1. [9 points] Let $g(x) = x + ke^x$, where k is any constant.

   a. [4 points] Write an explicit expression for the limit definition for the derivative of $g(x)$ at $x = 2$. Your expression should not include the letter 'g'. Do not evaluate your expression.

$$g'(2) = \underline{\hspace{6cm}}$$

   b. [5 points] Find all values of k for which the function $g(x)$ has a critical point. Do not try to use your answer from (a).

2. [5 points] A piece of wire of length L is cut into two pieces. One piece of length x cm is made into a circle and the rest is made into a square. Write an expression for the sum of the areas, A, of the circle and square in terms of the length L and the variable x. Do not optimize A.