Continuity Quiz

1. Prove that the absolute value function $|x|$ is continuous for all values of x. (Hint: Using the definition of the absolute value function, compute $\lim_{x\to 0^-} |x|$ and $\lim_{x\to 0^+} |x|$).

2. Let

$$g(x) = \begin{cases} x^2 + x & \text{if } x < 1 \\ a & \text{if } x = 1 \\ -3x + 5 & \text{if } x > 1. \end{cases}$$

   a. Determine the value of a for which g is continuous from the left at 1.

   b. Determine the value of a for which g is continuous from the right at 1.

   c. Is there a value of a for which g is continuous at 1? Explain.