{b}{a}}\right)$.

Rješenje 681

Ponovimo!

$$a\cdot\sqrt[n]{b}=\sqrt[n]{a^n\cdot b}\quad,\quad a^1=a\quad,\quad a^n:a^m=a^{n-m}\quad,\quad\left(\sqrt[n]{a}\right)^m=\sqrt[n]{a^m}.$$

$$\frac{a}{b}\cdot\frac{b}{a}=1\quad,\quad\sqrt[n]{a\cdot b}=\sqrt[n]{a}\cdot\sqrt[n]{b}\quad,\quad\left(\sqrt[n]{a}\right)^n=a.$$

$$a^3-b^3=(a-b)\cdot\left(a^2+a\cdot b+b^2\right)\quad,\quad\frac{a}{b}-\frac{c}{d}=\frac{a\cdot d-b\cdot c}{b\cdot d}.$$

Skratiti razlomak znači brojnik i nazivnik tog razlomka podijeliti istim brojem različitim od nule i jedinice

$$\frac{a\cdot n}{b\cdot n}=\frac{a}{b}\ ,\ n\neq 0\ ,\ n\neq 1.$$

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

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

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

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

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

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

$$=\frac{a}{b}-\frac{b}{a}=\frac{a^2-b^2}{a\cdot b}.$$

Vježba 681

Pojednostavnite: $\left(1+\frac{1}{a}\cdot\sqrt[3]{a\cdot b^2}+\frac{1}{b}\cdot\sqrt[3]{a^2\cdot b}\right)\cdot\left(\frac{1}{a}\cdot\sqrt[3]{\frac{a^4}{b}}-\frac{1}{b}\cdot\sqrt[3]{\frac{b^4}{a}}\right)$.

Rezultat: $\frac{a^2-b^2}{a\cdot b}$.

Zadatak 682 (Pero, pomorska škola)

Izračunaj: $3\cdot\left(x^3-y^2\right)^2-2\cdot\left(x^3-y^2\right)\cdot\left(x^3+y^2\right).$

Rješenje 682

Ponovimo!

$$(a-b)^2=a^2-2\cdot a\cdot b+b^2 \quad , \quad \left(a^n\right)^m=a^{n\cdot m} \quad , \quad (a-b)\cdot(a+b)=a^2-b^2 \quad , \quad a^1=a.$$

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

Zakon distribucije množenja prema zbrajanju.

$$a\cdot(b+c)=a\cdot b+a\cdot c \quad , \quad a\cdot b+a\cdot c=a\cdot(b+c).$$

Množenje zagrada

$$(a+b)\cdot(c+d)=a\cdot c+a\cdot d+b\cdot c+b\cdot d.$$

1.inačica

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

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

$$=3\cdot\left(x^6-2\cdot x^3\cdot y^2+y^4\right)-2\cdot\left(x^6-y^4\right)=$$

$$=3\cdot x^6-6\cdot x^3\cdot y^2+3\cdot y^4-2\cdot x^6+2\cdot y^4=x^6-6\cdot x^3\cdot y^2+5\cdot y^4.$$

2.inačica

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

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

$$=\left(x^3-y^2\right)\cdot\left(x^3-5\cdot y^2\right)=x^6-5\cdot x^3\cdot y^2-x^3\cdot y^2+5\cdot y^4=x^6-6\cdot x^3\cdot y^2+5\cdot y^4.$$

3.inačica

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

$$=3\cdot\left(\left(x^3\right)^2-2\cdot x^3\cdot y^2+\left(y^2\right)^2\right)-2\cdot\left(x^6+x^3\cdot y^2-x^3\cdot y^2-y^4\right)=$$

$$=3\cdot\left(x^6-2\cdot x^3\cdot y^2+y^4\right)-2\cdot\left(x^6+x^3\cdot y^2-x^3\cdot y^2-y^4\right)=$$

$$=3\cdot\left(x^6-2\cdot x^3\cdot y^2+y^4\right)-2\cdot\left(x^6-y^4\right)=$$

$$=3\cdot x^6-6\cdot x^3\cdot y^2+3\cdot y^4-2\cdot x^6+2\cdot y^4=x^6-6\cdot x^3\cdot y^2+5\cdot y^4.$$

Vježba 682

Izračunaj: $3\cdot\left(x^3-y^2\right)^2+2\cdot\left(y^2-x^3\right)\cdot\left(y^2+x^3\right).$

Rezultat: $x^6-6\cdot x^3\cdot y^2+5\cdot y^4.$

Zadatak 683 (Pero, pomorska škola)

Izračunaj: $16-(2-x)\cdot(2+x)\cdot\left[(2-x)^2+4\cdot x\right]$.

Rješenje 683

Ponovimo!

$(a-b)\cdot(a+b)=a^2-b^2$, $(a-b)^2=a^2-2\cdot a\cdot b+b^2$, $(a^n)^m=a^{n\cdot m}$.

Zakon distribucije množenja prema zbrajanju.

$$a\cdot(b+c)=a\cdot b+a\cdot c \quad , \quad a\cdot b+a\cdot c=a\cdot(b+c).$$

$$16-(2-x)\cdot(2+x)\cdot\left[(2-x)^2+4\cdot x\right]=16-\left(2^2-x^2\right)\cdot\left[2^2-2\cdot 2\cdot x+x^2+4\cdot x\right]=$$

$$=16-\left(4-x^2\right)\cdot\left[4-4\cdot x+x^2+4\cdot x\right]=16-\left(4-x^2\right)\cdot\left[4-4\cdot x+x^2+4\cdot x\right]=$$

$$=16-\left(4-x^2\right)\cdot\left[4+x^2\right]=16-\left(4^2-\left(x^2\right)^2\right)=16-\left(16-x^4\right)=16-16+x^4=16-16+x^4=x^4.$$

Vježba 683

Izračunaj: $16+(x-2)\cdot(x+2)\cdot\left[(2-x)^2+4\cdot x\right]$.

Rezultat: x^4.

Zadatak 684 (Tona, gimnazija)

Izračunaj: $\left(\frac{0.25\cdot x^3\cdot y^{-2}}{27\cdot z^{-2}}\right)^{-2}\cdot\left(\frac{9\cdot x^{-2}}{4\cdot y^2\cdot z^3}\right)^{-3}$.

Rješenje 684

Ponovimo!

$$a^{-n}=\frac{1}{a^n} \quad , \quad \frac{\frac{a}{b}}{c}=\frac{a}{b\cdot c} \quad , \quad \left(\frac{a}{b}\right)^{-n}=\left(\frac{b}{a}\right)^n \quad , \quad (a\cdot b)^n=a^n\cdot b^n.$$

$$\left(a^n\right)^m=a^{n\cdot m} \quad , \quad \frac{n}{1}=n \quad , \quad a^n\cdot a^m=a^{n+m}.$$

Decimalni broj piše se u obliku decimalnog razlomka tako da se u brojnik napiše zadani decimalni broj bez decimalne točke, a u nazivnik se napiše dekadska jedinica (10, 100, 1000, 10000, 100000, …) koja ima toliko nula koliko decimalni broj ima decimala (znamenaka na decimalnom mjestu, tj. iza decimalne točke ili decimalnog zareza).

Skratiti razlomak znači brojnik i nazivnik tog razlomka podijeliti istim brojem različitim od nule i jedinice

$$\frac{a\cdot n}{b\cdot n}=\frac{a}{b} \quad , \quad n\neq 0 \quad , \quad n\neq 1.$$

$$\left(\frac{0.25\cdot x^3\cdot y^{-2}}{27\cdot z^{-2}}\right)^{-2}\cdot\left(\frac{9\cdot x^{-2}}{4\cdot y^2\cdot z^3}\right)^{-3}=\left(\frac{\frac{25}{100}\cdot x^3\cdot z^2}{27\cdot y^2}\right)^{-2}\cdot\left(\frac{9}{4\cdot x^2\cdot y^2\cdot z^3}\right)^{-3}=$$

$$= \left(\frac{\frac{25}{100} \cdot x^3 \cdot z^2}{27 \cdot y^2} \right)^{-2} \cdot \left(\frac{9}{4 \cdot x^2 \cdot y^2 \cdot z^3} \right)^{-3} = \left(\frac{\frac{1}{4} \cdot x^3 \cdot z^2}{27 \cdot y^2} \right)^{-2} \cdot \left(\frac{9}{4 \cdot x^2 \cdot y^2 \cdot z^3} \right)^{-3} =$$

$$= \left(\frac{x^3 \cdot z^2}{4 \cdot 27 \cdot y^2} \right)^{-2} \cdot \left(\frac{9}{4 \cdot x^2 \cdot y^2 \cdot z^3} \right)^{-3} = \left(\frac{4 \cdot 27 \cdot y^2}{x^3 \cdot z^2} \right)^{2} \cdot \left(\frac{4 \cdot x^2 \cdot y^2 \cdot z^3}{9} \right)^{3} =$$

$$= \left(\frac{2^2 \cdot 3^3 \cdot y^2}{x^3 \cdot z^2} \right)^{2} \cdot \left(\frac{2^2 \cdot x^2 \cdot y^2 \cdot z^3}{3^2} \right)^{3} = \frac{2^4 \cdot 3^6 \cdot y^4}{x^6 \cdot z^4} \cdot \frac{2^6 \cdot x^6 \cdot y^6 \cdot z^9}{3^6} =$$

$$= \frac{2^4 \cdot 3^6 \cdot y^4}{x^6 \cdot z^4} \cdot \frac{2^6 \cdot x^6 \cdot y^6 \cdot z^9}{3^6} = \frac{2^4 \cdot y^4}{z^4} \cdot \frac{2^6 \cdot y^6 \cdot z^9}{1} =$$

$$= \frac{2^4 \cdot y^4}{z^4} \cdot \frac{2^6 \cdot y^6 \cdot z^9}{1} = \frac{2^4 \cdot y^4}{1} \cdot \frac{2^6 \cdot y^6 \cdot z^5}{1} = 2^{10} \cdot y^{10} \cdot z^5.$$

Vježba 684

Izračunaj: $\left(\frac{9 \cdot x^{-2}}{4 \cdot y^2 \cdot z^3} \right)^{-3} \cdot \left(\frac{0.25 \cdot x^3 \cdot y^{-2}}{27 \cdot z^{-2}} \right)^{-2}$.

Rezultat: $2^{10} \cdot y^{10} \cdot z^5$.

Zadatak 685 (4A, TUPŠ)

Zadana su dva različita broja x i y. Razliku kvadrata brojeva x i y podijelite s razlikom brojeva x i y. Dobiveni kvocijent pomnožite sa zbrojem brojeva x i y. Što je rezultat?

A. kvadrat zbroja brojeva x i y *B*. zbroj kvadrata brojeva x i y

C. kvadrat razlike brojeva x i y *D*. razlika kvadrata brojeva x i y

Rješenje 685

Ponovimo!

$a^2 - b^2 = (a-b)(a+b)$, $\frac{n}{1} = n$, $a^1 = a$, $a^n \cdot a^m = a^{n+m}$.

Skratiti razlomak znači brojnik i nazivnik tog razlomka podijeliti istim brojem različitim od nule i jedinice

$$\frac{a \cdot n}{b \cdot n} = \frac{a}{b} \ , \ n \neq 0 \ , \ n \neq 1.$$

Zadana su dva različita broja x i y.	
Razliku kvadrata brojeva x i y …	$x^2 - y^2$
… podijelite s razlikom brojeva x i y.	$\frac{x^2 - y^2}{x - y}$
Dobiveni kvocijent pomnožite sa zbrojem brojeva x i y.	$\frac{x^2 - y^2}{x - y} \cdot (x + y)$

Rezultat je:

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

$$=(x+y)\cdot(x+y)=(x+y)^2.$$

Dobije se kvadrat zbroja brojeva x i y.
Odgovor je pod A.

Vježba 685

Zadana su dva različita broja x i y. Razliku kvadrata brojeva x i y podijelite sa zbrojem brojeva x i y. Dobiveni kvocijent pomnožite sa zbrojem brojeva x i y. Što je rezultat?

A. kvadrat zbroja brojeva x i y *B*. zbroj kvadrata brojeva x i y
C. kvadrat razlike brojeva x i y *D*. razlika kvadrata brojeva x i y

Rezultat: D.

Zadatak 686 (4A, TUPŠ)

Izrazi x iz sljedeće formule $\frac{1}{y}=\frac{1}{a}+\frac{1}{x}$.

Rješenje 686

Ponovimo!

$$a=b\ \Rightarrow\ b=a\quad,\quad \frac{a}{b}-\frac{c}{d}=\frac{a\cdot d-b\cdot c}{b\cdot d}\quad,\quad \frac{n}{1}=n\quad,\quad \frac{a}{b}=\frac{c}{d}\ \Rightarrow\ \frac{b}{a}=\frac{d}{c}.$$

Zakon distribucije množenja prema zbrajanju.

$$a\cdot(b+c)=a\cdot b+a\cdot c\quad,\quad a\cdot b+a\cdot c=a\cdot(b+c).$$

1.inačica

$$\frac{1}{y}=\frac{1}{a}+\frac{1}{x}\ \Rightarrow\ \frac{1}{a}+\frac{1}{x}=\frac{1}{y}\ \Rightarrow\ \frac{1}{x}=\frac{1}{y}-\frac{1}{a}\ \Rightarrow\ \frac{1}{x}=\frac{a-y}{a\cdot y}\ \Rightarrow\ \frac{x}{1}=\frac{a\cdot y}{a-y}\ \Rightarrow\ x=\frac{a\cdot y}{a-y}.$$

2.inačica

$$\frac{1}{y}=\frac{1}{a}+\frac{1}{x}\ \Rightarrow\ \frac{1}{y}=\frac{1}{a}+\frac{1}{x}\ /\cdot a\cdot x\cdot y\ \Rightarrow\ a\cdot x=x\cdot y+a\cdot y\ \Rightarrow\ a\cdot x-x\cdot y=a\cdot y\ \Rightarrow$$

$$\Rightarrow\ x\cdot(a-y)=a\cdot y\ \Rightarrow\ x\cdot(a-y)=a\cdot y\ /\cdot\frac{1}{a-y}\ \Rightarrow\ x=\frac{a\cdot y}{a-y}.$$

Vježba 686

Izrazi a iz sljedeće formule $\frac{1}{y}=\frac{1}{a}+\frac{1}{x}$.

Rezultat: $a=\frac{x\cdot y}{x-y}$.

Zadatak 687 (4A, TUPŠ)

Izrazi x iz formule $y=a\cdot b\cdot(1+x)$.

Rješenje 687

Ponovimo!

$$a=b\ \Rightarrow\ b=a\quad,\quad \frac{a}{b}-\frac{c}{d}=\frac{a\cdot d-b\cdot c}{b\cdot d}\quad,\quad \frac{n}{1}=n.$$

Zakon distribucije množenja prema zbrajanju.

$$a\cdot(b+c)=a\cdot b+a\cdot c\quad,\quad a\cdot b+a\cdot c=a\cdot(b+c).$$

1.inačica

$$y = a\cdot b\cdot(1+x) \Rightarrow a\cdot b\cdot(1+x) = y \Rightarrow a\cdot b\cdot(1+x) = y \ /\cdot \frac{1}{a\cdot b} \Rightarrow 1+x = \frac{y}{a\cdot b} \Rightarrow$$

$$\Rightarrow x = \frac{y}{a\cdot b} - 1 \Rightarrow x = \frac{y}{a\cdot b} - \frac{1}{1} \Rightarrow x = \frac{y - a\cdot b}{a\cdot b}.$$

2.inačica

$$y = a\cdot b\cdot(1+x) \Rightarrow y = a\cdot b + a\cdot b\cdot x \Rightarrow a\cdot b + a\cdot b\cdot x = y \Rightarrow a\cdot b\cdot x = y - a\cdot b \Rightarrow$$

$$\Rightarrow a\cdot b\cdot x = y - a\cdot b \ /\cdot \frac{1}{a\cdot b} \Rightarrow x = \frac{y - a\cdot b}{a\cdot b}.$$

Vježba 687

Izrazi b iz formule $y = a\cdot b\cdot(1+x)$.

Rezultat: $b = \frac{y}{a\cdot(1+x)}$.

Zadatak 688 (4A, TUPŠ)

Ako je $t = \frac{1}{r} - \frac{m}{h}$, čemu je jednako m?

A. $m = h\cdot\left(\frac{1}{r} - t\right)$ B. $m = h\cdot\left(\frac{1}{r} + t\right)$ C. $m = \frac{1 - r\cdot t}{r\cdot h}$ D. $m = \frac{1 + r\cdot t}{r\cdot h}$

Rješenje 688

Ponovimo!

$$\frac{a-b}{n} = \frac{a}{n} - \frac{b}{n}, \quad \frac{n}{1} = n.$$

Skratiti razlomak znači brojnik i nazivnik tog razlomka podijeliti istim brojem različitim od nule i jedinice

$$\frac{a\cdot n}{b\cdot n} = \frac{a}{b} \ , \ n \neq 0 \ , \ n \neq 1.$$

Zakon distribucije množenja prema zbrajanju.

$$a\cdot(b+c) = a\cdot b + a\cdot c \quad , \quad a\cdot b + a\cdot c = a\cdot(b+c).$$

1.inačica

$$t = \frac{1}{r} - \frac{m}{h} \Rightarrow \frac{m}{h} = \frac{1}{r} - t \Rightarrow \frac{m}{h} = \frac{1}{r} - t \ /\cdot h \Rightarrow m = h\cdot\left(\frac{1}{r} - t\right).$$

Odgovor je pod A.

2.inačica

$$t = \frac{1}{r} - \frac{m}{h} \Rightarrow t = \frac{1}{r} - \frac{m}{h} \ /\cdot r\cdot h \Rightarrow t\cdot r\cdot h = h - m\cdot r \Rightarrow m\cdot r = h - t\cdot r\cdot h \Rightarrow$$

$$\Rightarrow m\cdot r = h - t\cdot r\cdot h \ /: r \Rightarrow m = \frac{h - t\cdot r\cdot h}{r} \Rightarrow m = \frac{h}{r} - \frac{t\cdot r\cdot h}{r} \Rightarrow$$

$$\Rightarrow m = \frac{h}{r} - \frac{t\cdot r\cdot h}{r} \Rightarrow m = \frac{h}{r} - t\cdot h \Rightarrow m = h\cdot\left(\frac{1}{r} - t\right).$$

Odgovor je pod A.

Vježba 688

Ako je $t=\frac{1}{r}+\frac{m}{h}$, čemu je jednako m?

A. $m=h\cdot\left(t-\frac{1}{r}\right)$ B. $m=h\cdot\left(t+\frac{1}{r}\right)$ C. $m=\frac{1+r\cdot t}{r\cdot h}$ D. $m=\frac{r\cdot t-1}{r\cdot h}$

Rezultat: A.

Zadatak 689 (Suzy, gimnazija)

Izračunajte: $\left(\frac{a+b}{a^2\cdot b-a\cdot b^2}-\frac{a-b}{a^2\cdot b+a\cdot b^2}\right)\cdot\frac{a^4-b^4}{4}$.

Rješenje 689

Ponovimo!

Zakon distribucije množenja prema zbrajanju.

$$a\cdot(b+c)=a\cdot b+a\cdot c \quad , \quad a\cdot b+a\cdot c=a\cdot(b+c).$$

$$a^1=a \quad , \quad a^n:a^m=a^{n-m} \quad , \quad (a^n)^m=a^{n\cdot m} \quad , \quad a^2-b^2=(a-b)\cdot(a+b).$$

$$\frac{a}{b}-\frac{c}{d}=\frac{a\cdot d-b\cdot c}{b\cdot d} \quad , \quad (a+b)^2=a^2+2\cdot a\cdot b+b^2 \quad , \quad (a-b)^2=a^2-2\cdot a\cdot b+b^2.$$

Skratiti razlomak znači brojnik i nazivnik tog razlomka podijeliti istim brojem različitim od nule i jedinice

$$\frac{a\cdot n}{b\cdot n}=\frac{a}{b} \quad , \; n\neq 0 \; , \; n\neq 1.$$

1.inačica

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

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

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

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

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

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

$$= a^2 + b^2.$$

2.inačica

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

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

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

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

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

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

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

Vježba 689

Izračunajte: $\left(\frac{a+b}{a^2\cdot b - a\cdot b^2} + \frac{b-a}{a^2\cdot b + a\cdot b^2}\right)\cdot\frac{a^4 - b^4}{4}.$

Rezultat: $a^2 + b^2.$

Zadatak 690 (Vesna, srednja škola)

Skrati razlomak: $\frac{4\cdot a^3 - 9\cdot a}{6\cdot a^2 - 9\cdot a}.$

Rješenje 690

Ponovimo!

Zakon distribucije množenja prema zbrajanju.

$$a\cdot(b+c) = a\cdot b + a\cdot c \quad , \quad a\cdot b + a\cdot c = a\cdot(b+c).$$

$$a^1 = a \quad , \quad a^n : a^m = a^{n-m} \quad , \quad (a\cdot b)^n = a^n\cdot b^n \quad , \quad a^2 - b^2 = (a-b)\cdot(a+b).$$

Skratiti razlomak znači brojnik i nazivnik tog razlomka podijeliti istim brojem različitim od nule i jedinice

$$\frac{a\cdot n}{b\cdot n}=\frac{a}{b}\ ,\ n\neq 0\ ,\ n\neq 1.$$

$$\frac{4\cdot a^3-9\cdot a}{6\cdot a^2-9\cdot a}=\frac{a\cdot\left(4\cdot a^2-9\right)}{3\cdot a\cdot(2\cdot a-3)}=\frac{a\cdot\left((2\cdot a)^2-3^2\right)}{3\cdot a\cdot(2\cdot a-3)}=\frac{a\cdot(2\cdot a-3)\cdot(2\cdot a+3)}{3\cdot a\cdot(2\cdot a-3)}=$$

$$=\frac{a\cdot(2\cdot a-3)\cdot(2\cdot a+3)}{3\cdot a\cdot(2\cdot a-3)}=\frac{2\cdot a+3}{3}.$$

Vježba 690

Skrati razlomak: $\frac{6\cdot a^2-9\cdot a}{4\cdot a^3-9\cdot a}$.

Rezultat: $\frac{3}{2\cdot a+3}$.

Zadatak 691 (Matija, srednja škola)

Algebarski izraz $\left(\frac{x}{y}-\frac{y}{x}\right)^2:\left(\frac{x}{y}+\frac{y}{x}-2\right)$ ekvivalentan je izrazu:

A. $\frac{x}{y}+\frac{y}{x}+2$ B. $\frac{x+y}{x\cdot y}$ C. $\frac{x^2-y^2}{x\cdot y}$ D. $\frac{1}{x\cdot y}$

Rješenje 691

Ponovimo!

$$n=\frac{n}{1}\ ,\ \frac{a}{b}-\frac{c}{d}=\frac{a\cdot d-b\cdot c}{b\cdot d}\ ,\ \frac{a}{b}+\frac{c}{d}=\frac{a\cdot d+b\cdot c}{b\cdot d}\ ,\ \left(\frac{a}{b}\right)^n=\frac{a^n}{b^n}.$$

$$\frac{a}{b}:\frac{c}{d}=\frac{a}{b}\cdot\frac{d}{c}=\frac{a\cdot d}{b\cdot c}\ ,\ a^2-b^2=(a-b)\cdot(a+b)\ ,\ a^1=a\ ,\ a^n\cdot a^m=a^{n+m}.$$

$$\frac{a}{b}\cdot\frac{c}{d}=\frac{a\cdot c}{b\cdot d}\ ,\ (a+b)^2=a^2+2\cdot a\cdot b+b^2\ ,\ \frac{a^n}{a^m}=a^{n-m}\ ,\ \frac{a+b}{n}=\frac{a}{n}+\frac{b}{n}.$$

$$(a\cdot b)^n=a^n\cdot b^n\ ,\ \left(a^n\right)^m=a^{n\cdot m}.$$

Skratiti razlomak znači brojnik i nazivnik tog razlomka podijeliti istim brojem različitim od nule i jedinice

$$\frac{a\cdot n}{b\cdot n}=\frac{a}{b}\ ,\ n\neq 0\ ,\ n\neq 1.$$

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

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

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

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

$$= \frac{x^2}{x \cdot y} + \frac{2 \cdot x \cdot y}{x \cdot y} + \frac{y^2}{x \cdot y} = \frac{x^2}{x \cdot y} + \frac{2 \cdot x \cdot y}{x \cdot y} + \frac{y^2}{x \cdot y} = \frac{x}{y} + 2 + \frac{y}{x} = \frac{x}{y} + \frac{y}{x} + 2.$$

Odgovor je pod A.

Vježba 691

Algebarski izraz $\left(\frac{y}{x} - \frac{x}{y}\right)^2 : \left(\frac{x}{y} + \frac{y}{x} - 2\right)$ ekvivalentan je izrazu:

$$A.\ \frac{x}{y} + \frac{y}{x} + 2 \qquad B.\ \frac{x+y}{x \cdot y} \qquad C.\ \frac{x^2 - y^2}{x \cdot y} \qquad D.\ \frac{1}{x \cdot y}$$

Rezultat: A.

Zadatak 692 (Iva, srednja škola)

Sredimo li izraz $S = (x-y)^3 + (x+y)^3 + 3 \cdot (x-y)^2 \cdot (x+y) + 3 \cdot (x+y)^2 \cdot (x-y)$, dobit ćemo:

$$A.\ 8 \cdot x^3 \qquad B.\ 8 \cdot y^3 \qquad C.\ 8 \cdot x^2 \cdot y \qquad D.\ 8 \cdot x \cdot y^2$$

Rješenje 692

Ponovimo!

$$(a+b)^3 = a^3 + 3 \cdot a^2 \cdot b + 3 \cdot a \cdot b^2 + b^3 \quad , \quad (a \cdot b)^n = a^n \cdot b^n .$$

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

$$\Rightarrow \begin{bmatrix} \text{zamjena} \\ a = x - y \\ b = x + y \end{bmatrix} \Rightarrow S = a^3 + b^3 + 3 \cdot a^2 \cdot b + 3 \cdot b^2 \cdot a \Rightarrow$$

$$\Rightarrow S = a^3 + 3 \cdot a^2 \cdot b + 3 \cdot a \cdot b^2 + b^3 \Rightarrow S = (a+b)^3 \Rightarrow S = (x - y + x + y)^3 \Rightarrow$$

$$\Rightarrow S = (x - y + x + y)^3 \Rightarrow S = (2 \cdot x)^3 \Rightarrow S = 2^3 \cdot x^3 \Rightarrow S = 8 \cdot x^3 .$$

Odgovor je pod A.

Vježba 692

Sredimo li izraz $S = (x-y)^3 + (x+y)^3 + 6 \cdot x \cdot (x-y) \cdot (x+y)$, dobit ćemo:

$$A.\ 8 \cdot x^3 \qquad B.\ 8 \cdot y^3 \qquad C.\ 8 \cdot x^2 \cdot y \qquad D.\ 8 \cdot x \cdot y^2$$

Rezultat: A.

Zadatak 693 (4A, TUPŠ)

Koji je rezultat dijeljenja: $\left(\frac{3 \cdot a - b}{b^2} + \frac{1}{b}\right) : \frac{6 \cdot a}{b}$, za $a \neq 0,\ b \neq 0$?

$$A.\ \frac{2}{a} \qquad B.\ \frac{2}{b} \qquad C.\ \frac{1}{2 \cdot a} \qquad D.\ \frac{1}{2 \cdot b}$$

Rješenje 693

Ponovimo!

$$\frac{a}{b}+\frac{c}{d}=\frac{a\cdot d+b\cdot c}{b\cdot d}\quad,\quad \frac{a}{b}:\frac{c}{d}=\frac{a}{b}\cdot\frac{d}{c}=\frac{a\cdot d}{b\cdot c}\quad,\quad \frac{a}{b}\cdot\frac{c}{d}=\frac{a\cdot c}{b\cdot d}\quad,\quad \frac{a-b}{n}=\frac{a}{n}-\frac{b}{n}.$$

Skratiti razlomak znači brojnik i nazivnik tog razlomka podijeliti istim brojem različitim od nule i jedinice

$$\frac{a\cdot n}{b\cdot n}=\frac{a}{b}\ ,\ n\neq 0\ ,\ n\neq 1.$$

1.inačica

$$\left(\frac{3\cdot a-b}{b^2}+\frac{1}{b}\right):\frac{6\cdot a}{b}=\frac{3\cdot a-b+b}{b^2}:\frac{6\cdot a}{b}=\frac{3\cdot a-b+b}{b^2}:\frac{6\cdot a}{b}=\frac{3\cdot a}{b^2}\cdot\frac{b}{6\cdot a}=$$

$$=\frac{3\cdot a}{b^2}\cdot\frac{b}{6\cdot a}=\frac{1}{b^2}\cdot\frac{b}{2}=\frac{1}{b^2}\cdot\frac{b}{2}=\frac{1}{b}\cdot\frac{1}{2}=\frac{1}{2\cdot b}.$$

Odgovor je pod D.

2.inačica

$$\left(\frac{3\cdot a-b}{b^2}+\frac{1}{b}\right):\frac{6\cdot a}{b}=\left(\frac{3\cdot a}{b^2}-\frac{b}{b^2}+\frac{1}{b}\right):\frac{6\cdot a}{b}=\left(\frac{3\cdot a}{b^2}-\frac{b}{b^2}+\frac{1}{b}\right):\frac{6\cdot a}{b}=$$

$$=\left(\frac{3\cdot a}{b^2}-\frac{1}{b}+\frac{1}{b}\right):\frac{6\cdot a}{b}=\left(\frac{3\cdot a}{b^2}-\frac{1}{b}+\frac{1}{b}\right):\frac{6\cdot a}{b}=\frac{3\cdot a}{b^2}:\frac{6\cdot a}{b}=\frac{3\cdot a}{b^2}\cdot\frac{b}{6\cdot a}=$$

$$=\frac{3\cdot a}{b^2}\cdot\frac{b}{6\cdot a}=\frac{1}{b^2}\cdot\frac{b}{2}=\frac{1}{b^2}\cdot\frac{b}{2}=\frac{1}{b}\cdot\frac{1}{2}=\frac{1}{2\cdot b}.$$

Odgovor je pod D.

Vježba 693

Koji je rezultat dijeljenja: $\left(\frac{3\cdot a+b}{b^2}-\frac{1}{b}\right):\frac{6\cdot a}{b}$, za $a\neq 0,\ b\neq 0$?

A. $\frac{2}{a}$ B. $\frac{2}{b}$ C. $\frac{1}{2\cdot a}$ D. $\frac{1}{2\cdot b}$

Rezultat: D.

Zadatak 694 (4A, 4B, TUPŠ)

Pojednostavni izraz: $\left(\frac{c^2\cdot d^{-3}}{c^{-1}\cdot d^{-4}}\right)^{-2}$.

Rješenje 694

Ponovimo!

$$\left(\frac{a}{b}\right)^n=\frac{a^n}{b^n}\quad,\quad (a\cdot b)^n=a^n\cdot b^n\quad,\quad \left(a^n\right)^m=a^{n\cdot m}\quad,\quad a^{-n}=\frac{1}{a^n}.$$

$$\left(\frac{a}{b}\right)^{-n}=\left(\frac{b}{a}\right)^n\quad,\quad \frac{a^{-n}}{b^{-m}}=\frac{b^m}{a^n}\quad,\quad a^n\cdot a^m=a^{n+m}\quad,\quad \frac{a^n}{a^m}=a^n:a^m=a^{n-m}.$$

Skratiti razlomak znači brojnik i nazivnik tog razlomka podijeliti istim brojem različitim od nule i jedinice

$$\frac{a\cdot n}{b\cdot n}=\frac{a}{b}\ ,\ n\neq 0\ ,\ n\neq 1.$$

1.inačica

$$\left(\frac{c^{2}\cdot d^{-3}}{c^{-1}\cdot d^{-4}}\right)^{-2}=\frac{\left(c^{2}\cdot d^{-3}\right)^{-2}}{\left(c^{-1}\cdot d^{-4}\right)^{-2}}=\frac{\left(c^{2}\right)^{-2}\cdot\left(d^{-3}\right)^{-2}}{\left(c^{-1}\right)^{-2}\cdot\left(d^{-4}\right)^{-2}}=\frac{c^{-4}\cdot d^{6}}{c^{2}\cdot d^{8}}=\frac{d^{6}}{c^{4}\cdot c^{2}\cdot d^{8}}=$$

$$=\frac{d^{6}}{c^{6}\cdot d^{8}}=\frac{d^{6}}{c^{6}\cdot d^{8}}=\frac{1}{c^{6}\cdot d^{2}}.$$

2.inačica

$$\left(\frac{c^{2}\cdot d^{-3}}{c^{-1}\cdot d^{-4}}\right)^{-2}=\left(\frac{c^{-1}\cdot d^{-4}}{c^{2}\cdot d^{-3}}\right)^{2}=\frac{\left(c^{-1}\cdot d^{-4}\right)^{2}}{\left(c^{2}\cdot d^{-3}\right)^{2}}=\frac{\left(c^{-1}\right)^{2}\cdot\left(d^{-4}\right)^{2}}{\left(c^{2}\right)^{2}\cdot\left(d^{-3}\right)^{2}}=\frac{c^{-2}\cdot d^{-8}}{c^{4}\cdot d^{-6}}=$$

$$=\frac{d^{6}}{c^{4}\cdot c^{2}\cdot d^{8}}=\frac{d^{6}}{c^{6}\cdot d^{8}}=\frac{d^{6}}{c^{6}\cdot d^{8}}=\frac{1}{c^{6}\cdot d^{2}}.$$

3.inačica

$$\left(\frac{c^{2}\cdot d^{-3}}{c^{-1}\cdot d^{-4}}\right)^{-2}=\left(\frac{c^{2}\cdot c^{1}\cdot d^{4}}{d^{3}}\right)^{-2}=\left(\frac{c^{3}\cdot d^{4}}{d^{3}}\right)^{-2}=\left(\frac{d^{3}}{c^{3}\cdot d^{4}}\right)^{2}=\left(\frac{d^{3}}{c^{3}\cdot d^{4}}\right)^{2}=$$

$$=\left(\frac{1}{c^{3}\cdot d^{1}}\right)^{2}=\frac{1}{\left(c^{3}\cdot d^{1}\right)^{2}}=\frac{1}{\left(c^{3}\right)^{2}\cdot\left(d^{1}\right)^{2}}=\frac{1}{c^{6}\cdot d^{2}}.$$

4.inačica

$$\left(\frac{c^{2}\cdot d^{-3}}{c^{-1}\cdot d^{-4}}\right)^{-2}=\left(\frac{c^{2}\cdot c^{1}\cdot d^{4}}{d^{3}}\right)^{-2}=\left(\frac{c^{3}\cdot d^{4}}{d^{3}}\right)^{-2}=\left(\frac{c^{3}\cdot d^{4}}{d^{3}}\right)^{-2}=\left(\frac{c^{3}\cdot d^{1}}{1}\right)^{-2}=$$

$$=\left(\frac{1}{c^{3}\cdot d^{1}}\right)^{2}=\frac{1}{\left(c^{3}\cdot d^{1}\right)^{2}}=\frac{1}{\left(c^{3}\right)^{2}\cdot\left(d^{1}\right)^{2}}=\frac{1}{c^{6}\cdot d^{2}}.$$

Vježba 694

Pojednostavni izraz: $\left(\frac{c^{1}\cdot d^{-3}}{c^{-2}\cdot d^{-4}}\right)^{-2}$.

Rezultat: $\frac{1}{c^{6}\cdot d^{2}}$.

Zadatak 695 (4A, 4B, TUPŠ)

Pojednostavni izraz: $\left(x^{3}\cdot y\right)^{-4}\cdot\left(x^{8}\cdot y^{7}\right)^{2}$.

Rješenje 695

Ponovimo!

$a^{1}=a$, $(a\cdot b)^{n}=a^{n}\cdot b^{n}$, $\left(a^{n}\right)^{m}=a^{n\cdot m}$, $a^{n}\cdot a^{m}=a^{n+m}$.

$$a^{-n}=\frac{1}{a^n} \quad , \quad \frac{a^n}{a^m}=a^{n-m} \quad , \quad \frac{a}{b}\cdot c=\frac{a\cdot c}{b}.$$

Skratiti razlomak znači brojnik i nazivnik tog razlomka podijeliti istim brojem različitim od nule i jedinice

$$\frac{a\cdot n}{b\cdot n}=\frac{a}{b} \quad , \quad n\neq 0 \quad , \quad n\neq 1.$$

1.inačica

$$\left(x^3\cdot y\right)^{-4}\cdot\left(x^8\cdot y^7\right)^2=\left(x^3\cdot y^1\right)^{-4}\cdot\left(x^8\cdot y^7\right)^2=$$

$$=\left(x^3\right)^{-4}\cdot\left(y^1\right)^{-4}\cdot\left(x^8\right)^2\cdot\left(y^7\right)^2=x^{-12}\cdot y^{-4}\cdot x^{16}\cdot y^{14}=$$

$$=x^{-12+16}\cdot y^{-4+14}=x^4\cdot y^{10}.$$

2.inačica

$$\left(x^3\cdot y\right)^{-4}\cdot\left(x^8\cdot y^7\right)^2=\frac{1}{\left(x^3\cdot y\right)^4}\cdot\left(x^8\cdot y^7\right)^2=\frac{\left(x^8\cdot y^7\right)^2}{\left(x^3\cdot y\right)^4}=\frac{\left(x^8\cdot y^7\right)^2}{\left(x^3\cdot y^1\right)^4}=$$

$$=\frac{\left(x^8\right)^2\cdot\left(y^7\right)^2}{\left(x^3\right)^4\cdot\left(y^1\right)^4}=\frac{x^{16}\cdot y^{14}}{x^{12}\cdot y^4}=x^{16-12}\cdot y^{14-4}=x^4\cdot y^{10}.$$

Vježba 695

Pojednostavni izraz: $\left(x^6\cdot y^2\right)^{-2}\cdot\left(x^8\cdot y^7\right)^2$.

Rezultat: $x^4\cdot y^{10}$.

Zadatak 696 (Goran, maturant)

Pojednostavni: $\left(\frac{a\cdot b}{a^2-b^2}-\frac{b}{2\cdot a-2\cdot b}\right):\frac{2\cdot b}{a^2-b^2}$.

Rješenje 696

Ponovimo!

$$a^2-b^2=(a-b)\cdot(a+b) \quad , \quad \frac{a}{b}:\frac{c}{d}=\frac{a}{b}\cdot\frac{d}{c}=\frac{a\cdot d}{b\cdot c} \quad , \quad \frac{a}{b}-\frac{c}{d}=\frac{a\cdot d-b\cdot c}{b\cdot d}.$$

$$\frac{a}{b}\cdot\frac{c}{d}=\frac{a\cdot c}{b\cdot d}.$$

Skratiti razlomak znači brojnik i nazivnik tog razlomka podijeliti istim brojem različitim od nule i jedinice

$$\frac{a\cdot n}{b\cdot n}=\frac{a}{b} \quad , \quad n\neq 0 \quad , \quad n\neq 1.$$

Zakon distribucije množenja prema zbrajanju.

$$a\cdot(b+c)=a\cdot b+a\cdot c \quad , \quad a\cdot b+a\cdot c=a\cdot(b+c).$$

1.inačica

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

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

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

$$=\frac{b\cdot(a-b)}{2\cdot(a-b)\cdot(a+b)}\cdot\frac{(a-b)\cdot(a+b)}{2\cdot b}=\frac{a-b}{2}\cdot\frac{1}{2}=\frac{a-b}{4}.$$

2.inačica

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

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

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

$$=\frac{a}{1}\cdot\frac{1}{2}-\frac{b}{2\cdot(a-b)}\cdot\frac{(a-b)\cdot(a+b)}{2\cdot b}=\frac{a}{2}\cdot\frac{1}{2}\cdot\frac{a+b}{2}=\frac{a}{2}-\frac{a+b}{4}=\frac{2\cdot a-(a+b)}{4}=$$

$$=\frac{2\cdot a-a-b}{4}=\frac{a-b}{4}.$$

Vježba 696

Pojednostavni: $\frac{a^2-b^2}{2\cdot b}\cdot\left(\frac{a\cdot b}{a^2-b^2}-\frac{b}{2\cdot a-2\cdot b}\right)$.

Rezultat: $\frac{a-b}{4}$.

Zadatak 697 (Mirta, gimnazija)

Reduciraj izraz: $\left(x^3-1\right)\cdot(x+1)^{-1}\cdot\left(x^3+1\right)\cdot\left(x^4+x^2+1\right)^{-1}$.

Rješenje 697

Ponovimo!

$$a^{-n}=\frac{1}{a^n}\quad,\quad a^1=a\quad,\quad a\cdot\frac{1}{b}=\frac{a}{b}\quad,\quad a^3-b^3=(a-b)\cdot\left(a^2+a\cdot b+b^2\right).$$

$$a^3+b^3=(a+b)\cdot\left(a^2-a\cdot b+b^2\right)\quad,\quad(a+b)\cdot(a-b)=a^2-b^2\quad,\quad\left(a^n\right)^m=a^{n\cdot m}.$$

$$(a+b)^2=a^2+2\cdot a\cdot b+b^2\quad,\quad\frac{a}{b}\cdot\frac{c}{d}=\frac{a\cdot c}{b\cdot d}.$$

Skratiti razlomak znači brojnik i nazivnik tog razlomka podijeliti istim brojem različitim od nule i jedinice

$$\frac{a\cdot n}{b\cdot n}=\frac{a}{b}\ ,\ n\neq 0\ ,\ n\neq 1.$$

Zakon distribucije množenja prema zbrajanju.

$$a\cdot(b+c)=a\cdot b+a\cdot c\quad ,\quad a\cdot b+a\cdot c=a\cdot(b+c).$$

1.inačica

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

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

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

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

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

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

2.inačica

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

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

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

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

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

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

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

Vježba 697

Reduciraj izraz: $\left(x^6-1\right)\cdot(x+1)^{-1}\cdot\left(x^4+x^2+1\right)^{-1}$.

Rezultat: $x-1$.

Zadatak 698 (BMX, gimnazija)

Kada se izraz $4\cdot n^3+12\cdot n^2-n-3,\ n\in N$ napiše u obliku umnoška linearnih faktora s cjelobrojnim koeficijentima, koji je od navedenih izraza jedan od tih faktora?

A. $n+1$ *B.* $n+2$ *C.* $2\cdot n+1$ *D.* $2\cdot n+3$

Rješenje 698

Ponovimo!

$a^n : a^m = a^{n-m}$, $a^1 = a$, $(a\cdot b)^n = a^n\cdot b^n$, $a^2-b^2=(a-b)\cdot(a+b)$.

Zakon distribucije množenja prema zbrajanju.

$$a\cdot(b+c)=a\cdot b+a\cdot c \quad , \quad a\cdot b+a\cdot c=a\cdot(b+c).$$

1.inačica

$$4\cdot n^3+12\cdot n^2-n-3=\left(4\cdot n^3+12\cdot n^2\right)-(n+3)=4\cdot n^2\cdot(n+3)-(n+3)=$$

$$=4\cdot n^2\cdot(n+3)-(n+3)=(n+3)\cdot\left(4\cdot n^2-1\right)=(n+3)\cdot\left((2\cdot n)^2-1^2\right)=$$

$$=(n+3)\cdot(2\cdot n-1)\cdot(2\cdot n+1)=(n+3)\cdot(2\cdot n-1)\cdot(2\cdot n+1).$$

Odgovor je pod C

2.inačica

$$4\cdot n^3+12\cdot n^2-n-3=\left(4\cdot n^3-n\right)+\left(12\cdot n^2-3\right)=n\cdot\left(4\cdot n^2-1\right)+3\cdot\left(4\cdot n^2-1\right)=$$

$$=n\cdot\left(4\cdot n^2-1\right)+3\cdot\left(4\cdot n^2-1\right)=\left(4\cdot n^2-1\right)\cdot(n+3)=$$

$$=\left((2\cdot n)^2-1^2\right)\cdot(n+3)=(2\cdot n-1)\cdot(2\cdot n+1)\cdot(n+3)=(2\cdot n-1)\cdot(2\cdot n+1)\cdot(n+3).$$

Odgovor je pod C.

Vježba 698

Kada se izraz $4\cdot n^3+12\cdot n^2-n-3,\ n\in N$ napiše u obliku umnoška linearnih faktora s cjelobrojnim koeficijentima, koji je od navedenih izraza jedan od tih faktora?

A. $n+1$ *B.* $n+2$ *C.* $2\cdot n+3$ *D.* $2\cdot n-1$

Rezultat: D.

Zadatak 699 (Tonka, ekonomska škola)

Kojemu je od navedenih izraza jednak izraz $\left(3\cdot a^2\cdot b\right)^4 : \left(27\cdot a^3\cdot b^2\right)$?

A. $3\cdot a^5\cdot b^2$ *B.* $9\cdot a^3\cdot b^6$ *C.* $\frac{1}{3}\cdot a^3\cdot b^2$ *D.* $\frac{1}{9}\cdot a^5\cdot b^6$

Rješenje 699

Ponovimo!

$$a:b=\frac{a}{b} \quad , \quad a^1=a \quad , \quad (a\cdot b)^n=a^n\cdot b^n \quad , \quad (a^n)^m=a^{n\cdot m} \quad , \quad \frac{a^n}{a^m}=a^{n-m}.$$

$$\left(3\cdot a^2\cdot b\right)^4:\left(27\cdot a^3\cdot b^2\right)=\frac{\left(3\cdot a^2\cdot b\right)^4}{27\cdot a^3\cdot b^2}=\frac{\left(3^1\cdot a^2\cdot b^1\right)^4}{3^3\cdot a^3\cdot b^2}=\frac{\left(3^1\right)^4\cdot\left(a^2\right)^4\cdot\left(b^1\right)^4}{3^3\cdot a^3\cdot b^2}=$$

$$=\frac{3^4\cdot a^8\cdot b^4}{3^3\cdot a^3\cdot b^2}=3^{4-3}\cdot a^{8-3}\cdot b^{4-2}=3^1\cdot a^5\cdot b^2=3\cdot a^5\cdot b^2.$$

Odgovor je pod A.

Vježba 699

Kojemu je od navedenih izraza jednak izraz $\left(2\cdot a^2\cdot b\right)^4:\left(8\cdot a^3\cdot b^2\right)$?

A. $2\cdot a^5\cdot b^2$ B. $4\cdot a^3\cdot b^6$ C. $\frac{1}{2}\cdot a^3\cdot b^2$ D. $\frac{1}{4}\cdot a^5\cdot b^6$

Rezultat: A.

Zadatak 700 (Sandra, maturantica)

Što je rezultat sređivanja izraza $\left(\frac{4\cdot(a+b)}{(a-b)^3}-\frac{1}{a^2-b^2}\right)\cdot\left(\frac{a^2}{3\cdot a+b}+\frac{b^2}{a+3\cdot b}\right)$ za sve a, b za koje je izraz definiran?

A. $\frac{(a+b)^2}{(a-b)^3}$ B. $\frac{1}{a^3+b^3}$ C. $\frac{(a-b)^3}{(a+b)^2}$ D. $\frac{(a+b)^3}{a^3-b^3}$

Rješenje 700

Ponovimo!

$$a^2-b^2=(a-b)\cdot(a+b) \quad , \quad \frac{a}{b}+\frac{c}{d}=\frac{a\cdot d+b\cdot c}{b\cdot d} \quad , \quad \frac{a}{b}-\frac{c}{d}=\frac{a\cdot d-b\cdot c}{b\cdot d} \quad , \quad a^1=a.$$

$$a^n\cdot a^m=a^{n+m} \quad , \quad (a+b)^2=a^2+2\cdot a\cdot b+b^2 \quad , \quad (a-b)^2=a^2-2\cdot a\cdot b+b^2.$$

$$(a+b)^3=a^3+3\cdot a^2\cdot b+3\cdot a\cdot b^2+b^3 \quad , \quad \frac{a^n}{a^m}=a^{n-m}.$$

Skratiti razlomak znači brojnik i nazivnik tog razlomka podijeliti istim brojem različitim od nule i jedinice

$$\frac{a\cdot n}{b\cdot n}=\frac{a}{b} \quad , \quad n\neq 0 \quad , \quad n\neq 1.$$

Zakon distribucije množenja prema zbrajanju.

$$a\cdot(b+c)=a\cdot b+a\cdot c \quad , \quad a\cdot b+a\cdot c=a\cdot(b+c).$$

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

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

$$= \frac{4\cdot(a+b)^2-(a-b)^2}{(a-b)^3\cdot(a+b)}\cdot\frac{a^3+3\cdot a^2\cdot b+3\cdot a\cdot b^2+b^3}{3\cdot a^2+9\cdot a\cdot b+a\cdot b+3\cdot b^2} =$$

$$= \frac{4\cdot\left(a^2+2\cdot a\cdot b+b^2\right)-\left(a^2-2\cdot a\cdot b+b^2\right)}{(a-b)^3\cdot(a+b)}\cdot\frac{(a+b)^3}{3\cdot a^2+10\cdot a\cdot b+3\cdot b^2} =$$

$$= \frac{4\cdot a^2+8\cdot a\cdot b+4\cdot b^2-a^2+2\cdot a\cdot b-b^2}{(a-b)^3\cdot(a+b)}\cdot\frac{(a+b)^3}{3\cdot a^2+10\cdot a\cdot b+3\cdot b^2} =$$

$$= \frac{3\cdot a^2+10\cdot a\cdot b+3\cdot b^2}{(a-b)^3\cdot(a+b)}\cdot\frac{(a+b)^3}{3\cdot a^2+10\cdot a\cdot b+3\cdot b^2} =$$

$$= \frac{3\cdot a^2+10\cdot a\cdot b+3\cdot b^2}{(a-b)^3\cdot(a+b)}\cdot\frac{(a+b)^3}{3\cdot a^2+10\cdot a\cdot b+3\cdot b^2} = \frac{(a+b)^2}{(a-b)^3}.$$

Odgovor je pod A.

Vježba 700

Što je rezultat sređivanja izraza $\left(\frac{a^2}{3\cdot a+b}+\frac{b^2}{a+3\cdot b}\right)\cdot\left(\frac{4\cdot(a+b)}{(a-b)^3}-\frac{1}{a^2-b^2}\right)$ za sve a, b za koje je izraz definiran?

A. $\frac{(a+b)^2}{(a-b)^3}$ B. $\frac{1}{a^3+b^3}$ C. $\frac{(a-b)^3}{(a+b)^2}$ D. $\frac{(a+b)^3}{a^3-b^3}$

Rezultat: A.