

Riemann Sum Practice

Name

Cordon

Date

Directions: Please show all work on separate paper! Please use your calculator!

1. Approximate the area between the curve $f(x) = x^3 - x + 1$ and the x -axis on the interval $[0, 2]$ using 4 divisions and:

A. Left endpoints

B. Right Endpoints

C. Midpoints

D. Trapezoids

2. A major retailer once studied the rate that people entered their store on any given day (excluding sales and holidays) in the month of December. The rate that people entered the store (given in people per hour) is listed in the chart below:

TIME	RATE (in people/hour)
8:00 am	1200
9:00 am	1000
10:00 am	900
11:00 am	700
12:00 pm	900
1:00 pm	800
2:00 pm	600
3:00 pm	700
4:00 pm	800
5:00 pm	900
6:00 pm	1000
7:00 pm	1100
8:00 pm	900

Use a Riemann Sum midpoint approximation with 6 subintervals of equal width to determine the total number of shoppers that entered the store in a single day.

$$A_P = 6[10.8 + 11.4 + 10.7 + 9.6 + 10.7 + 9.6] = 255$$

$$A_L = 6[9.6 + 10.8 + 11.4 + 10.7] = 255$$

$$\text{width} = \frac{24 - 0}{4} = 6$$

3. The rate at which water flows out of a pipe, in gallons per hour, is given by a differentiable function R of time t . The table below shows the rate as measured every 3 hours for a 24-hour period.

Approximate the area under the graph of $R(t)$ using a right Riemann sum and using a left Riemann sum. Use 4 subdivisions of equal length with both methods. Using correct units, explain the meaning of your answer in terms of water flow.

Approximately 255 gallons of water flows out of the pipe from $t=0$ to $t=24$ hours

t (hours)	$R(t)$ (gallons per hour)
0	9.6
3	10.4
6	10.8
9	11.2
12	11.4
15	11.3
18	10.7
21	10.2
24	9.6

4. Find a Riemann-sum approximation of the area of the plane region under the curve $y = x^2$ on $[0, 5]$ using the partition $\{0, 1, 3, 4, 4.5, 5\}$ and ...

A. Left endpoints

B. Right endpoints

C. Trapezoid approximation

5. (MC) The graph of f is shown below for $0 \leq x \leq 3$. Of the following, which has the least value?

- A. Left Riemann Sum approximation from $x = 1$ to $x = 3$ with 4 subintervals of equal length
 B. Right Riemann Sum approximation from $x = 1$ to $x = 3$ with 4 subintervals of equal length
 C. Midpoint Riemann Sum approximation from $x = 1$ to $x = 3$ with 4 subintervals of equal length
 D. Trapezoidal Sum approximation from $x = 1$ to $x = 3$ with 4 subintervals of equal length

