Extra Continuity

Directions: Find all values of a and b such that the following functions are continuous for all real numbers.

1. $f(x) = \begin{cases} 3x - 5 & if\ x \leq 1 \\ ax^2 + bx + 1 & if\ 1 < x < 2 \\ 2x & if\ x \geq 2 \end{cases}$

2. $f(x) = \begin{cases} ax^2 + bx + 1 & if\ x \leq 1 \\ 2x + a + 2b & if\ 1 < x < 2 \\ 3x - 3 & if\ x \geq 2 \end{cases}$

3. $f(x) = \begin{cases} 2x + 1 & if\ x \leq -1 \\ ax^2 + bx & if\ -1 < x < 1 \\ \ln(x) & if\ x \geq 1 \end{cases}$

4. $f(x) = \begin{cases} x^2 + bx + 4 & if\ x \leq 0 \\ ax + 2b + 2 & if\ 0 < x < 3 \\ bx - 2a + 5 & if\ x \geq 3 \end{cases}$

5. $f(x) = \begin{cases} 2ax^2 + x & if\ x \leq 1 \\ 3x + a + 2b & if\ 1 < x < 2 \\ 4x - a - b & if\ x \geq 2 \end{cases}$