6.2 Approximating Areas with Riemann Sums

Calculus Name: _____ **CA #1**

Approximate the area under the curve using the given Riemann Sum.

1. $f(x) = \frac{1}{5}x^3 - x + 7$

   Midpoint Riemann Sum on the interval $[-1,2]$ with $n = 3$ subintervals.

2. $f(x) = 6x + 5$

   Left Riemann Sum on $[-2,2]$ with $n = 5$ subintervals.

3. $f(x) = -0.2x^2 - x + 12$

   Trapezoid approximation on the interval $[-1, 3]$ with $n = 4$ subintervals

4. Let $y(t)$ represent the weight loss per week of a contestant on the Biggest Loser, where y is a differentiable function of t. The table shows the weight loss per week recorded at selected times.

Time (week)	2	4	7	8	11
$\boldsymbol{y(t)}$ **(pounds/week)**	14	12	18	14	17

   a. Use the data from the table and a left Riemann Sum with four subintervals. Show the computations that lead to your answer.

   b. What does your answer represent in this situation?

5. Let $v(t)$ represent the rate of change of a hot air balloon over time, where v is a differentiable function of t. The table shows the rate of change at selected times. The balloons height at $t = 0$ was 50 meters.

Time (minutes)	0	4	6	9	11
$\boldsymbol{v(t)}$ **(meters/min)**	5.2	6.3	7.1	7.9	8.4

a. Use the data from the table and a trapezoidal approximation with four subintervals. Show the computations that lead to your answer.

b. What is the approximate height of the balloon at 11 minutes?

---

6. A particle moves along a horizontal line with a positive velocity $v(t)$, where v is a differentiable function of t. The time t is measured in seconds, and the velocity is measured in cm/sec. The velocity of the particle at selected times is given in the table below.

Time (sec)	0	2	4	6	8	10	12	14	16
$\boldsymbol{v(t)}$ **(cm/sec)**	21	18	15	23	27	31	35	32	29

a. Use the data from the table and a midpoint Riemann Sum with four subintervals. Show the computations that lead to your answer.

b. What does your answer represent in this situation?

Answers to 6.2 CA #1

1. 20.175	2. 10.4	3. 42
4. a. 124 b. The total pounds lost from week 2 to week 11.	5. a. 75.2 b. 125.2 meters	6. a. 416 b. The distance travelled by the particle from 0 to 16 seconds.