3. KONTROLNA NALOGA

1.E, 21. 1. 2002

B

1.) Poenostavi in rešitev zapiši v obliki $2^p \cdot 5^q \cdot a^r \cdot b^s$:

$$\left(\frac{5b^4}{6b^3a^2} : \left(\frac{15ab^3}{4b^2}\right)^5\right) \cdot \left(\frac{8b}{27a^6b}\right)^{-2} =$$ na listu

(16)

2.) Skrči izraz:

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

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

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

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

$$\frac{a(a^2-a+1)}{(a^2+a+1)}$$

(16)

na listu še enkrat

3.) Skrči:

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

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

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

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

$$\frac{a^2-b^2-a^2+1-ab^2}{a^2+1+ab^2}\cdot\frac{b^n(2b)}{(a-b)(a+b)}=\frac{-b^2(1+a)\cdot b^n(2b)}{a(a+b^2)+1\;(a-b)(a+b)}$$

(16)

4.) Zapiši z okrajšanim ulomkom: $1{,}1\overline{2}$. (6)

$1 + 0{,}1\overline{2} = \boxed{1\frac{11}{9}}$ (6)

$x = 0{,}1\overline{2}$

$10x = 1{,}\overline{2}$

$100x = 12{,}\overline{2}$

$90x = 11 \mid :90$

$x = \frac{11}{9}$

5.) Izračunaj: $\left(\sqrt{8} - 4\sqrt{2} + 1\right)^3 =$ (10)

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

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

$= \left(1 - 2\sqrt{2}\right)^3 = 1 - 6 \cdot 2\sqrt{2} + 3 \cdot (2\sqrt{2})^2 - (2\sqrt{2})^3 =$

$1 - 6\sqrt{2} + 24 - 16\sqrt{2} = -22\sqrt{2} + 25$

1 1 1 1 2 1 1 3 3 1 (10)

6.) Pocnostavi $3^{|x+3|} \cdot 9^{|x|} =$ (12)

1. $\frac{1}{3^{4x+3}}$
2. 3^{4x+3}
3. 3^{4x+3}

k.t.: -3, 0

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

② $3^{(x+3)} \cdot 9^{x} = 3^{4x+3}$ (6)

③ $3^{4x+3} \quad 3^{x+3} \quad 3^{-3x} \quad \frac{3^{x+3}}{3^{3x}} = ?$

① $x \leq -3$ ✓

② $x \geq 0$ ✓

③ $-3 < x < 0$ ✓

7.) Slana raztopina tehta 0,5 kg in vsebuje 25% soli. Koliko vode mora izpareti, da bo preostala mešanica 60%? (12)

raztopina 0,5 kg – 25% soli 0,125 kg

– 75% vode

0,5 kg – 60% soli 0,125 kg

x – 40% vode

60% ... 0,125

100% ... 0,5 + x

na listu do konca (12)

8.) Sindikat zahteva znižanje števila delovnih ur z 42 na 40 ur tedensko. Za koliko % se mora zvišati cena delovne ure, če naj plača ostane enaka? (12)

ure 42 ... 100%

40 ... x %

40 ... 95%

cena 42 h ... 100%

cena 42 h ... 100%

$\boxed{5\%}$ (12)

cena se mora zvišati za 5%