Exercise 41

The total cost of repaying a student loan at an interest rate of $r\%$ per year is $C = f(r)$.

   (a) What is the meaning of the derivative $f'(r)$? What are its units?

   (b) What does the statement $f'(10) = 1200$ mean?

   (c) Is $f'(r)$ always positive or does it change sign?

Solution

   (a) $f'(r)$ is the rate that the cost changes as the interest rate increases. Its units are dollars/(percentage point/year).

   (b) $f'(10) = 1200$ means that when the interest rate is 10%, the cost is increasing by $1200/(percentage point/year).

   (c) $f'(r)$ is always positive because the higher the interest rate gets, the higher the cost of repaying the loan.