

You have 20 minutes to take this quiz. Each problem will be graded for clarity of work as well as correctness, so show all work **clearly and in order**. Circle or otherwise indicate your final answers. Please note that there are problems on both the front and the back of this page.

NO CALCULATORS ON THIS QUIZ.

This entire quiz is about the function $f(x) = \frac{1}{1 + e^{-x}}$.

1. (3 points) Find the domain of $f(x)$. Be sure to explain your answer.
2. (3 points) Find $\lim_{x \rightarrow \infty} f(x)$. What does this mean about the graph of $f(x)$?
3. (3 points) Find $\lim_{x \rightarrow -\infty} f(x)$. What does this mean about the graph of $f(x)$?

Turn over for more...

4. (*4 points*) Find and simplify $f'(x)$. Then determine all the values of x for which $f(x)$ is zero or does not exist.

5. (*4 points*) Find and simplify $f''(x)$. Then determine all the values of x for which $f'(x)$ is zero or does not exist.

6. (*3 points*) Use your answers to all the questions above to sketch a graph of $f(x)$. Label any important points or features on your graph.