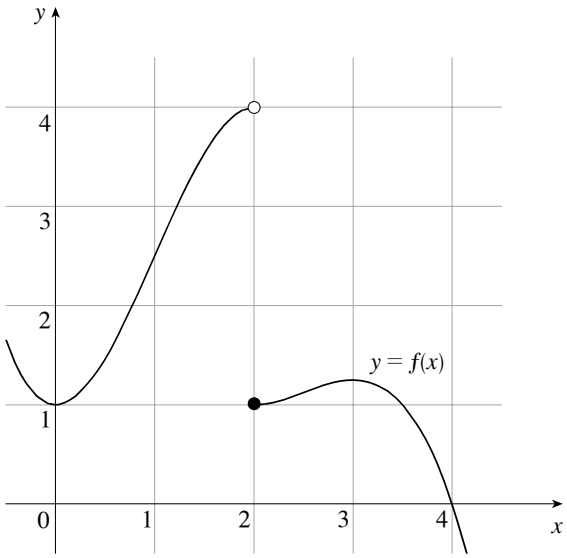
GROUP WORK 3, SECTION 4.1

Two Easy Pieces

Let $f(x)$ be the piecewise-continuous function graphed below.



1. Compute L_2 and R_2, the left-endpoint and right-endpoint Riemann sum approximations for $\int_0^4 f(x)\,dx$ with two subintervals. How do you think these values compare to the actual value of the integral?

2. Now compute L_4 and R_4. Which appears to be the best approximation to the actual value of the integral?

3. Now compute L_5 and L_6. Which do you think is closer to the actual value?

4. The values of L_9, L_{10}, and L_{11} are given in the following table, along with the actual value of the integral.

L_9	7.173
L_{10}	6.560
L_{11}	7.149
$\int_0^4 f(x)\,dx$	7

Can you explain why L_{10} is a poorer approximation than L_9 and L_{11}?

5. Do you think a similar pattern holds for L_{14}, L_{15}, and L_{16}? Does this pattern also hold for higher values of n?

6 What do you think will happen to this discrepancy as $n \to \infty$?