1. (6) Let \( g(x) = x^2 + 1 \) on the interval \([0, 2]\).
   
   (a) Sketch the graph of \( g(x) \) and shade the region bounded by the graph of \( g \), the \( x \)-axis, and the vertical lines \( x = 0 \) and \( x = 2 \).
   
   (b) Compute \( R_4 \) for \( g(x) \) on \([0, 2]\). Use right endpoints for the calculation. Sketch the graph of \( g \) and the approximating rectangles.
   
   (c) Evaluate the integral using the definition of a definite integral.

2. (4) Let

\[
 f(x) = \begin{cases} 
 \sqrt{16 - x^2} & \text{if } -4 \leq x < 0 \\
 4 & \text{if } 0 \leq x < 1 \\
 6 - 2x & \text{if } 1 \leq x \leq 4 
\end{cases}
\]

Compute \( \int_{-4}^{4} f(x) \, dx \) by first sketching the graph of \( f \) and then interpreting the integral in terms of areas.