

Where is the mistake?

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In high school you learned the real function $f(x) = x^{1/3}$ which is defined for all real x .

From this course we know that $z^{1/3}$ has analytic branches in the upper half-plane. One of these branches should match this high school real function. Then by the Schwarz symmetry principle this branch must extend to a function analytic in the whole plane. But this is absurd since $f'(0)$ does not exist.