6b) $f(x) = \frac{1}{6}(x+1)^2(x-2)$

- $\mathbb{D} = \mathbb{R} \setminus \{-1; 2\}$
- Symmetrie:

$f(-x) = \frac{1}{6}(-x+1)^2(-x-2) \neq f(x)$

$-f(x) = -\left(\frac{1}{6}(x+1)^2(x-2)\right) = +\frac{1}{6}(+x+1)^2(-x+2) \neq f(-x)$

- Nullstellen: $0 = \frac{1}{6}(x+1)^2(x-2)$

$\Rightarrow x_1 = -1 \qquad x_2 = 2$

SP mit y-Achse: $f(0) = -\frac{1}{3}$

- Verhalten im Unendlichen:

$\lim_{x \to \infty} f(x) = \infty \qquad \lim_{x \to -\infty} f(x) = -\infty$

- Ableitung:

$f'(x) = \frac{1}{6}(x^2+2x-1)\cdot(x-2) = \left(\frac{1}{6}x^2 + \frac{1}{3}x + \frac{1}{6}\right)\cdot(x-2)$

$f'(x) = \left(\frac{1}{3}x + \frac{1}{3}\right)\cdot(x-2) + \left(\frac{1}{6}x^2 + \frac{1}{3}x + \frac{1}{6}\right)\cdot 1 =$

$= \frac{1}{3}x^2 - \frac{2}{3}x + \frac{1}{3}x - \frac{2}{3} + \frac{1}{6}x^2 + \frac{1}{3}x + \frac{1}{6} = \frac{1}{2}x^2 - \frac{1}{2}$

NS von f': $x_1 = -1 \qquad x_2 = 1$

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x	$x<-1$	$x=-1$	$-1<x<1$	$x=1$	$x>1$
$f'(x)$	+	0	−	0	+
$f(x)$	↗ SMS	Max $(-1\,\vert\,0)$	↘ SMF	Min $(1\,\vert\,-\frac{2}{3})$	↗ SMS