1. Let $g(x) = \begin{cases} x & \text{if } x > 1 \\ c & \text{if } x = 1 \\ 1 & \text{if } x < 1 \end{cases}$.

   (a) Compute the third right-endpoint approximation R_3 for the area under $g(x)$ between $a = 0$ and $b = 3$. Your answer will depend on c. What is R_3 when $c = 7$? When $c = 8$? How much did your answer change when you changed c?

   (b) Compute R_4. Your answer will not depend on c.

   (c) Compute R_6 for the same area. Your answer will depend on c. What is R_6 when $c = 7$? When $c = 8$? How much did your answer change?

   (d) Set up, but don't compute, and expression for R_{300} of the same area. What is the difference between R_{300} when $c = 7$ and R_{300} when $c = 8$?

   (e) Suppose $c = 1$. Now $g(x)$ is continuous on $[0, 3]$. What is $\int_0^3 g(x)\,dx$?

   (f) Even if $c \neq 1$, we still say $\int_0^3 g(x)\,dx$ equals the value you computed in part (e). That is, the value of $g(x)$ at a single point doesn't matter when computing a definite integral. Explain why this makes sense with Riemann approximations. [Hint: How many terms of R_N does c affect? What happens to these terms as $N \to \infty$?]