3.7. Ispitivanje toka funkcije 3

20. 11. 2020.

Fotografija: Paul Einerhand

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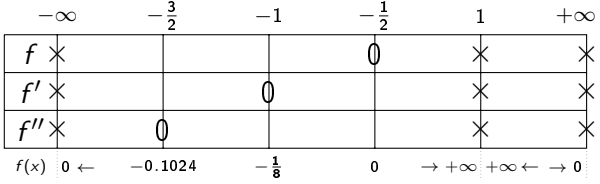
7. 

Zadatak 34

Ispitajte tok i skicirajte graf funkcije $f(x) := \dfrac{4x+2}{(x-1)^4} = \dfrac{4}{(x-1)^3} + \dfrac{6}{(x-1)^4}$.

Rješenje.

1. $D = \mathcal{D}_f = \mathbb{R} \setminus \{1\} \quad \rightsquigarrow$ R. d.: $\pm\infty$, 1.
2. f nije ni parna ni neparna ni periodična.
3. Nultočke: $-\frac{1}{2}$.
4. $f'(x) = -\frac{12}{(x-1)^4} - \frac{24}{(x-1)^5} = -12 \cdot \frac{x+1}{(x-1)^5}$
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5. $f''(x) = \frac{48}{(x-1)^5} + \frac{120}{(x-1)^6} = 24 \cdot \frac{2x+3}{(x-1)^6}$
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	$-\infty$		$-\frac{3}{2}$		-1		$-\frac{1}{2}$		1		$+\infty$
f	$\times$	$-$		$-$		$-$	0	$+$	$\times$	$+$	$\times$
f'	$\times$				0				$\times$		$\times$
f''	$\times$		0						$\times$		$\times$
$f(x)$	$0 \leftarrow$		-0.1024		$-\frac{1}{8}$		0		$\to +\infty$	$+\infty \leftarrow$	$\to 0$

Zadatak 34

Ispitajte tok i skicirajte graf funkcije $f(x) := \dfrac{4x+2}{(x-1)^4} = \dfrac{4}{(x-1)^3} + \dfrac{6}{(x-1)^4}$.

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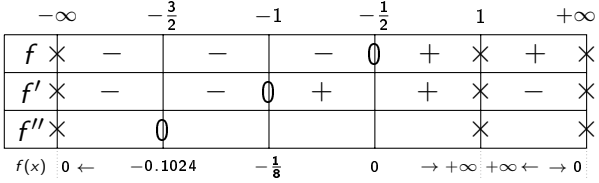
7. 

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	$-\infty$		$-\frac{3}{2}$		-1		$-\frac{1}{2}$		1		$+\infty$
f	$\times$	$\searrow$	$-$	$\searrow$	$-$	$\nearrow$	$-$	0	$\nearrow$	$+$	$\times$	$\searrow$	$+$	$\times$
f'	$\times$	$-$		$-$	0	$+$		$+$	$\times$	$-$		$-$	$\times$	
f''	$\times$		0						$\times$				$\times$	
$f(x)$	$0 \leftarrow$		-0.1024		$-\frac{1}{8}$		0		$\to +\infty$		$+\infty \leftarrow$		$\to 0$	

Zadatak 34

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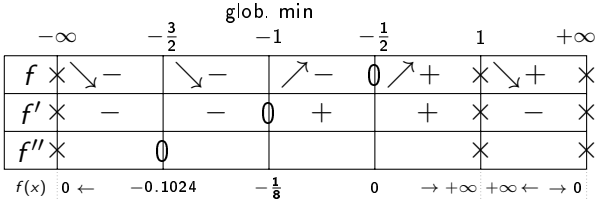

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7. glob. min

	$-\infty$		$-\frac{3}{2}$		-1		$-\frac{1}{2}$		1		$+\infty$
f	$\times$	$\searrow$	$-$	$\searrow$	$-$	$\nearrow$	$-$	0	$+$	$\searrow$	$+$	$\times$
f'	$\times$	$-$		$-$	0	$+$		$+$	$\times$	$-$		$\times$
f''	$\times$	$-$	0	$+$		$+$		$+$	$\times$	$+$		$\times$
$f(x)$	$0 \leftarrow$		-0.1024		$-\frac{1}{8}$		0		$\to +\infty$	$+\infty \leftarrow$	$\to 0$	

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	$-\infty$		$-\frac{3}{2}$		-1		$-\frac{1}{2}$		1		$+\infty$
f	$\times$	$\searrow$	$-$ $\cap$	$\searrow$	$-$ $\cup$	$\nearrow$	$-$ $\cup$ 0	$\nearrow$	$+$ $\cup$	$\searrow$	$+$ $\cup$
f'	$\times$	$-$		$-$	0	$+$		$+$	$\times$	$-$	$\times$
f''	$\times$	$-$	0	$+$		$+$		$+$	$\times$	$+$	$\times$
$f(x)$	$0 \leftarrow$		-0.1024		$-\frac{1}{8}$		0		$\to +\infty$	$+\infty \leftarrow$	$\to 0$

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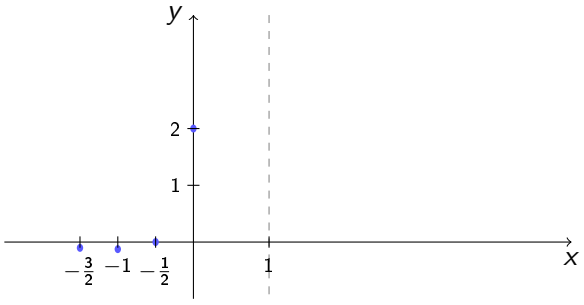
f	$\times$	$\searrow$	$-$ $\cap$	$\searrow$	$-$ $\cup$	$\nearrow$	$-$ $\cup$ 0	$\nearrow$	$+$ $\cup$	$\searrow$	$+$ $\cup$
f'	$\times$	$-$		$-$	0	$+$		$+$	$\times$	$-$	$\times$
f''	$\times$	$-$	0	$+$		$+$		$+$	$\times$	$+$	$\times$
$f(x)$	$0 \leftarrow$		-0.1024				$-\frac{1}{8}$		0		$\to +\infty$ $+\infty \leftarrow$ $\to 0$

8. 

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f'	$\times$	$-$		$-$	0	$+$		$+$	$\times$	$-$	$\times$
f''	$\times$	$-$	0	$+$		$+$		$+$	$\times$	$+$	$\times$
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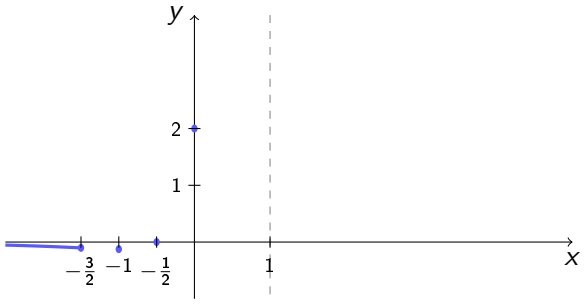
8. 

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f	$\times$	$\searrow$	$-$ $\cap$	$\searrow$	$-$ $\cup$	$\nearrow$	$-$ $\cup$ 0	$\nearrow$	$+$ $\cup$	$\searrow$	$+$ $\cup$
f'	$\times$	$-$		$-$	0	$+$		$+$	$\times$	$-$	$\times$
f''	$\times$	$-$	0	$+$		$+$		$+$	$\times$	$+$	$\times$
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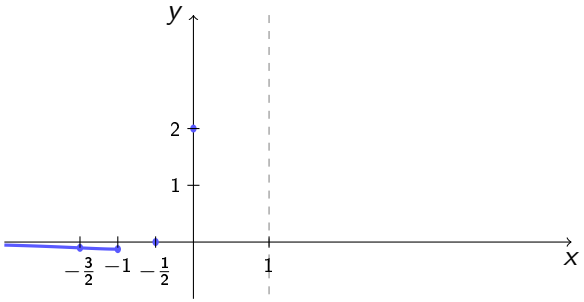
8. 

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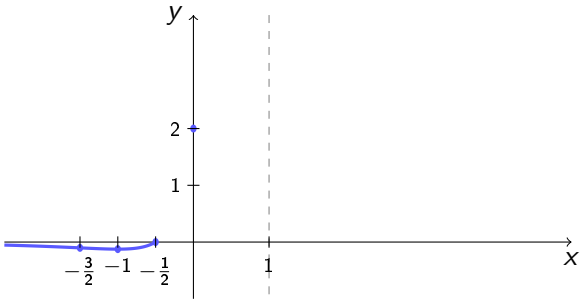
8. 

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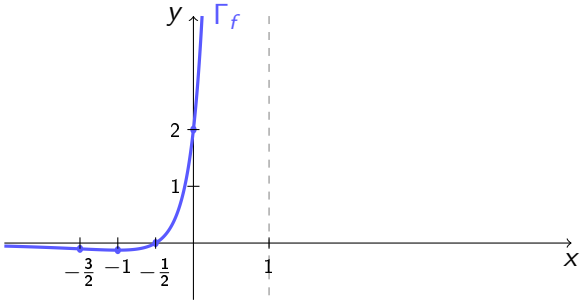
f''	$\times$	$-$	0	$+$		$+$		$+$	$\times$	$+$	$\times$
$f(x)$	$0 \leftarrow$		-0.1024		$-\frac{1}{8}$		0		$\to +\infty$	$+\infty \leftarrow$	$\to 0$

8. 

Zadatak 34

Ispitajte tok i skicirajte graf funkcije $f(x) := \dfrac{4x+2}{(x-1)^4} = \dfrac{4}{(x-1)^3} + \dfrac{6}{(x-1)^4}$.

Rješenje.

1. $D = \mathcal{D}_f = \mathbb{R} \setminus \{1\}$ $\rightsquigarrow$ R. d.: $\pm\infty$, 1.
2. f nije ni parna ni neparna ni periodična.
3. Nultočke: $-\frac{1}{2}$.
4. $f'(x) = -\frac{12}{(x-1)^4} - \frac{24}{(x-1)^5} = -12 \cdot \frac{x+1}{(x-1)^5}$
   $\rightsquigarrow$ Stacionarne točke: -1.
5. $f''(x) = \frac{48}{(x-1)^5} + \frac{120}{(x-1)^6} = 24 \cdot \frac{2x+3}{(x-1)^6}$
   $\rightsquigarrow$ $f''(x) = 0 \Leftrightarrow x = -\frac{3}{2}$.
6. $x \to \pm\infty \Rightarrow \frac{4x+2}{(x-1)^4} \cdot \frac{\frac{1}{x^4}}{\frac{1}{x^4}} = \frac{\frac{4}{x^3}+\frac{2}{x^4}}{\left(1-\frac{1}{x}\right)^4} \to 0$
   $\rightsquigarrow$ H. a.: $y = 0$.
   $x \to 1\pm \Rightarrow \frac{4x+2}{(x-1)^4} \to \left(\frac{6}{0+}\right) = +\infty$
   $\rightsquigarrow$ V. a.: $x = 1$.
7. glob. min

	$-\infty$		$-\frac{3}{2}$		-1		$-\frac{1}{2}$		1		$+\infty$
f	$\times$	$\searrow$	$-$ $\cap$	$\searrow$	$-$ $\cup$	$\nearrow$	$-$ $\cup$	$\nearrow$	$+$ $\cup$	$\searrow$	$+$ $\cup$
f'	$\times$	$-$		$-$	0	$+$		$+$	$\times$	$-$	$\times$
f''	$\times$	$-$	0	$+$		$+$		$+$	$\times$	$+$	$\times$
$f(x)$	$0 \leftarrow$		-0.1024		$-\frac{1}{8}$		0		$\to +\infty$	$+\infty \leftarrow$	$\to 0$

8.