8.1 notes calculus

## Chapter 8 The Integral as Net Change

- 1. How do we calculate areas that appear to be irregular? (First paragraph) Finite sums (Riemann Sums) LRAM PRAM MRAM
- 2. What ideas make it easier to calculate irregular quantities? (Second paragraph) integrals
- 3. How long have the following methods been around to help compute irregular quantities?
  - a. finite sums (modeling step) Thousands of years
    b. integrals
    c. technology

    tens of years

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?

a) velocity

b) distance

c) distance

time

5. a. If you integrate a velocity function, what do you get?

b. What are the units on a position function? a) distance

6. What type of solution would you get if you integrated a velocity S v(t) dt => general solution for position function?

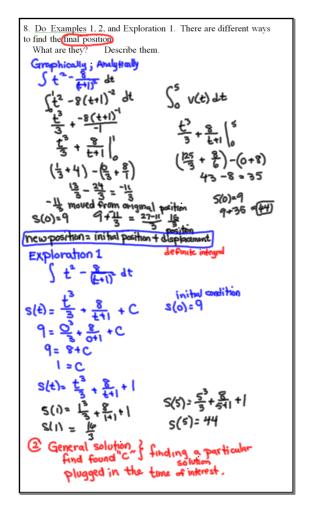
What if you integrated it with an initial condition?

Particular solution (because you found

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 \_\_\_\_\_\_\_

you get ( ) rate of change = get whatever the unit is what is being measured per time



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

new position = initial position + displacement What do you need = initial condition

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

Integrate + C; find "C" plug in point of intenst integrale to find change + in tal condition

- 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? (4)
  - b. What is a) asking for?

  - then look in the book.

12. If you integrate a rate of consumption over time, what should you get? Read Example 5. (c) H 1970 to 1980 function is ((t) = 22+1.12 

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? We work force of distance.

There is also Hooke's Law: F = kx. Describe it. What are the units on k? Metabor nodes.

units on k? Newton-makes Fore-with Wewtons What are the units on x? When you integrate F over a length (m) what unit should the answer have? Newton-meters

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

What quantity is it?

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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.

The integral helps you figure out how much the quantity changed