9. (5 points) Write the **limit definition** for the derivative of $e^{\sin(x)}$ with respect to x. (No need to simplify or to attempt to find the limit.)

10. (9 points) Suppose

$$f(x) = \begin{cases} e^{\sin(x)} & x < \frac{\pi}{2} \\ kx & x \geq \frac{\pi}{2} \end{cases}$$

where k is some constant.

(a) If f is continuous, what is the value of k?

(b) Compute the average rate of change of f between $x = 1.5$ and $x = \frac{\pi}{2}$.

(c) Compute the average rate of change of f between $x = 1.57$ and $x = \frac{\pi}{2}$.

(d) Do you think f is differentiable at $x = \frac{\pi}{2}$? Explain your answer. [Your work from parts (a) - (c) may be useful here.]