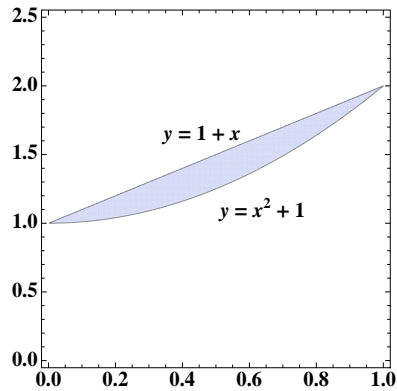


10. [7 points] A metal thin plate has density  $\delta(x) = 1 + x$  kg per square meter. The shape of the plate is bounded by the curves  $y = 1 + x$  and  $y = 1 + x^2$  for  $0 \leq x \leq 1$  as shown below.



- a. [3 points] Find the exact value of the mass of the plate. Show all your work.
- b. [4 points] Let  $(\bar{x}, \bar{y})$  be its center of mass. Write a formula for  $\bar{x}$  and evaluate your formula to find the exact value of  $\bar{x}$ . Show all your work.