3. [4 points] Find positive constants $a$, $b$, and $c$ such that the function

$$f(x) = \begin{cases} 
\ln(ce - x) & x \leq 0 \\
ax^3 + \pi & x > 0 \\
\frac{x^b + 1}{x^b + 1} & x > 0
\end{cases}$$

is continuous and satisfies $\lim_{x \to \infty} f(x) = 4$. Show your work, and write your answers in exact form.

Answers: $a = \underline{}$ $b = \underline{}$ $c = \underline{}$

4. [5 points] Let

$$Q(w) = w^w + \cos(6w - 1).$$

Use the limit definition of the derivative to write an explicit expression for $Q'(3)$. Your answer should not involve the letter $Q$. Do not attempt to evaluate or simplify the limit. Write your final answer in the answer box provided below.

Answer: $Q'(3) =$