7. [10 points] Let \( N(u) = \begin{cases} 
eq 3u^2 + k & \text{if } u < 1 \\ 5e \ln(e + u - 1) & \text{if } u \geq 1 \end{cases} \) where \( k \) is a constant.

   a. [6 points] Use the limit definition of the derivative to write an explicit expression for \( N'(-2) \). Your answer should not involve the letter \( N \). Do not attempt to evaluate or simplify the limit. Please write your final answer in the answer box provided below.

   Answer: \( N'(-2) = \)

   b. [4 points] Find all values of \( k \) so that \( N(u) \) is continuous at \( u = 1 \). Show your work carefully, and leave your answer(s) in exact form.

   Answer: \( k = \)

8. [7 points] Suppose \( w \) and \( q \) are continuous and invertible functions. The table below shows many values of \( w \) and \( q^{-1} \) (the inverse of \( q \)).

   \[
   \begin{array}{|c|c|c|c|c|c|c|c|c|c|}
   \hline
   s & -4.7 & -3.3 & -1.8 & 0.7 & 1.1 & 1.6 & 2.1 & 2.5 & 4.1 & 5.2 \\
   \hline
   w(s) & 4.1 & 2.5 & 1.4 & 0 & -0.5 & -1.8 & -2 & -3.1 & -3.9 & -4.7 \\
   \hline
   q^{-1}(s) & -3.7 & 0.1 & 0.7 & 2.5 & 4.1 & 5.1 & 5.2 & 7.3 & 9.5 & 11.3 \\
   \hline
   \end{array}
   \]

   a. [2 points] Find \( q^{-1}(w(-4.7)) \).

   Answer: \[
   \]

   b. [2 points] Find \( w(q(0.7)) \).

   Answer: \[
   \]

   c. [3 points] Find the average rate of change of \( q(x) \) between \( x = 0.7 \) and \( x = 5.2 \). Be sure to show your work.

   Answer: \[
   \]