

STEPENOVANJE I KORENOVANJE

OSOBINE

$$a^x \cdot a^y = a^{x+y}$$

$$a^x : a^y = a^{x-y}$$

$$(a^x)^y = a^{x \cdot y}$$

$$(a \cdot b)^x = a^x \cdot b^x$$

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

$$(-a)^{\text{PARAN}} = a^{\text{PARAN}}$$

$$(-a)^{\text{NEPARAN}} = -a^{\text{NEPARAN}}$$

$$\sqrt{a^2} = |a|$$

primer:

$$\sqrt{(2-\sqrt{2})^2} = |2-\sqrt{2}| = 2-\sqrt{2} \quad (2 > \sqrt{2})$$

$$\begin{aligned} \sqrt{(1-\sqrt{2})^2} &= |1-\sqrt{2}| = -(1-\sqrt{2}) = \\ &= -1 + \sqrt{2} \quad (\text{jer } 1 < \sqrt{2}) \end{aligned}$$

$$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$$

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

$$\begin{aligned} \textcircled{1} \quad & -2^2 - (-2)^2 : (-2) + (-2)(-2)^2 - (-2)^3 = \\ & = -4 - 4 : (-2) + (-2) \cdot 4 - (-8) = \\ & = -4 + 2 - 8 + 8 = -2 \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad & \frac{(X^4)^3 \cdot X^3 : X^5}{(X^5 : X^4)^3} = \frac{X^{12} \cdot X^3 : X^5}{(X^3)^3} = \\ & = \frac{X^{15} : X^5}{X^9} = \frac{X^{10}}{X^9} = X \end{aligned}$$

$$\begin{aligned} \textcircled{3} \quad & \frac{-3^4 \cdot (-3)^4}{-3^3 \cdot (-3)^3} = \frac{-3^4 \cdot 3^4}{-3^3 \cdot (-3^3)} = \\ & = \frac{-3^{8^2}}{3^6} = -3^2 = -9 \end{aligned}$$

$$\begin{aligned} \textcircled{4} \quad & \frac{(7^n)^2 \cdot 7^{n+4}}{(7^{n+1})^3} = \frac{7^{2n} \cdot 7^{n+4}}{7^{3(n+1)}} = \\ & = \frac{7^{2n+n+4}}{7^{3n+3}} = \frac{7^{3n+4}}{7^{3n+3}} = 7^{3n+4-(3n+3)} = \\ & = 7^{3n+4-3n-3} = 7 \end{aligned}$$

$$\begin{aligned} \textcircled{5} \quad & 2^5 \cdot \frac{4^3 \cdot 8}{4^2 \cdot 2^6} - 2^3 \cdot \frac{16^2 \cdot 4^2}{2^3 \cdot 8^3} = \\ & = 2^5 \cdot \frac{(2^2)^3 \cdot 2^3}{(2^2)^2 \cdot 2^6} - 2^3 \cdot \frac{(2^4)^2 \cdot (2^2)^2}{2^3 \cdot (2^3)^3} = \end{aligned}$$

$$\begin{aligned}
& 2^5 \cdot \frac{2^6 \cdot 2^3}{2^4 \cdot 2^6} - 2^3 \cdot \frac{2^8 \cdot 2^4}{2^3 \cdot 2^9} = \\
& = 2^5 \cdot \frac{2^9}{2^{10}} - 2^3 \cdot \frac{2^{12}}{2^{12}} = \\
& = \frac{2^{14}}{2^{10}} - \frac{2^{15}}{2^{12}} = 2^4 - 2^3 = 16 - 8 = 8
\end{aligned}$$

$$\begin{aligned}
(6) \quad & \frac{10^7 \cdot 6^6}{2^{10} \cdot 15^5} = \frac{(2 \cdot 5)^7 \cdot (2 \cdot 3)^6}{2^{10} \cdot (3 \cdot 5)^5} = \\
& = \frac{2^7 \cdot 5^{\cancel{7}2} \cdot 2^{\cancel{6}4} \cdot 3^{\cancel{6}1}}{2^{10} \cdot 3^{\cancel{6}1} \cdot 5^{\cancel{5}5}} = \frac{2^{13} \cdot 5^2 \cdot 3}{2^{10}} = \\
& = 2^3 \cdot 25 \cdot 3 = 600
\end{aligned}$$

$$\begin{aligned}
(7) \quad & \frac{10^4 \cdot 14^5}{2^{10} \cdot 35^2} = \frac{(2 \cdot 5)^4 \cdot (2 \cdot 7)^5}{2^{10} \cdot (5 \cdot 7)^2} = \\
& = \frac{2^4 \cdot 5^{\cancel{4}2} \cdot 2^{\cancel{5}5} \cdot 7^{\cancel{5}3}}{2^{10} \cdot 5^{\cancel{2}2} \cdot 7^{\cancel{2}2}} = \frac{\cancel{2^8} \cdot 5^2 \cdot 7^3}{\cancel{2^{10}} \cdot 1} = \frac{25 \cdot 343}{2} = \\
& = \frac{8575}{2}
\end{aligned}$$

$$\textcircled{8} \quad \frac{\sqrt{200} + \sqrt{72} - \sqrt{50} - \sqrt{8}}{9\sqrt{2}} = \frac{10\sqrt{2} + 6\sqrt{2} - 5\sqrt{2} - 2\sqrt{2}}{9\sqrt{2}}$$

$$\begin{aligned} \sqrt{200} &= \sqrt{2^2 \cdot 5^2 \cdot 2} = \\ &= 2 \cdot 5 \cdot \sqrt{2} = \\ &= 10\sqrt{2} \end{aligned}$$

$$\begin{array}{r|l} 200 & \textcircled{2} \cdot 2^2 \\ 100 & \textcircled{2} \\ 50 & \textcircled{5} \cdot 5^2 \\ 25 & \textcircled{5} \\ 5 & \textcircled{5} \\ 1 & \end{array}$$

$$= \frac{9\sqrt{2}}{9\sqrt{2}} = 1$$

$$\begin{aligned} \sqrt{72} &= \sqrt{2^2 \cdot 2 \cdot 3^2} = \\ &= 2 \cdot 3 \cdot \sqrt{2} = \\ &= 6\sqrt{2} \end{aligned}$$

$$\begin{array}{r|l} 72 & \textcircled{2} \cdot 2^2 \\ 36 & \textcircled{2} \\ 18 & 2 \\ 9 & \textcircled{3} \cdot 3^2 \\ 3 & \textcircled{3} \\ 1 & \end{array}$$

$$\sqrt{50} = \sqrt{5^2 \cdot 2} = 5\sqrt{2}$$

$$\begin{array}{r|l} 50 & 2 \\ 25 & \textcircled{5} \cdot 5^2 \\ 5 & \textcircled{5} \\ 1 & \end{array}$$

$$\sqrt{8} = \sqrt{2^2 \cdot 2} = 2\sqrt{2}$$

$$\begin{array}{r|l} 8 & 2 \\ 4 & \textcircled{2} \cdot 2^2 \\ 2 & \textcircled{2} \\ 1 & \end{array}$$

$$\begin{aligned} \textcircled{9} \quad & \sqrt{(\sqrt{5} - 5)^2} - (\sqrt{5} - 5) = \\ & = |\sqrt{5} - 5| - (\sqrt{5} - 5) = -(\sqrt{5} - 5) - (\sqrt{5} - 5) = \\ & = -\sqrt{5} + 5 - \sqrt{5} + 5 = 10 - 2\sqrt{5} \\ \text{napomena: } & 5 > \sqrt{5} \Rightarrow |\sqrt{5} - 5| = -(\sqrt{5} - 5) \end{aligned}$$

10) Ako je $X = 2 - \sqrt{3}$

izračunaj $\sqrt{(X+1)^2} - \sqrt{(X-1)^2} + 2\sqrt{3} =$

$$= |X+1| - |X-1| + 2\sqrt{3} = // \text{memo } X //$$

$$= |2 - \sqrt{3} + 1| - |2 - \sqrt{3} - 1| + 2\sqrt{3} =$$

$$= |3 - \sqrt{3}| - |1 - \sqrt{3}| + 2\sqrt{3} =$$

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

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

$$= 3 - \sqrt{3} + 1 - \sqrt{3} + 2\sqrt{3} = 4$$

11) Ako je $\frac{a}{b} = -3$

izračunaj

$$\frac{-2}{\frac{a}{b}} + \frac{\frac{b}{a}}{-2} =$$

$$= \frac{-2}{-3} + \left(\frac{-\frac{1}{3}}{-2} \right) = \frac{2}{3} + \frac{1}{6} =$$

$$= \frac{4}{6} + \frac{1}{6} = \frac{5}{6}$$

na primer:

$$\frac{a}{b} = -3 \Rightarrow \frac{b}{a} = -\frac{1}{3}$$

$$\frac{a}{b} = \frac{5}{7} \Rightarrow \frac{b}{a} = \frac{7}{5}$$

$$\frac{a}{b} = -\frac{1}{2} \Rightarrow \frac{b}{a} = -\frac{2}{1} = -2 \dots$$