# Chapter 8
# The Integral as Net Change

1. How do we calculate areas that appear to be irregular? (First paragraph)

2. What ideas make it easier to calculate irregular quantities? (Second paragraph)

3. How long have the following methods been around to help compute irregular quantities?
   a. finite sums (modeling step)
   b. integrals
   c. technology

4. a. If you integrate an acceleration function, what do you get?
   b. What are the units on an acceleration function?
   c. What are the units on a velocity function?

5. a. If you integrate a velocity function, what do you get?
   b. What are the units on a position function?

6. What type of solution would you get if you integrated a velocity function?
   What if you integrated it with an initial condition?

7. If you integrate a function that represents a rate of change over time, what do you get? Explain.
   (i.e. if you integrate ft/sec you get _____, if you integrate $/mile you get _____)

8. Do Examples 1, 2, and Exploration 1. There are different ways to find the final position.
   What are they? Describe them.

9. What is the difference between displacement and position? How do you get position from displacement? What do you need?

10. In your own words, what is a general strategy for modeling and calculating net change?

11. Read Example 4 down to question a) and b) without looking further on the page.
    a. What type of function are you dealing with?
    b. What is a) asking for?
    c. How do you get the answer to a) according to your general method?
    d. What is b) asking for? Describe how you would solve b), then look in the book.

12. If you integrate a rate of consumption over time, what should you get?
    Read Example 5.

13. If you integrate a function in gallons per minute over a time in minutes, what unit would the answer have? Read Example 6.

14. Given work problems you will use the formula $W = Fd$. What do F and d represent?
    There is also Hooke's Law: $F = kx$. Describe it. What are the units on k?
    What are the units on x? So, what are the units on F?
    When you integrate F over a length (m) what unit should the answer have?

15. The unit you should have written down to the last question is the unit on a quantity in physics.
    What quantity is it?

16. Read Example 7. Can you see how the units work out in the same manner as all the other problems?

17. Why did they title this section "The Integral as Net Change"? Explain.