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

s	-4.7	-3.3	-1.8	0.7	1.1	1.6	2.1	2.5	4.1	5.2
$w(s)$	4.1	2.5	1.4	0	-0.5	-1.8	-2	-3.1	-3.9	-4.7
$q^{-1}(s)$	-3.7	0.1	0.7	2.5	4.1	5.1	5.2	7.3	9.5	11.3

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: _____