Problem statement Consider the function $f(x) = e^x \sin Nx$ <u>on the interval</u> $[0, 1]$ where N is a positive integer.

a) With a sketch or otherwise, describe the graph of this function when $N = 5$, $N = 10$, and $N = 100$.

b) Compute $\int_0^1 f(x)\, dx$. Evaluate this integral when $N = 5$, $N = 10$, and $N = 100$.

c) What happens to the graph and to the value of the integral as $N \to \infty$? Does the graph confirm the limiting behavior of the integral's value?