

- 1) Estimate the area under  $y = \sec x$  on  $x \in [0, \pi/4]$  by using 4 equal subdivisions with

a) LRAM      b) RRAM

Show your work and draw the rectangles used on a graph of  $y = \sec x$ . Also, given that

$$\int \sec x \, dx = \ln|\sec x + \tan x| + k,$$

calculate the percent relative errors of the estimations.

- 2) Estimate

$$\int_0^{\pi/4} \sec x \, dx$$

using MRAM and 500 subdivisions. Also calculate the percent relative error of the estimation.

- 3) Given that

$$\int_7^{17} f(x) \, dx = 42, \quad \int_7^{11} f(x) \, dx = 27$$

and

$$\int_{11}^{17} g(x) \, dx = 19,$$

evaluate

a)  $\int_{11}^{17} f(x) \, dx$       b)  $\int_{11}^{17} [3g(x) - 2f(x)] \, dx$

- 4) Use geometry to evaluate the definite integrals.

a)  $\int_0^4 (2x - 3) \, dx$       b)  $\int_0^4 \sqrt{4 - (x - 2)^2} \, dx$

- 5) Calculate the indefinite integrals.

a)  $\int (9x^2 - 6x + 4) \, dx$   
 b)  $\int \left( \frac{3}{\sqrt[4]{x}} + 5 \cdot \sqrt[3]{x^2} \right) \, dx$

- 6) Use your results from problem 5 to evaluate

a)  $\int_3^7 (9x^2 - 6x + 4) \, dx$   
 b)  $\int_3^7 \left( \frac{3}{\sqrt[4]{x}} + 5 \cdot \sqrt[3]{x^2} \right) \, dx$

- 7) For

$$\int F(x) \, dx = \frac{1}{2} (\sec x \tan x + \ln|\sec x + \tan x|) + k$$

- a) Express  $F(x)$  in terms of a single trigonometric function.

*Hint:* use  $\tan^2 x + 1 = \sec^2 x$ .

- b) Evaluate

$$\int_0^{\pi/4} F(x) \, dx$$

- 8) Calculate the derivatives.

a)  $\frac{d}{dx} \int_{13}^x \cos(47t) \, dt$   
 b)  $\frac{d}{dx} \int_{x^4}^{x^6} t^{14} \, dt$