1. Evaluate the following limit, if it exists: \( \lim_{h \to 0} \frac{1}{(x+h)^2} - \frac{1}{x^2} \), for \( x \neq 0 \).

2. Prove that \( \lim_{x \to 0} x^4 \cos \left( \frac{2}{x} \right) = 0 \).

3. Use the \( \epsilon - \delta \) definition of the limit to prove that \( \lim_{x \to -2} \left( \frac{x}{4} + 3 \right) = \frac{5}{2} \).

4. Use the \( \epsilon - \delta \) definition of the limit to prove that \( \lim_{x \to 2} (x^2 - 4x + 5) = 1 \).

5. Find the numbers at which

\[
 f(x) = \begin{cases} 
 1 + x^2 & \text{if } x \leq 0 \\
 2 - x & \text{if } 0 < x \leq 2 \\
 x - 2 & \text{if } 2 < x 
\end{cases}
\]

is discontinuous. Determine, at these points, whether \( f(x) \) is continuous from the left, from the right, or neither.