

# Chapter 5.1: Measuring Distance and Soy Milk

## Calculus II

College of the Atlantic

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1. A very fast cat is running at a speed, meters per second, given by the function  $v(t) = 20 - 2t$ . We are interested in how far the cat travels from  $t = 0$  to  $t = 6$  seconds.
  - (a) Estimate the distance traveled using a left-hand sum with  $\Delta t = 2$ .
  - (b) Estimate the distance traveled using a right-hand sum with  $\Delta t = 2$ .
  - (c) Estimate the distance traveled using a left-hand sum with  $\Delta t = 1$ .
  - (d) Estimate the distance traveled using a right-hand sum with  $\Delta t = 1$ .
  - (e) Suppose you needed an estimate for the cat distance that was accurate to 0.5 meters. What  $\Delta t$  should you choose?
2. Soy milk is leaking from a storage tank in COA's dining hall. The rate of leakage is shown on the graph.
  - (a) Come up with upper and lower estimates for the total amount of soy milk that has been released into the environment. Use  $\Delta t = 2$ .
  - (b) Represent these upper and lower estimates on the graph.
  - (c) Show how you would represent upper and lower estimates using  $\Delta t = 1$ . Do not calculate numerical values for the estimates.
  - (d) Suppose you needed to know how much soy milk was released into the environment to within 4 gallons. What  $\Delta t$  would you choose?



