Calculus

Date:

Items Needed: .Book,.

Objective: The students will learn what a Reimann Sum is and how to use it.

Lesson:

- Up until this point all we were doing is looking at cutting the area under the function into equal parts. But if you look at p. 271and look at figure 4.18 you will see that is not always the case.
- In the last section are summation formulas had limitations (nonnegative). Take a look at the definition of a Reimann sum on p. 272. Note how this definition has no restrictions on the function.
- Put up an example of a function. Then draw different size rectangles pointing out that the c value is any point within the given rectangle that is put into the given function. The summation has to be worked out by hand unless you are going on to the next part.
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Do if time permits

- Put up $\sum_{i=1}^{n} f(c_i)\Delta x_i$ and refer to the rest of the definition on the same page pointing out that you have a partition Δ of [a,b].
- The width of the largest subinterval of a partition Δ is the norm (average) of the partition denoted by $\|\Delta\| = \Delta x = \frac{b-a}{n}$.
- If you solve for n you get $\frac{b-a}{\|\Delta\|} \le n$ as the norm approaches zero the number of subintervals n approaches $n \to \infty$.

- That is how they come up with the definition of a Definite Integral. Put up the second part of the definition. $\lim_{\|\Delta\|\to 0} \sum_{i=1}^{n} f(c_i)\Delta x_i = \int_a^b f(x)dx$.
- It is important to see that definite integrals and indefinite integrals are different identities. A definite integral is a number, whereas an indefinite integral is a family of functions.

- Look at example 2, p 274 to see how you can get a negative answer.

- Definite integrals can be positive, negative, or zero. For a definite integral to be interpreted as an area the function f must be continuous and nonnegative on [a,b].
- State theorem 4.5.

- Look at the graphs of the integrals in example 3 a,b,c, p. 275.
- How could you find the area of these figures between the given interval.
- Look at the special definite integrals on page 276.
- Do $\int_{-\pi}^{\pi} \cos x dx = 0$
- Look at the other theorems, 4-7 and 4-8.

- Do #72 p. 281 to show how to do a true Reimann sum.

Assignment: . Have students do 42, 43, 47, 48, 52 (Capstone), 71, p. 278.

Evaluation: (Could be from any one/several of the following)

Responses from classroom questions
Results of classroom sample problems
Homework responses
Check answer with Calculator
End of the section exam

Enrichment: