Instructions. Put your first and last name at the top of your paper. Everyone is to do their own worksheet but only one from each group is graded with the score shared. Be sure to show your work and explain your reasoning. All worksheets from each group will be collected.

1. Compute the limit, if it exists.
   
   (a) \( \lim_{x\to4} \frac{x^2 - 4x}{x^2 - 3x - 4} \)

   (b) \( \lim_{x\to1} \left( \frac{2}{x - 1} - \frac{2}{x^2 - x} \right) \)

   (c) \( \lim_{h\to0} \frac{1}{h} \left( \frac{1}{(x + h)^2} - \frac{1}{x^2} \right) \) [Hint: try factoring using the difference of two squares]
2. Fill in the blanks: \textit{The Intermediate Value Theorem says that} \\
\textbf{IF} \\
\textbf{THEN} \\

3. Find the values of \(a\) and \(b\) that make \(f\) continuous everywhere \\
\[
    f(x) = \begin{cases} 
      \frac{x^2-4}{x-2} & \text{if } x < 2 \\
      ax^2 - bx + 3 & \text{if } 2 \leq x < 3 \\
      2x - a + b & \text{if } x \geq 3 
    \end{cases}
\]

4. Show that there is a number between \(\frac{1}{4}\) and 1 such that the square of \(\log_2\) of the number is equal to the number: that is, show there exists an \(x\) such that \\
\([\log_2(x)]^2 = x\) in the interval \(\left[\frac{1}{4}, 1\right]\)