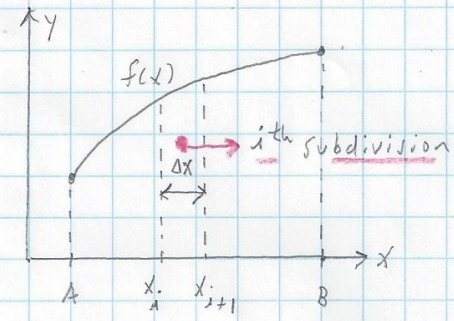
6.1. Program for RAM



We want to find the area under f(x) on $X \in [A, B]$.

$N \equiv$ number of subdivisions

$\Delta X \equiv$ subdivision size

$$\Delta X = \frac{B-A}{N}$$

$$\text{area} \approx \sum_{i=1}^{N} f(X_i + \theta)\,\Delta X \qquad (*)$$

$$X_i = A + (i-1)\Delta X \quad (i = 1, 2, \cdots, N)$$

$\theta \equiv$ offset $\theta = 0$ for LRAM; $\theta = \frac{\Delta X}{2}$ for MRAM; $\theta = \Delta X$ for RRAM

As a class, type in the prgm RAM

```
: ClrHome                    Clear Screen
: Disp "FROM:"               Print FROM:
: Prompt A                   Prompt user for A
: Disp "TO:"
: Prompt B
: Disp "NUMBER"
: Disp "SUBDIVISIONS:"
: Prompt N
: ClrHome
: (B-A)/N → C                C ≡ ΔX
: Disp "TYPE:"
: Disp "1 = LRAM"
: Disp "2 = MRAM"
: Disp "3 = RRAM"
: Prompt T
: If (T=1)
: Then
: 0 → O                      θ = 0 for LRAM
: End
: If (T=2)
: Then
: C/2 → O                    θ = ΔX/2 for MRAM
: End
: If (T=3)
: Then
: C → O                      θ = ΔX for RRAM
: End
: 0 → S                      S ≡ area
: For (I, 1, N, 1)           I = 1, 2, ···, N
: A + (I-1)*C → D            D ≡ X_I
: S + Y1(D+O)*C → S          formula (*)
: End
: Disp S
```

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Example: Use prgmRAM to calculate the area under $f(x) = 12x - 3x^2$ on $x \in [0, 2]$.

SOLUTION:

Put $12x - 3x^2$ in Y_1 of the "Y=" menu.
Run prgm RAM with A=0 and B=2

The following table gives the results...

N	LRAM	MRAM	RRAM
4	12.75	16.125	18.75
10	14.76	16.02	17.16
100	15.8796	16.0002	16.1196
1000	15.987996	16.000002	16.011996

It turns out that the exact area is 16.
Note that MRAM is the most accurate.