Activity Score - 1/2

Continuous but not Smooth

Find values of the constants a and b for which the following function is continuous but *not* differentiable.

$$f(x) = \begin{cases} ax + b, & x > 0; \\ \sin 2x, & x \leq 0. \end{cases}$$

In other words, the graph of the function should have a sharp corner at the pont $(0, f(0))$.

for a function to be continous, it should be unbroken. which means that if we have a piecewise function, the next function shand start where the other ends.

$\lim_{x \to 0} ax+b = \lim_{x \to 0} \sin 2x$

$a(0)+b = \sin 2(0)$

$b = 0$

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for a function to be not differentiable, the left and right $f'(x)$ shanld not be equal

$\lim_{x \to 0^-} \sin 2 \neq \lim_{x \to 0^+} a$

$\times \sin 2 \neq a$ and

$b = 0$ /

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$$\lim_{\Delta x \to 0} = \frac{\Delta f}{\Delta x} = \frac{\sin 2(x + \Delta x) - \sin 2(x)}{\Delta x}$$

$$= \frac{\sin 2x + \sin 2\Delta x - \sin 2x}{\Delta x}$$

$$= \sin 2$$

$$= \sin 2$$