NALOGE ZA 2. LETNIK - POTENCE IN KORENI

Naloge[1] *so namenjene utrjevanju učne snovi in pripravi na preverjanje in ocenjevanje znanja. Priporočam uporabo učbenika Od piramid do kaosa.*

Šolsko leto: 2007/2008

POTENCE

⋆ V učbeniku reši naloge 284, 285, 286, 287, 288, 289

1. Skrči izraze:

   (a) $a^3 \cdot a^5 : (a^3)^2 =$ [R: a^2]

   (b) $(a^3(a^2b^3)^2)^4 =$ [R: $a^{28}b^{24}$]

   (c) $4x^5 \cdot (6^{-2}x^{-2}y^3z)^2 : (9^{-1}xz^{-3})^3 =$ [R: $\frac{9y^6z^{11}}{4x^2}$]

   (d) $x^2(x^2y^{-5}(2x^{-2}(x^3y^{-2})^2)^{-2})^3(8x^2y^{-3})^3 =$ [R: $8x^{-10}$]

   (e) $(a^2b^{-3})^2 \cdot (b^2a^{-3})^3 : (a^{-5})^2 =$ [R: a^5]

   (f) $(3a^3b^2x^{-5})^2 \cdot (2a^{-2}b^{-3}x^3)^3 : (2b^{-1})^4 =$ [R: $\frac{9}{2bx}$]

2. Skrči izraze:

   (a) $9^{a-2} \cdot 3^{(a-1)^2} \cdot (3^a)^{a-3} =$ [R: 3^{2a^2-3a-3}]

   (b) $5 \cdot 25^{(2x-3)^2} \cdot 5^{x^2-7} \cdot (125^x)^{4-x} : (5^{2x-1})^{2x} =$ [R: $25^{(x-2)(x-3)}$]

   (c) $(2^{a-2})^2 \cdot 2^{(a-1)^2} : 4^{a^2-1} =$ [R: $2^{-(a^2+1)}$]

   (d) $3^{2r^2-3} \cdot (4^{r-1})^{r+1} \cdot 2^{-1} : (36^r)^r =$ [R: 6^{-3}]

   (e) $3^{(n+1)^2} \cdot (3^{n-2})^{n+2} : 9^{n(n+1)} =$ [R: 3^{-3}]

   (f) $2 \cdot 4^{x-1} \cdot (5^x)^{x-2} \cdot 25^{(x+1)^2} : (125^x)^{4-x} =$ [R: $2^{2x-1} \cdot 5^{6x^2-10x+2}$]

3. Izpostavi skupni faktor in skrči:

   (a) $3^{x+2} - 7 \cdot 3^x + 2 \cdot 3^{x-2} =$ [R:$20 \cdot 3^{x-2}$]

   (b) $3^{x+2} - 5 \cdot 3^x - 9 \cdot 3^{x-1} =$ [R:3^x]

   (c) $2^3 + 2(3^n - 5 \cdot 3^{n-2}) =$ [R:$8(1 + 3^{n-2})$]

   (d) $5^{x+2} - 2 \cdot 5^x + 3 \cdot 5^{x-1} =$ [R:$18 \cdot 5^{x-1}$]

   (e) $3 \cdot 2^{2n+1} - 21 \cdot 2^{2n-1} + 8 \cdot 2^{2n-4} =$ [R:-4^{n+1}]

   (f) $5 \cdot 2^{2x+4} - 2^{2x+2} + 2^{2x} - 2^{2x-2} =$ [R:$307 \cdot 2^{2x-2}$]

4. Razstavi števec in imenovalec ter okrajšaj ulomek:

   (a) $\frac{x^{n+3} - 4x^{n+1}}{x^{n-2} + 2x^{n-3}} =$ [R:$x^4(x-2)$]

   (b) $\frac{2^{2x+3} + 5 \cdot 2^{2x+1} - 6 \cdot 2^{2x-1}}{5 \cdot 2^{2x-3}} =$ [R:24]

   (c) $\frac{x^{n-2} - 5x^{n-3}}{x^n - 10x^{n-1} + 25x^{n-2}} =$ [R:$\frac{1}{x(x-5)}$]

   (d) $\frac{x^{n+1} - 6x^{n-1} + 9x^{n-3}}{x^{n-2} - 3x^{n-4}} =$ [R:$x(x^2-3)$]

   (e) $\frac{2^{n+3} - 3 \cdot 2^{n+1} + 11 \cdot 2^{n-1}}{2^{n-1} - 3 \cdot 2^{n-4}} =$ [R:24]

   (f) $\frac{x^n - 5 \cdot x^{n-1}}{x^n - 10x^{n-1} + 25x^{n-2}} =$ [R:$\frac{x+5}{x-5}$]

[1] Pripravila Vera Orešnik, prof.

⋆ V učbeniku reši nalogo 293

KORENI

Ponovi pravila za računanje s kvadratnimi koreni.

⋆ V učbeniku reši naloge 295, 296, 298, 299, 300, 301, 302

5. Uporabi ustrezno pravilo za računanje s koreni in poenostavi izraz:

   (a) $\sqrt[3]{a^2} \cdot \sqrt[3]{a^4} =$ [R: a^2]

   (b) $\sqrt{a} \cdot \sqrt[3]{a^2} \cdot \sqrt[6]{a^5} =$ [R: a^2]

   (c) $\sqrt[3]{\sqrt[4]{a^{15}}} =$ [R: $\sqrt[4]{a^5} = a^{\frac{5}{4}}$]

   (d) $\sqrt{\sqrt[3]{\sqrt[4]{a^{12}}}} =$ [R: $\sqrt{a} = a^{\frac{1}{2}}$]

   (e) $\sqrt[8]{\sqrt[3]{625}} =$ [R: $\sqrt[6]{5} = 5^{\frac{1}{6}}$]

   (f) $(\sqrt[3]{a\sqrt{a}})^2 =$ [R: a]

   (g) $\sqrt[5]{(a^{10}b^{15})^7} =$ [R: $a^{14}b^{21}$]

   (h) $\sqrt[6]{a(\sqrt[4]{ab^3})^5} =$ [R: $\sqrt[8]{a^3b^5}$]

   (i) $\sqrt[12]{8a^3b^9x^{15}} =$ [R: $\sqrt[4]{2ab^3x^5}$]

   ⋆ V učbeniku reši naloge 320, 321, 325

6. Poenostavi izraz in rezultat zapiši v obliki potence.

   (a) $\sqrt[6]{\sqrt[7]{a^{21}}} =$ [R: $\sqrt{a} = a^{\frac{1}{2}}$]

   (b) $(\sqrt[3]{a^2\sqrt[6]{a^{11}}})^6 =$ [R: $a^{\frac{23}{3}}$]

   (c) $\sqrt{\sqrt{\sqrt{\sqrt{a^{16}}}}} =$ [R: a]

   (d) $\sqrt[6]{a^9} \cdot \sqrt[5]{a^9} =$ [R: $a^{\frac{33}{10}}$]

   (e) $(\sqrt[6]{\sqrt{15625}})^2 =$ [R: 5]

   (f) $\sqrt[5]{\sqrt[8]{a^5}} =$ [R: $a^{\frac{1}{8}}$]

   (g) $(\sqrt[3]{a\sqrt[6]{a^{11}}})^3 =$ [R: $a^{\frac{17}{6}}$]

   (h) $\sqrt{\sqrt{\sqrt{a^8}}} =$ [R: a]

   (i) $\sqrt[6]{a^3} \cdot \sqrt[5]{a^3} =$ [R: $a^{\frac{11}{10}}$]

   (j) $\sqrt[7]{\sqrt[4]{a^{14}}} =$ [R: $a^{\frac{1}{2}}$]

   (k) $(\sqrt[4]{a^2\sqrt[8]{a^{16}}})^3 =$ [R: a^3]

   (l) $\sqrt{\sqrt{\sqrt{a^{10}}}} =$ [R: $a^{\frac{5}{4}}$]

   (m) $\sqrt[7]{a^3} \cdot \sqrt[5]{a^3} =$ [R: $a^{\frac{36}{35}}$]

   (n) $(\sqrt[8]{\sqrt{6561}})^2 =$ [R: 3]

   (o) $\sqrt[7]{\sqrt[8]{a^4}} =$ [R: $a^{\frac{1}{14}}$]

   (p) $(\sqrt[3]{a\sqrt[11]{a^{11}}})^{-3} =$ [R: a^{-2}]

(q) $\sqrt{\sqrt{\sqrt{a^{100}}}} =$ [R:$a^{\frac{25}{2}}$]

(r) $\sqrt[4]{a^9} \cdot \sqrt[5]{a^{-4}} =$ [R:$a^{\frac{29}{20}}$]

(s) $(\sqrt[10]{\sqrt{1024}})^2 =$ [R:2]

(t) $(\sqrt[20]{\sqrt{1024}})^4 =$ [R: 2]

⋆ V učbeniku reši naloge 322, 323, 324, 326, 305

7. Poenostavi:

(a) $\sqrt[3]{ab} \cdot \sqrt[4]{a^2b} \cdot \sqrt[8]{a^4\sqrt[3]{b^2}}$ [R:$\sqrt[3]{a^4b^2}$]

(b) $\sqrt{a} \cdot \sqrt[10]{a^{-5}b^4} \cdot \sqrt[5]{a^{-4}b} =$ [R: $\sqrt[10]{a^{-4}b^3}$]

(c) $\sqrt[3]{ab^{-2}} \cdot \sqrt[6]{a^5b} : \sqrt[4]{(ab^{-1})^3} =$ [R: $\sqrt[12]{a^5b^3}$]

(d) $\sqrt[4]{\sqrt[3]{x^{13}y^{-2}}} \cdot \sqrt[4]{x^3y^{-2}} \cdot \sqrt[3]{y^{-2}} : (\sqrt[6]{xy^{-1}})^3 =$ [R:$\sqrt[6]{x^8y^{-5}}$]

(e) $\sqrt[3]{a^4b^{-2}} \cdot \sqrt[3]{\sqrt[4]{ab^{-1}}} \cdot \sqrt[6]{a^5} : (\sqrt[4]{ab^{-1}})^3 =$ [R:$\sqrt{a^3}$]

(f) $\sqrt[5]{a^5b^{-2}c^{-1}} \cdot \sqrt[10]{(a^{-2}b^2)^3} : \sqrt[6]{a^3c^{-3}} =$ [R: $\sqrt[10]{a^{-1}b^2c^3}$]

(g) $\sqrt[5]{(a^{10}b^{-15})^{11}} : (\sqrt[3]{a\sqrt{a} \cdot b^{-18}})^2 =$ [R:$(\frac{a}{b})^{21}$]

(h) $\sqrt[6]{(x^{12}y^{-18})^5} : (\sqrt[5]{x^2\sqrt{x}y^{-15}})^2 =$ [R:$\frac{x^{10}}{\sqrt{x}y^{12}}$]

(i) $\sqrt{a\sqrt[3]{b\sqrt[4]{a^3b^3}}} : \sqrt[4]{a^3\sqrt[3]{b\sqrt{ab}}} =$ [R:$\sqrt[6]{\frac{b}{a}}$]

8. Skrči izraz:

(a) $\sqrt[4]{x^3\sqrt[3]{xy\sqrt{xy^{-2}}}} : \sqrt{x\sqrt[3]{y^2\sqrt[4]{x^{-3}}}} =$ [R:$\sqrt[6]{\frac{x^3}{y^2}}$]

(b) $\sqrt[8]{\left(\frac{x^{16}}{y^{24}}\right)^3} \cdot \sqrt[3]{y^7\sqrt{yx^{-3}}} \cdot \sqrt[3]{\sqrt[2]{x^{-3}y^3}} =$ [R:$\frac{x^7}{y^6}$]

(c) $\sqrt[3]{x\sqrt[9]{xy\sqrt{x^{-11}y^{-2}}}} : \sqrt[6]{y^{-2}\sqrt[3]{x\sqrt[3]{x^{-9}y^9}}} =$ [R: $\sqrt[18]{x^5y^4}$]

⋆ V učbeniku reši naloge 327,328,329,330

9. Poenostavi:

(a) $4\sqrt[3]{x\sqrt[4]{x^3}} - \sqrt{\sqrt[5]{\sqrt[6]{x^{35}}}} =$ [R:3 $\sqrt[12]{x^7}$]

(b) $3 \cdot \sqrt[3]{\sqrt[4]{z^5}} + 7\sqrt[5]{\sqrt[12]{z^{25}}} - 8\sqrt{\sqrt[9]{\sqrt{z^{15}}}} =$ [R:2 $\sqrt[12]{z^5}$]

10. Najprej delno koreni in nato izračunaj:

⋆ V učbeniku reši naloge 314, 315, 316, 318, 319

(a) $3 \cdot \sqrt[3]{48} - 2 \cdot \sqrt[3]{750} + 4 \cdot \sqrt[3]{135} - 7 \cdot \sqrt[3]{320} + 2 \cdot \sqrt[3]{162} =$ [R:$2\sqrt[3]{6} - 16\sqrt[3]{5}$]

(b) $\sqrt[3]{54a^4b^4c} - \sqrt[3]{16a^4bc^4} + \sqrt[3]{128ab^4c^4} =$ [R:$\sqrt[3]{2abc}(3ab - 2ac + 4bc)$]

11. Racionaliziraj imenovalec in skrči:

⋆ V učbeniku reši naloge 307, 308, 309

(a) $\frac{12}{\sqrt{3}} =$ [R: $4\sqrt{3}$]

(b) $\frac{4}{\sqrt{6}} =$ [R: $\frac{2}{3}\sqrt{6}$]

(c) $\frac{2\sqrt{3}}{\sqrt{6}} =$ [R: $\sqrt{2}$]

(d) $\frac{a\sqrt{b}}{\sqrt{a}} =$ [R: $\sqrt{ab}$]

(e) $\frac{\sqrt{15}}{\sqrt{5}-\sqrt{3}} =$ [R: $\frac{5\sqrt{3}+3\sqrt{5}}{2}$]

(f) $\frac{20+10\sqrt{2}}{2\sqrt{5}-\sqrt{10}} =$ [R: $6\sqrt{5}+4\sqrt{10}$]

(g) $\frac{12+6\sqrt{2}}{2\sqrt{3}-\sqrt{6}} =$ [R: $2\sqrt{3}(2\sqrt{2}+3)$]

(h) $\frac{3\sqrt{10}}{4\sqrt{5}-5\sqrt{2}} =$ [R: $2\sqrt{2}+\sqrt{5}$]

(i) $\frac{\sqrt{10}}{3\sqrt{5}+5\sqrt{2}} + (\frac{1}{\sqrt{2}})^{-1} =$ [R: $2(\sqrt{5}-\sqrt{2})$]

(j) $\frac{3\sqrt{10}}{4\sqrt{5}-5\sqrt{2}} - \left(\frac{1}{2\sqrt{2}+\sqrt{5}}\right)^{-1} =$ [R:0]

12. Izračunaj:

(a) $(\sqrt{5}-1)(\sqrt{5}+1) =$ [R: 4]

(b) $(\sqrt{3}-1)^2 =$ [R: $2(2-\sqrt{3})$]

(c) $(5-\sqrt{5})^2(3+\sqrt{5}) =$ [R:40]

(d) $(1-\sqrt{3})^2(4+2\sqrt{3}) =$ [R:4]

(e) $(\sqrt{7}-2)^2(11+4\sqrt{7}) =$ [R: 9]

(f) $(3-\sqrt{2})^2 \cdot \sqrt{18} - \sqrt[3]{8} =$ [R: $33\sqrt{2}-38$]

13. Faktor pred korenom postavi pod koren po pravilu $a\sqrt{b} = \sqrt{a^2 b}$ in zmnoži.

(a) $(3+\sqrt{3})\sqrt{12-6\sqrt{3}} =$ [R:6]

(b) $(2-\sqrt{10})\sqrt{7+2\sqrt{10}} =$ [R:$3\sqrt{2}$]

(c) $(1+\sqrt{5})\sqrt{3-\sqrt{5}} =$ [R:$2\sqrt{2}$]

(d) $(3-\sqrt{3})\sqrt{2+\sqrt{3}} =$ [R:$\sqrt{6}$]

POTENCE Z RACIONALNIMI EKSPONENTI

⋆ V učbeniku reši naloge 339, 340, 341, 343, 344, 345, 346, 348

14. Izračunaj:

(a) $9^{\frac{3}{2}} \cdot 8^{-\frac{1}{3}} - \sqrt{16^{\frac{5}{4}} - 7} =$ [R:$\frac{17}{2}$]

(b) $\left(6\frac{1}{4}\right)^{-\frac{1}{2}} \cdot 0,008^{-\frac{2}{3}} + 9^{\frac{3}{2}} =$ [R:37]

(c) $4^{\frac{3}{2}} \cdot 8^{-\frac{1}{3}} - \sqrt{9^{\frac{3}{2}} - 2 \cdot 27^{\frac{2}{3}}} =$ [R:1]

(d) $4^{\frac{3}{2}} \cdot 9^{-\frac{1}{2}} + \sqrt{16^{\frac{3}{4}} + 1} =$ [R:$\frac{17}{3}$]

(e) $\left(\frac{2}{3}\right)^3 \cdot 1,5^7 : \left(2\frac{1}{3}\right)^{-4} =$ [R:$(\frac{7}{2})^4$]

IRACIONALNE ENAČBE

⋆ V učbeniku reši naloge 333, 324, 335, 336, 337,