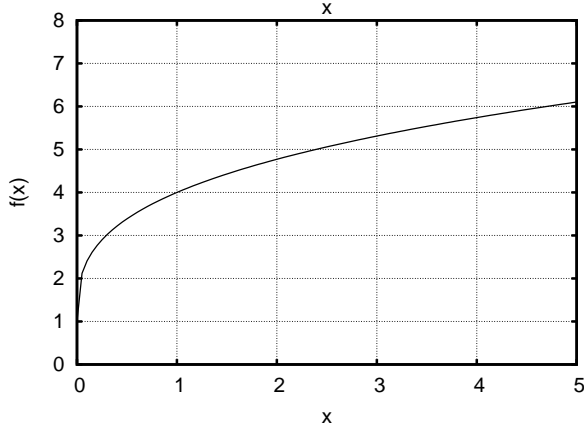
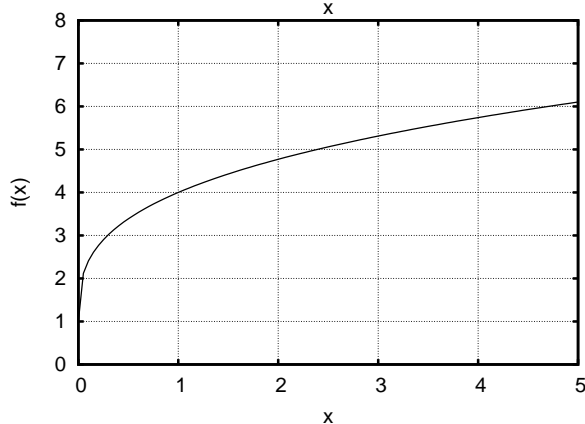
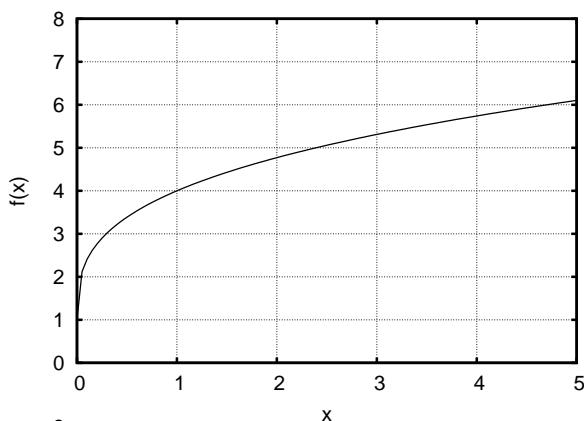
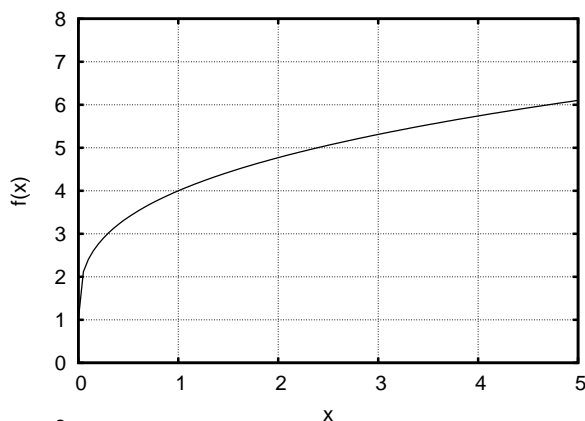


Chapter 5.1: More Distance Estimation

Calculus II

College of the Atlantic. Fall 2014

1. An object moves at a speed given by the function shown in the figure.
 - (a) How far does the object move from $t = 1$ to $t = 4$? Use a left-hand sum with $\Delta t = 1$. Illustrate this left-hand sum as a bunch of rectangles on the figure.
 - (b) How far does the object move from $t = 1$ to $t = 4$? Use a right-hand sum with $\Delta t = 1$. Illustrate this right-hand sum as a bunch of rectangles on the figure.
 - (c) What Δt would you need so that the difference between the left- and right-hand sums is less than 0.25?



2. A cat is running. The speed of the cat as a function of time t is given by the function $v(x) = 3t^2$, where v has units of meters per second.
 - (a) How far does the cat run from $t = 2$ seconds to $t = 5$ seconds? Come up with estimates by evaluating left- and right-hand sums with $\Delta t = 1$ second.
 - (b) What Δt is needed so that your estimate of the distance the cat travels is accurate to within 0.1 meter?

TAB Disaster

Soy milk is leaking from an underground storage tank. The rate of leakage is shown on the graph below.

1. Come up with upper and lower estimates for the total amount of soy milk that has been released into the environment. Use a Δt of 1 day.
2. What Δt would you need so that the error in your estimate was no more than 1 gallon?

