

1. Consider the continuous function $f(x)$ such that $f(x) > 0$ for $[0,1]$. Selected values of $f(x)$ are given in the table below. Use the table of values to approximate the area under $f(x)$ using the Riemann Sum indicated.

| | | | | | |
|--------|-----|------|-----|------|-----|
| x | 0 | 0.25 | 0.5 | 0.75 | 1.0 |
| $f(x)$ | 1.0 | 0.8 | 1.3 | 1.1 | 1.6 |

- a) Trapezoidal Approximation using 4 subintervals
 b) Right Rectangular Approximation using 4 subintervals
 c) Midpoint Rectangular Approximation using 2 subintervals
2. If a chart of values for the differentiable function $f(x) =$

| | | | | | |
|--------|---|---|----|----|----|
| x | 0 | 4 | 16 | 17 | 20 |
| $f(x)$ | 8 | 4 | 6 | 3 | 6 |

- a) Find a trapezoidal approximation for the area under $f(x)$ on $[0,20]$ using four subintervals.
 b) Find a right Riemann sum approximation for the area under $f(x)$ on $[0,20]$ using four subintervals.
3. $f(x)$ is a differentiable function that is increasing for all x . Selected values of $f(x)$ are given in the table below.

| | | | | | | |
|--------|------|------|------|------|------|------|
| x | 0 | 2 | 4 | 6 | 8 | 10 |
| $f(x)$ | 12.5 | 13.4 | 13.9 | 14.3 | 14.6 | 14.8 |

- a) Use a Left Rectangular Riemann sum to approximate the area under $f(x)$ on the interval $[0,10]$ using 5 subintervals of equal width. Is this approximation an underestimate or overestimate? Explain
 b) Approximate $f'(5)$. Show the work that leads to your answer.
 c) Find the average rate of change of $f(x)$ on the interval $[0,10]$.
 d) Evaluate $\int_0^{10} f'(x) dx$
4. $R(t)$ is a differentiable function that is concave up for all t . Selected values of $R(t)$ are given in the table below.

| | | | | | |
|--------|----|----|----|----|----|
| t | 0 | 3 | 5 | 9 | 11 |
| $R(t)$ | 20 | 18 | 12 | 15 | 19 |

- a) Use a trapezoidal sum to approximate the area under $f(x)$ on the interval $[0,10]$ using 4 subintervals. Is this approximation an underestimate or overestimate? Explain
 b) Approximate $R'(4)$. Show the work that leads to your answer.
 c) Find the average rate of change of $R(t)$ on the interval $[0,11]$.
 d) Evaluate $\int_0^{11} (3 + R'(t)) dt$