Priprema za provjeru znanja „Korijeni"

<u>Ishodi:</u>

<u>Procjenjuje i računa vrijednost drugog i trećeg korijena služeći se džepnim računalom.</u>

<u>Računa s izrazima s drugim i trećim korijenom poštujući redoslijed računskih operacija.</u>

<u>Kvadrira binom s drugim i trećim korijenom.</u>

<u>Djelomično korjenuje izraz.</u>

<u>Racionalizira nazivnik razlomka</u>

Zadatak 1.2.1

Pojednostavni:

a) $23\sqrt{15} - 4(12\sqrt{15} + 2)$

b) $12(\sqrt{23} - 1) + 14(2 - \sqrt{23})$

c) $0.5(\sqrt[3]{111} + 11) - 0.25(2\sqrt[3]{111} - 14)$

d) $18 - 21(\sqrt{3} - \sqrt{2})$

e) $2(\sqrt{3} - \sqrt{2}) - 8(\sqrt{3} + \sqrt{2})$

f) $41(\sqrt[3]{3} - 2\sqrt{5}) + 5(5\sqrt{5} + \sqrt[3]{3})$.

Rješenje:

a) $-25\sqrt{15} - 8$

b) $-2\sqrt{23} + 16$

c) 9

d) $18 - 21\sqrt{3} + 21\sqrt{2}$

e) $-6\sqrt{3} - 10\sqrt{2}$

f) $46\sqrt[3]{3} - 57\sqrt{5}$.

Zadatak 1.2.3

Pojednostavni:

a) $\dfrac{\sqrt{98}}{\sqrt{2}}$

b) $\dfrac{\sqrt{27}}{\sqrt{12}}$

c) $\dfrac{\sqrt{18}}{\sqrt{50}}$

d) $\dfrac{\sqrt{1000}}{\sqrt{160}}$

e) $\dfrac{\sqrt{32}}{\sqrt{54}} \cdot \sqrt{75}$

f) $\dfrac{\sqrt{1000}}{\sqrt{98}} \cdot \dfrac{\sqrt{18}}{\sqrt{250}}$

g) $\sqrt{\dfrac{56}{3}} \cdot \dfrac{\sqrt{8}}{\sqrt{189}} \cdot \dfrac{\sqrt{128}}{\sqrt{50}}$.

Rješenje:

a) 7

b) $\dfrac{3}{2}$

c) $\dfrac{3}{5}$

d) $\dfrac{5}{2}$

e) $\dfrac{20}{3}$

f) $\dfrac{6}{7}$

g) $\dfrac{64}{45}$.

Zadatak 1.2.5

Djelomično korjenuj:

a) $\sqrt{12}$

b) $\sqrt{20}$

c) $\sqrt{50}$

d) $\sqrt{18}$

e) $\sqrt{98}$

f) $\sqrt{128}$

g) $\sqrt{32}$

h) $\sqrt{1000}$

i) $\sqrt{116}$

j) $\sqrt{343}$

k) $\sqrt{250}$

l) $\sqrt{160}$

m) $\sqrt[3]{24}$

n) $\sqrt[3]{54}$

o) $\sqrt[3]{250}$

p) $\sqrt[3]{10\,000}$.

Zadatak 1.2.6

Neka su $a, b, x, y > 0$. Djelomično korjenuj:

a) $\sqrt{a^3}$

b) $\sqrt{x^9}$

c) $\sqrt{y^7}$

d) $\sqrt{a^2 b}$

e) $\sqrt{x^6 y^{-3}}$

f) $\sqrt{a^{11} b^{-8}}$

g) $\sqrt{256 x y^3}$

h) $\sqrt{72(a+b)^5}$

i) $\sqrt[3]{x^5}$

j) $\sqrt[3]{8 a^7}$

k) $\sqrt[3]{a b^{10}}$

l) $\sqrt[3]{x^{-4} y^{11}}$.

Zadatak 1.2.8

Neka su a i x pozitivni brojevi. Unesi pod znak korijena:

a) $2\sqrt{5}$

b) $2\sqrt{3}$

c) $3\sqrt{2}$

d) $18\sqrt{5}$

e) $2\sqrt{a}$

f) $a\sqrt{2}$

g) $x\sqrt{3}$

h) $x^3\sqrt{5}$

i) $2\sqrt[3]{2}$

j) $3\sqrt[3]{2}$

k) $2\sqrt[3]{5}$

l) $4\sqrt[3]{7}$

m) $x\sqrt[3]{2}$

n) $a^2\sqrt[3]{3}$

o) $x^{-1}\sqrt[3]{5}$

p) $x^2\sqrt[3]{y}$.

Rješenje:

a) $\sqrt{20}$

b) $\sqrt{12}$

c) $\sqrt{18}$

d) $\sqrt{1620}$

e) $\sqrt{4a}$

f) $\sqrt{2a^2}$

g) $\sqrt{3x^2}$

h) $\sqrt{5x^6}$

i) $\sqrt[3]{16}$

j) $\sqrt[3]{54}$

k) $\sqrt[3]{40}$

l) $\sqrt[3]{448}$

m) $\sqrt[3]{2x^3}$

n) $\sqrt[3]{3a^6}$

o) $\sqrt[3]{5x^{-3}}$

p) $\sqrt[3]{x^6y}$.

Zadatak 1.2.9

Izračunaj:

a) $2\sqrt{75} - \sqrt{12} + 12\sqrt{27}$

b) $\sqrt{1000} + 2\sqrt{160} - 4\sqrt{250}$

c) $18\sqrt{98} + 12\sqrt{18} - 22\sqrt{32}$

d) $\sqrt{125} - 5\sqrt{45} + 27\sqrt{20}$

e) $8\sqrt[3]{54} + 2\sqrt[3]{250} - \sqrt[3]{2}$

f) $\sqrt[3]{1250} - 12\sqrt[3]{270} + \sqrt[3]{10\,000}$.

Rješenje:

a) $44\sqrt{3}$

b) $-2\sqrt{10}$

c) $74\sqrt{2}$

d) $44\sqrt{5}$

e) $33\sqrt[3]{2}$

f) $-21\sqrt[3]{10}$.

Zadatak 1.2.10

Kvadriraj binome:

a) $(\sqrt{2} + 3\sqrt{3})^2$

b) $(\sqrt{5} - \sqrt{15})^2$

c) $(2\sqrt{3} - 4\sqrt{5})^2$

d) $(3\sqrt{6} + 4\sqrt{3})^2$

e) $(\sqrt[3]{4} + 1)^2$

f) $(2\sqrt[3]{3} - 3\sqrt[3]{2})^2$

g) $(\sqrt[3]{250} + 2)^2$

h) $(8\sqrt[3]{2} - 3)^2$.

Rješenje:

a) $29 + 6\sqrt{6}$

b) $20 - 10\sqrt{3}$

c) $92 - 16\sqrt{15}$

d) $102 + 72\sqrt{2}$.

Zadatak 1.2.12

Neka su a, b, x, y pozitivni brojevi. Izvedi naznačene operacije:

a) $\sqrt[3]{a^2} : \sqrt[3]{a} + 9\sqrt[3]{a}$

b) $\sqrt[3]{x^7 y^6} : \sqrt[3]{y^2 x^{-3}}$

c) $(\sqrt[3]{9} - 2\sqrt{3}) \cdot \sqrt[3]{3}$

d) $(2\sqrt[3]{8} - \sqrt[3]{32}) : \sqrt[3]{2}$

e) $(8\sqrt[3]{a^4} - 12\sqrt[3]{27a^4}) : \sqrt[3]{a}$

f) $(6\sqrt{a^3} - 2\sqrt[3]{a^5}) \cdot a$

g) $(\sqrt{a} - 1)(\sqrt{a} + 1)$

h) $(x\sqrt{y} - 3\sqrt{x})(x\sqrt{y} + 3\sqrt{x})$

i) $(\sqrt[3]{3} + \sqrt[3]{2})(\sqrt[3]{9} - \sqrt[3]{6} + \sqrt[3]{4})$

j) $(\sqrt[3]{10} - \sqrt[3]{2})(\sqrt[3]{100} + \sqrt[3]{20} + \sqrt[3]{4})$

k) $(\sqrt[3]{25} - \sqrt[3]{4})(\sqrt[3]{625} + \sqrt[3]{100} + \sqrt[3]{16})$

l) $(\sqrt[3]{a} - \sqrt[3]{b})(\sqrt[3]{a} + \sqrt[3]{b})$

m) $(\sqrt{x^3 y} + \sqrt{xy^3})(\sqrt{x^3 y} - \sqrt{xy^3})$

n) $(\sqrt[3]{x^5} + 2\sqrt[3]{y^8})(\sqrt[3]{x^5} - 2\sqrt[3]{y^8})$.

Rješenje:

a) $10\sqrt[3]{a}$

b) $\sqrt[3]{x^{10} y^4}$

c) $\sqrt[3]{27} - 2\sqrt{3} \cdot \sqrt[3]{3}$

d) $2\sqrt[3]{4} - 2\sqrt[3]{2}$

e) $-28a$

f) $6a^2 \sqrt{a} - 2a^2 \sqrt[3]{a^2}$

g) $a - 1$

h) $x^2 y - 9x$

i) 5

j) 8

k) 21

l) $\sqrt[3]{a^2} - \sqrt[3]{b^2}$

m) $x^3 y - xy^3$

n) $x^3 \sqrt[3]{x} - 4y^5 \sqrt[3]{y}$.

Zadatak 1.2.13

Racionaliziraj nazivnike danih razlomaka:

a) $\dfrac{1}{\sqrt{2}}$

b) $\dfrac{3}{\sqrt{3}}$

c) $\dfrac{2}{\sqrt{5}}$

d) $\dfrac{2}{\sqrt{6}}$

e) $\dfrac{1}{2\sqrt{2}}$

f) $\dfrac{4}{\sqrt{18}}$

g) $\dfrac{27}{\sqrt{3}}$

h) $\dfrac{3\sqrt{3}}{2\sqrt{2}}$.

Rješenje:

a) $\dfrac{\sqrt{2}}{2}$

b) $\sqrt{3}$

c) $\dfrac{2\sqrt{5}}{5}$

d) $\dfrac{\sqrt{6}}{3}$

e) $\dfrac{\sqrt{2}}{4}$

f) $\dfrac{2\sqrt{18}}{9} = \dfrac{2\sqrt{2}}{3}$

g) $9\sqrt{3}$

h) $\dfrac{3\sqrt{6}}{4}$.

Zadatak 1.2.14

Racionaliziraj:

a) $\dfrac{1}{\sqrt[3]{2}}$

b) $\dfrac{1}{\sqrt[3]{5}}$

c) $\dfrac{1}{\sqrt[3]{9}}$

d) $\dfrac{4}{\sqrt[3]{16}}$

e) $\dfrac{1}{2\sqrt[3]{3}}$

f) $\dfrac{25}{\sqrt[3]{25}}$

g) $\dfrac{1}{\sqrt[3]{a}}$

h) $\dfrac{1}{\sqrt[3]{a^2}}$.

Rješenje:

a) $\dfrac{\sqrt[3]{4}}{2}$

b) $\dfrac{\sqrt[3]{25}}{5}$

c) $\dfrac{\sqrt[3]{3}}{3}$

d) $\sqrt[3]{4}$

e) $\dfrac{\sqrt[3]{9}}{6}$

f) $5\sqrt[3]{5}$

g) $\dfrac{\sqrt[3]{a^2}}{a}$

h) $\dfrac{\sqrt[3]{a}}{a}$.

Zadatak 1.2.15

Racionaliziraj nazivnike danih razlomaka:

a) $\dfrac{1}{\sqrt{3} - \sqrt{2}}$

b) $\dfrac{1}{\sqrt{7} + \sqrt{6}}$

c) $\dfrac{1}{\sqrt{18} - \sqrt{12}}$

d) $\dfrac{15}{\sqrt{45} + \sqrt{15}}$

e) $\dfrac{\sqrt{3} + \sqrt{5}}{\sqrt{3} - \sqrt{5}}$

f) $\dfrac{\sqrt{7} + \sqrt{3}}{\sqrt{7} - \sqrt{3}}$

g) $\dfrac{1}{2\sqrt{5} - 5\sqrt{2}}$

h) $\dfrac{2\sqrt{7} + 7\sqrt{2}}{2\sqrt{7} - 7\sqrt{2}}$.

Rješenje:

a) $\sqrt{3} + \sqrt{2}$

b) $\sqrt{7} - \sqrt{6}$

c) $\dfrac{\sqrt{18} + \sqrt{12}}{6} = \dfrac{3\sqrt{2} + 2\sqrt{3}}{6}$

d) $\dfrac{\sqrt{45} - \sqrt{15}}{2}$

e) $-(4 + \sqrt{15})$

f) $\dfrac{1}{2}(5 + \sqrt{21})$

g) $-\dfrac{1}{30}(2\sqrt{5} + 5\sqrt{2})$

h) $-\dfrac{1}{5}(9 + 2\sqrt{14})$.