

Quiz 6

1. (8 points). Find a, b, c so that the following function f is differentiable everywhere and so that the derivative f' is differentiable everywhere. Recall that the derivative of e^x is e^x .

$$f(x) = \begin{cases} e^x & \text{if } x < 0 \\ ax^2 + bx + c & \text{if } 0 \leq x \end{cases}$$

2. (8 points). Compute the derivative of $f(x) = \frac{1}{1+x^2}$, and find an equation of the tangent line through the point $(-1, \frac{1}{2})$.

Extra credit. (2 points). Let θ be the measure of an angle centered in a unit circle. The angle subtends an arc and a chord, measured by a and c , respectively. Find $\lim_{\theta \rightarrow 0^+} \frac{a}{c}$.