

DATUM: 22.10

RAZRED: 2.2

TOČKE 19,5 / 38

OCENA: zdr(2)

51.

Kriterij ocenjevanja:

[0%, 50%) Nzd(1) [50%, 63%) Zd(2) [63%, 76%) Db(3) [76%, 88%) Pdb(4) [88, 100%) Odl(5)

Pišite z nalivnim peresom ali s kemičnim svinčnikom. Če se zmotite, napisano prečrtajte. Pri reševanju nalog mora biti jasno in korektno predstavljena pot do rezultata z vmesnimi računi in sklepi. Uporaba računala ni dovoljena. Naloge, pisane z navadnim svinčnikom, nejasne in nečitljive rešitve se ovrednotijo z 0 točkami. Če ste nalogu reševali na več načinov, jasno označite, katera rešitev naj se točkuje. Vsako nalogu skrbno preberite. Zaupajte vase in v svoje sposobnosti.

1. Poenostavite izraz: $\frac{x^{-3}+4x^{-4}}{x^{-3}+5x^{-4}} - \frac{2-10x^{-1}}{x-1-12x^{-1}} : \frac{1-25x^{-2}}{x^{-1}-4x^{-2}} =$

$$\begin{aligned} & \cancel{x^{-3}} \frac{x^{-3}+4x^{-4}}{x^{-4}(x+5)} - \frac{2-10x^{-1}}{x-1-12x^{-1}} : \frac{1-25x^{-2}}{x^2(x-4)} = \\ & \cancel{x^{-4}(x+4)} - \frac{\cancel{x^1(2x-10)}}{\cancel{x^1(x^2-12)}} : \frac{x^2(x-25)}{x^2(x-4)} = \\ & \cancel{x^1(x+5)} - \frac{x^2(x-10)}{\cancel{x^1(x^2-12)}} : \frac{x^2(x-25)}{x^2(x-4)} = \\ & \cancel{x^1(x+5)} - \frac{x^2-10}{\cancel{x^1(x^2-12)}} : \frac{x^2(x-25)}{x^2(x-4)} = \\ & \cancel{x^1(x+5)} - \frac{2-10}{\cancel{x^1(x^2-12)}} : \frac{x^2(x-25)}{(x-5)(x+5)} = \\ & \cancel{(x+4)(x-5)} : \frac{2x-10}{(x+5)(x-5)} = \frac{x-4}{(x-5)(x+5)} = \\ & \cancel{(x+5)(x-5)} // \end{aligned}$$

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2. Poenostavite, rezultat delno korenite in racionalizirajte: $\sqrt{25ab^{-3}} \sqrt[3]{ba^{-2}} : \sqrt[3]{a^{-1}b^4} \sqrt[4]{a^{-5}b^7} =$

$$\begin{aligned} & \sqrt[6]{25^3 a^3 b^{-8} b a^{-2}} : \sqrt[12]{a^{-4} b^{16} a^{-5} b^4} = \sqrt[12]{\frac{25^6 a^{25} b^{16}}{a^9 b^{23}}} = \\ & \sqrt[12]{25^6 a^6 b^{-18} b^2 a^{-4}} : \sqrt[12]{a^{-4} b^{16} a^{-5} b^4} = \sqrt[12]{\frac{25^6 a^2 b^2}{a^{16} b^{23}}} = \\ & \sqrt[12]{25^6 a^2 b^{-16}} : \sqrt[12]{a^{-9} b^{23}} = \sqrt[12]{\frac{25^6 a^11}{b^{36} b^{-3}}} = \\ & \sqrt[12]{25^6 a^6 b^{-36} b^3} = \sqrt[12]{a^{11}} \end{aligned}$$

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$$3. \text{ Izračunajte: } \sqrt{6}\sqrt{14}\sqrt{21} - (\sqrt{3}-1)^2 + \frac{\sqrt{3}}{2+\sqrt{3}} - (\sqrt{3}+3)(1-2\sqrt{3}) = \sqrt{3 \cdot 2 \cdot 7 \cdot 7 \cdot 2 \cdot 3}$$

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$$\begin{aligned}
 & \sqrt{6 \cdot 14 \cdot 21} - (3 - 2\sqrt{3} + 1) + \frac{\sqrt{3}}{2+\sqrt{3}} - (\sqrt{3}+3)(1-2\sqrt{3}) \\
 &= \sqrt{6 \cdot 14 \cdot 21} - 2 - 2\sqrt{3} + \frac{\sqrt{3}}{2+\sqrt{3}} - (\sqrt{3} - 2\sqrt{3} + 3 - 6\sqrt{3}) \\
 &= \sqrt{6 \cdot 14 \cdot 21} - 2 - 2\sqrt{3} - \frac{\sqrt{3} + 6 - 3 + 6\sqrt{3}}{2+\sqrt{3}} = \\
 &= \sqrt{6 \cdot 14 \cdot 21} - 2 + 4\sqrt{3} - \frac{\sqrt{3}}{2+\sqrt{3}} + 3 = \\
 &= \sqrt{6 \cdot 14 \cdot 21} + 1 \\
 & 3 \cdot 2 \cdot \cancel{7} + 91 + 4\sqrt{3} - \frac{\sqrt{3}}{2+\sqrt{3}} = \\
 &= 42 + 1 + 4\sqrt{3} - \frac{\sqrt{3}}{2+\sqrt{3}} = \cancel{\sqrt{3}(2-\sqrt{3})} \\
 &= 43(2-\sqrt{3}) + 4\sqrt{3}(2-\sqrt{3}) - \frac{\cancel{\sqrt{3}(2-\sqrt{3})}}{(2+\sqrt{3})(2-\sqrt{3})} = \\
 &= 86 - 43\sqrt{3} + 8\sqrt{3} \\
 &= 86 - \frac{43\sqrt{3} - 8\sqrt{3}}{4-\sqrt{3}} = \\
 &= 86 - 35\sqrt{3} - 12 - 2\sqrt{3} = \\
 &= 74 - 37\sqrt{3} = \\
 &= \underline{\underline{74 - 37\sqrt{3}}} \\
 & 4. \text{ Poenostavite: } \left(\frac{2a^2b^{-1}}{c^3}\right)^2 \cdot \left(\frac{4c^0b^{\frac{2}{5}}}{a^{-\frac{4}{3}}}\right)^{-\frac{1}{2}} : \left(\frac{2a^{\frac{1}{9}}c}{b^{-\frac{1}{15}}}\right)^3
 \end{aligned}$$

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$$\begin{aligned}
 & \frac{2a^4}{c^6} \cdot \frac{4^{\frac{1}{2}} c^0 \cancel{5^{\frac{2}{5}}}}{\cancel{a^2}} \cdot (-\frac{1}{2}) \\
 &= \frac{2a^4}{c^6} \cdot \frac{4^{\frac{1}{2}} c^0 \sqrt[5]{b^2}}{\sqrt[3]{a^2}} \cdot \frac{2^3 a^{\frac{3}{9}} c^3}{b^{-\frac{3}{15}}} \\
 &= \frac{2a^4}{c^6} \cdot \frac{2\sqrt{24}}{3\sqrt{a^2}} \cdot \frac{-2 c^0 \sqrt[5]{5}}{3\sqrt{a^2}} \cdot \frac{\sqrt[15]{b^3}}{\sqrt[24]{a^3} c^3} \\
 &= \frac{2a^4 \cdot (-2)c^0 \sqrt[5]{5}}{c^9 b^2 a^3} \cdot \frac{5\sqrt[5]{5^3}}{c^3}
 \end{aligned}$$

$$\begin{aligned}
 &= \frac{2a^4 \cdot (-2)c^0 \sqrt[5]{5}}{c^9 b^2 a^3} \cdot \frac{5\sqrt[5]{5^3}}{c^3} \\
 &= \frac{2a^3 \cdot (-2)c^0 \sqrt[5]{b^2}}{c^9 b^2 a^3} = \frac{-4a^3 \cdot \cancel{2} \sqrt[5]{b^2}}{c^9 b^2 a^3} = \frac{a^3 \sqrt[5]{b^2}}{2c^9 b^2}
 \end{aligned}$$

5. Rešite enačbo: $\sqrt{x + 11} + \sqrt{x + 4} = 7$.

$$\begin{aligned} -\sqrt{x+11} + \sqrt{x+7} &= 7 - \sqrt{x+4} \\ x+11 &= (7 - \sqrt{x+4})(7 - \sqrt{x+4}) \\ x+11 &= 49 - 14\sqrt{x+4} + x+4 \\ 14\sqrt{x+4} &= 53 \end{aligned}$$

$$x+11 + x+4 = 7$$

$$2x + 15 = 7$$

$$2x = -8$$

$$x = -4$$

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6. Izračunajte vrednost izraza $Re(z) - \frac{3Im(z)}{3+i} - |z|$, če je $z = 3 - 2i$.

$$\begin{aligned}
 & \text{Def}(2) \text{ or } z = \frac{3+bi}{3+i} = a+bi \\
 & \checkmark 3 - \frac{3 \cdot (-2\cancel{i})}{3+i} - |3-2i| = \\
 & = 3 - \frac{-6i}{3+i} - \cancel{3+2i} = 3i + \frac{6i}{3+i} + 2i = \\
 & = \frac{6i(3-i)}{(3+i)(3-i)} + 2i = \frac{18i - 6i^2}{9 - i^2} = \\
 & = \frac{18i + 6}{9} = \frac{2i(3i+1)}{9} = \underline{\underline{\frac{2(3i+1)}{9}}}
 \end{aligned}$$

7. Zapišite lastnosti grafa funkcije na sliki.

$D_f = [-2, 2] \quad //$

$Z_f = (-\infty, \infty) \quad \checkmark$

Ničle: $x \in \{-2, 2\} \quad //$

Začetna vrednost: $f(0) = 0 \quad \checkmark$

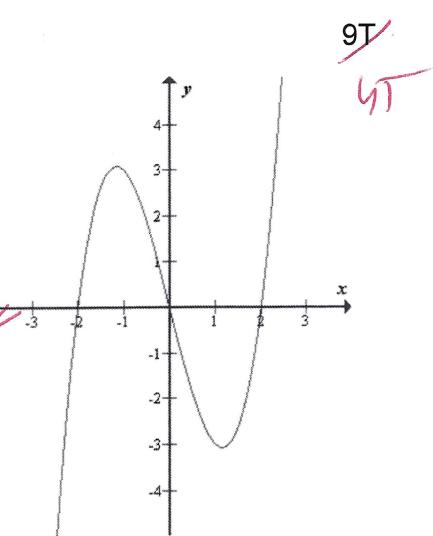
Interval, kjer je funkcija pozitivna: $x \in [-1, 0] \cup [2, \infty) \quad //$

Interval, kjer funkcija narašča: $x \in (-\infty, -1] \cup [1, \infty) \quad //$

Sodost/lihost: liha / lihost \checkmark

Injektivnost/bijektivnost/surjektivnost: nije inječna $\cancel{\checkmark}$

Omejenost: ne omejuje \checkmark



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