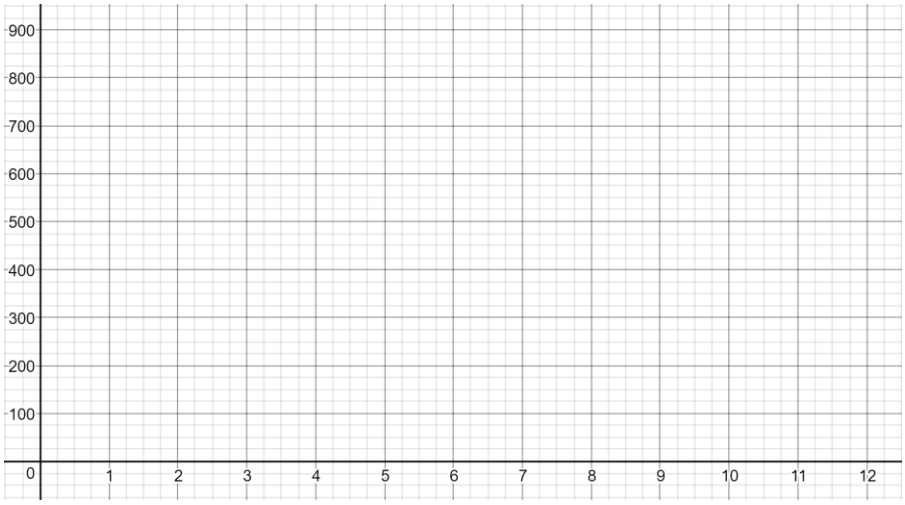
ABCALC Estimating Finite Sums Homework **Name:** _____

1. Suppose an oil pump is producing 800 gallons per hour for the first 5 hours of operation. For the next 4 hours, the pump's production is increased to 900 gallons per hour, and then, for the next 3 hours, the production is cut to 600 gallons per hour.

a) Make a graph modeling this situation.



b) The term "area under a graph" is the area between the graph and the horizontal axis. Find the area under the graph from 0 to 5 hours. What does this value represent?

c) Find the total area under the graph for the entire 12 hour period. What does this value represent?

2. The function f is continuous on the closed interval $[2, 8]$ and has values that are given in the table below.

x	2	5	7	8
$f(x)$	10	30	40	20

Using the subintervals $[2, 5]$, $[5, 7]$, and $[7, 8]$, what are the following approximations of the area under the curve? Be sure to show the correct setup for each approximation.

a) LRAM

b) RRAM

c) Trapezoid Rule

3. Oil is leaking out of a tanker damaged at sea. The damage to the tanker is getting worse as evidenced by the increased leakage each hour, recorded in the table below.

a) Find an estimate using a MRAM sum for the total quantity of oil that has escaped in the first 8 hours using 4 intervals of equal width.

b) Without calculating them, will LRAM or RRAM yield a "higher" estimate in this case? Why?

Time (h)	**Leakage (gal/hr)**
0	50
1	70
2	97
3	136
4	190
5	265
6	369
7	516
8	720

4. (Calculator) Let R be the region between the graphs of $y = 2x - x^2$ and the x-axis for $0 \leq x \leq 2$. Partition $[0, 2]$ into 4 subintervals and find the following

a) LRAM

b) RRAM

c) MRAM

d) Trapezoid Approximation

5. A truck moves with positive velocity $v(t)$ from time $t = 3$ to time $t = 15$. What would the area under the graph of $v(t)$ between time $t = 3$ to time $t = 15$ give?