6.2 Approximating Areas with Riemann Sums

Calculus Name: ______________________________ **CA #2**

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

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

   Right Riemann Sum on the interval $[-1, 3]$ with $n = 8$ subintervals.

2. $f(x) = \frac{6}{x} + 5$

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

3. 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.

Time (minutes)	4	8	10	13	15
$\boldsymbol{v(t)}$ **(meters/min)**	5.2	6.3	7.1	7.9	8.4

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

   b. What does your answer represent in this situation?

4. The rate of fuel consumption, in gallons per minute, recorded during an airplane flight is given by the twice-differentiable and strictly increasing function R of time t. A table of selected values of $R(t)$ for the time interval $0 \leq t \leq 90$ minutes is shown below. At $t = 0$ the plane had already consumed 84 gallons of fuel.

Time (minutes)	0	30	40	50	70	90
$R(t)$ (gallons per min)	20	30	40	55	65	70

a. Use data from the table to find an approximation for $R'(45)$. Show the computations that led to your answer. Indicate units of measure.

b. Using a trapezoidal approximation with five subintervals, approximate how much fuel the plane has consumed after 90 minutes.

Answers to 6.2 CA #2

1. 40.7	2. 16.781
3. a. 79.9 b. total distance travelled by the hot air balloon from 4 minutes to 15 minutes.	4. a. $\frac{3}{2}$ gal/min^2 b. 4125 gallons