

Calculus Chapter 6 Test Practice

- 1) Use Riemann Sums with 6 subintervals of equal length to find the following for $y = x^3 + 11x^2 - 3x + 14$ on $[-1, 5]$.

x	-1	0	1	2	3	4	5
y	27	14	23	60	131	242	399

- A) LRAM: **497** B) RRAM: **869** C) TRAP: **683**

- 2) Using the data from problem #1, use 3 subintervals of equal length to find the MRAM estimate. **632**

- 3) The speed of a toy car is given in the table below. Use the Trapezoidal Rule to estimate the **average** speed for the toy car. $T = \frac{h}{2}(y_0 + 2y_1 + 2y_2 + \cdots + 2y_{n-1} + y_n)$.

Time (sec)	0	5	10	15	20	25	30
Speed (cm/sec)	12	14	19	21	10	16	8

$$T = \frac{5}{2}(12 + 2(14) + 2(19) + 2(21) + 2(10) + 2(16) + 8) = 450$$

$$\text{average speed} = \frac{450}{30} = 15 \text{ cm per second}$$

- 4) Use Simpson's Rule to estimate $\int_{-\pi}^0 \sin x \, dx$ using 6 subintervals of equal length.

$$S = \frac{h}{3}(y_0 + 4y_1 + 2y_2 + 4y_3 + \cdots + 2y_{n-2} + 4y_{n-1} + y_n)$$

x	$-\pi$	$-\frac{5\pi}{6}$	$-\frac{2\pi}{3}$	$-\frac{\pi}{2}$	$-\frac{\pi}{3}$	$-\frac{\pi}{6}$	0
y	0	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	0

$$S = \frac{\pi/6}{3} \left(0 + 4\left(-\frac{1}{2}\right) + 2\left(-\frac{\sqrt{3}}{2}\right) + 4(-1) + 2\left(-\frac{\sqrt{3}}{2}\right) + 4\left(-\frac{1}{2}\right) + 0 \right) = \frac{\pi}{18}(-8 - 2\sqrt{3})$$

Construct a function in the form of $y = \int_a^x f(t) \, dt + C$ that satisfies the given conditions.

5) $\frac{dy}{dx} = x^4 \sec x$ and $y = 2$ when $x = 3$

$$y = \int_3^x t^4 \sec t \, dt + 2$$

6) $\frac{dy}{dx} = \sqrt[5]{x^2 - \ln x}$ and $y = -2$ when $x = 3$

$$y = \int_3^x \sqrt[5]{t^2 - \ln t} \, dt - 2$$