Closing Wed. Apr 6: HW_1A, 1B, 1C
Read newsletter and see new postings.
Read sections 5.2, 5.3, and 5.4.

Entry Tasks: Approximate the area under $f(x) = 1 + x^2$ from $x = 2$ to $x = 3$ using Riemann sums with $n = 4$ subdivisions and right endpoints.

Step 1: $\Delta x = \frac{b-a}{n} =$

Step 2:

$x_0 = a$ =

$x_1 = a + \Delta x$ =

$x_2 = a + 2\Delta x$ =

$x_3 = a + 3\Delta x$ =

$x_4 = a + 4\Delta x$ =

Pattern: $x_i = a + i\,\Delta x$ =

Step 3:

Area of Rect 1 = $f(x_1)\,\Delta x$ =

Area of Rect 2 = $f(x_2)\,\Delta x$ =

Area of Rect 3 = $f(x_3)\,\Delta x$ =

Area of Rect 4 = $f(x_4)\,\Delta x$ =

Pattern:

$$\sum_{i=1}^{4} f(x_i)\Delta x =$$

Answer: Area ≈

What is the general pattern for any *n*?

Another Quick Example:

Write down the general Riemann sum definition of the area from x = 5 to x = 7 under

$$f(x) = 3x + \sqrt{x}$$

$$\Delta x = \frac{b-a}{n} =$$

x_i = a + i Δx =

$$\lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\Delta x =$$

Velocity/Distance and Reimann Sums

When velocity is a constant:

Distance = Velocity x Time

If velocity is not constant, we can break the problem into subdivisions and approximate by assuming that velocity is constant over each subdivision.

Example: You are accelerating in a car. You get the following measurements of your velocity.

t (sec)	0	0.5	1.0	1.5	2.0
v(t) (ft/s)	0	6.2	10.8	14.9	18.1

Estimate the distance traveled from 0 to 2 seconds.

5.2 The Definite Integral

Def'n: We define the **definite integral of f(x) from x = a to x = b** by

$$\int_a^b f(x)dx = \lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\Delta x$$