

Math 2315 - Calculus 2

Quiz #6 - 2017.01.25

Solutions

Compute the following limit: $\lim_{x \rightarrow 0} \frac{\tan^{-1}(3x)}{\sin(2x)}$

If we plug in $x = 0$, we are of the form $\frac{0}{0}$ which means we can apply l'Hôpital's rule:

$$\begin{aligned}\lim_{x \rightarrow 0} \frac{\tan^{-1}(3x)}{\sin(2x)} &= \lim_{x \rightarrow 0} \frac{\frac{d}{dx} \tan^{-1}(3x)}{\frac{d}{dx} \sin(2x)} \\ &= \lim_{x \rightarrow 0} \frac{\frac{3}{1+9x^2}}{2 \cos(2x)} \\ &= \frac{3}{2}\end{aligned}$$