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.]