Problem 1 (5 points)

Prove using the $\epsilon$ and $\delta$ definition that

$$
\lim_{x \to 1} \frac{2 + 4x}{3} = 2.
$$

Problem 2 (5 points)

Find the value of the parameter $a$ for which the following function is continuous everywhere;

$$
f(x) = \begin{cases} 
x + a, & \text{if } x \leq 0, \\
e^x, & \text{if } x > 0.
\end{cases}
$$

Problem 3 (5 points)

Consider the function $f(x) = \frac{1}{x}$.

a How many asymptotes does the function have?

b Find the expression of its derivative using limits.

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1The quiz lasts 20 minutes.