# STUDIARE LA DERIVABILITÀ

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**FLESSO A TANGENTE VERTICALE** $\Rightarrow \begin{cases} f'_-(c) = f'_+(c) = +\infty \\ f'_-(c) = f'_+(c) = -\infty \end{cases}$

**CUSPIDE** $\Rightarrow$ $f'_-(c) = -\infty \quad f'_+(c) = +\infty$

$f'_-(c) = +\infty \quad f'_+(c) = -\infty$

**PUNTO ANGOLOSO** $\Rightarrow$ $f'_-(c) \neq f'_+(c)$

- entrambe finite
- una finita l'altra infinita.

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1) $y = -\sqrt[3]{x^2}$ D: $\mathbb{R}$

Calcoliamo $f'(x) \Rightarrow$ $f(x) = -x^{\frac{2}{3}}$ $f'(x) = -\frac{2}{3}x^{\frac{2}{3}-1} = -\frac{2}{3}x^{-\frac{1}{3}} = \frac{-2}{3\sqrt[3]{x}}$

$x \neq 0$ $\lim_{x\to 0^+} \frac{-2}{3\sqrt[3]{x}} = -\infty$ $\lim_{x\to 0^-} \frac{-2}{3\sqrt[3]{x}} = +\infty$

$f'_+(c) = -\infty$ $f'_-(c) = +\infty$ $X = 0$ CUSPIDE

2) $y = \sqrt[3]{x^2-1}$ D: $\mathbb{R}$ $f'(x) = \frac{1}{3}(x^2-1)^{\frac{1}{3}-1} \cdot (2x) = \frac{2}{3}x(x^2-1)^{-\frac{2}{3}}$

$= \frac{2}{3}x \cdot \frac{1}{\sqrt[3]{(x^2-1)^2}} = \frac{2x}{3\sqrt[3]{(x^2-1)^2}}$ $x \neq \pm 1$

$f'_-(1) = \lim_{x\to 1^-} \frac{2x}{3\sqrt[3]{(x^2-1)^2}} = \frac{2}{0^+} = +\infty$ $f'_+(1) = \lim_{x\to 1^+} f'(x) = \frac{2}{0^+} = +\infty$

$X = 1$ FLESSO A TG. VERTICALE

$f'_-(-1) = \lim_{x\to -1^-} \frac{2x}{3\sqrt[3]{(x^2-1)^2}} = \frac{-2}{0^+} = -\infty$

$X = -1$ FLESSO TG VERTICALE

$f'_+(-1) = \lim_{x\to -1^+} f'(x) = \frac{-2}{0^+} = -\infty$