

## 7.4

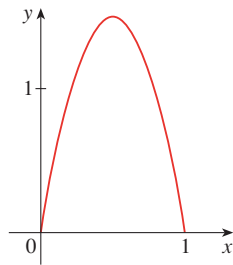
### DISCOVERY PROJECT: ARC LENGTH CONTEST

This project can be completed anytime after you have studied Section 7.4 in the textbook.

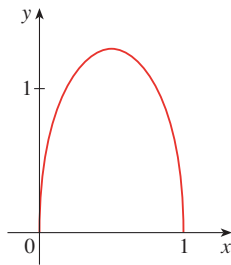
The curves shown are all examples of graphs of continuous functions  $f$  that have the following properties.

1.  $f(0) = 0$  and  $f(1) = 0$
2.  $f(x) \geq 0$  for  $0 \leq x \leq 1$
3. The area under the graph of  $f$  from 0 to 1 is equal to 1.

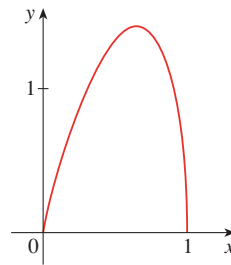
The lengths  $L$  of these curves, however, are different.



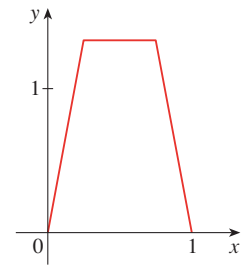
$L \approx 3.249$



$L \approx 2.919$



$L \approx 3.152$



$L \approx 3.213$

Try to discover formulas for two functions that satisfy the given conditions 1, 2, and 3. (Your graphs might be similar to the ones shown or could look quite different.) Then calculate the arc length of each graph. The winning entry will be the one with the smallest arc length.