1. Discuss the continuity of the function \( R(t) = t^2 e^{1/t} \). In particular, if there is a discontinuity, determine if it is removable or essential and show algebraic work.

2. Determine if the following function is continuous at \( x = 1 \). If so, determine if it is differentiable at \( x = 1 \).

\[
f(x) = \begin{cases} 
\ln(x) & x > 1 \\
(1.7)^x - 1.7 & x \leq 1 
\end{cases}
\]

3. Determine the values of \( A \) and \( B \) so that the function \( g(r) \) is continuous.

\[
g(r) = \begin{cases} 
\frac{r \log(r^2)}{r+1} & r \neq 0, -1 \\
A & r = 0 \\
B & r = -1 
\end{cases}
\]

4. The analysis of blood flow through the heart leads to a function of the form

\[
f(r) = -2|r| + \sqrt{1 - 4r^2 + 4|r|}.
\]

A. Investigate the differentiability of \( f(r) \) at \( r = 0 \) graphically.

B. Rewrite \( f(r) \) without absolute values.

C. Use your equation in part B to find the slope of \( f(r) \) for \( r > 0 \) and for \( r < 0 \).

D. What do your answers to part C tell you about the differentiability of \( f(r) \) at \( r = 0 \)?