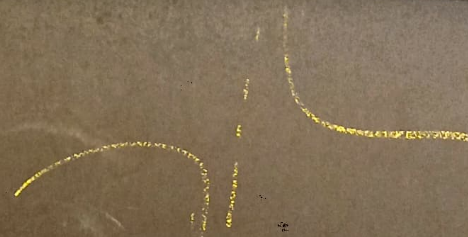
$$f: y = \frac{x^2}{x-1}$$

1. určit, kde je rostoucí / klesající / extrémy
2. určit konvexitu/konkavitu inflexní body
3. graf

x^2

$$f:\ y=\frac{x^2}{x-1}$$



1. $$D(f)=\boxed{(-\infty;1)\cup(1;+\infty)}$$

$$y'=\frac{(x^2)'\cdot(x-1)-x^2(x-1)'}{(x-1)^2}=$$

$$=\frac{2x\cdot(x-1)-x^2\cdot 1}{(x-1)^2}=\frac{2x^2-2x-x^2}{(x-1)^2}=$$

$$=\frac{x^2-2x}{(x-1)^2}=\boxed{\frac{x(x-2)}{(x-1)^2}}\overset{f'}{=}0 \quad \boxed{\begin{matrix}x=0\\ x=2\end{matrix}}$$

x		0		1		2	
		max				min	
f'	$+$		$-$		$-$		$+$
f	$\nearrow$		$\searrow$		$\searrow$		$\nearrow$

$$f'(x) = \frac{x^2-2x}{(x-1)^2}$$

$$f''(x) = \frac{(x^2-2x)' \cdot (x-1)^2 - (x^2-2x)((x-1)^2)'}{((x-1)^2)^2}$$

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

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

$$= \frac{2\cancel{(x-1)}\left((x-1)^2 - x(x-2)\right)}{(x-1)^{\cancel{4}\,3}} =$$

$$= \frac{2(\cancel{x^2} - \cancel{2x} + 1 - \cancel{x^2} + \cancel{2x})}{(x-1)^3} = \boxed{\frac{2}{(x-1)^3}}$$

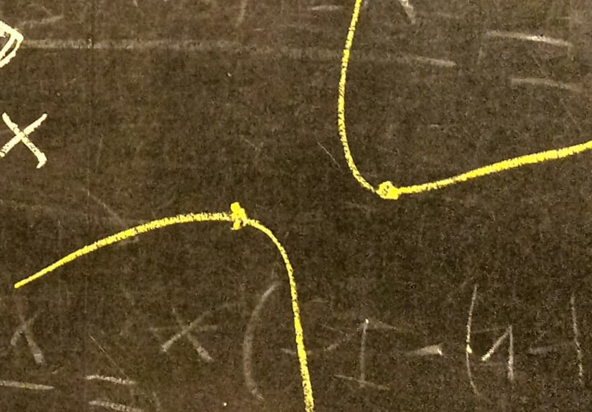
$$f'' = 0$$

$$\frac{2}{(x-1)^3} = 0$$

nemá řešení

f'': $-$ | 1 | $+$ → x

f: $\cap$ | $\cup$



$$= \frac{-x-(1-\ln x)\,2x}{x^4}$$

$$= \frac{-1-(1-\ln x)\,2}{x^3} = \frac{-1-2+2\ln x}{}$$