A GRAPHING CALCULATOR IS REQUIRED.

t (minutes)	0	1	5	6	8
$g(t)$ (cubic feet per minute)	12.8	15.1	20.5	18.3	22.7

9. Grain is being added to a silo. At time $t = 0$, the silo is empty. The rate at which the grain is being added is modeled by the differential function g, where $g(t)$ is measured in cubic feet per minute for $0 \leq t \leq 8$ minutes. Selected values of $g(t)$ are given in the table.

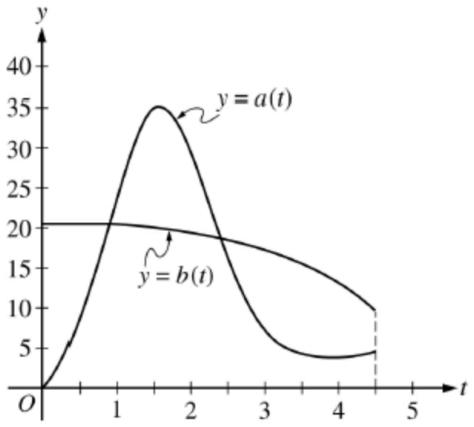
   (a) Using the date in the table, approximate $g'(3)$. Using correct units, interpret the meaning of $g'(3)$ in context of the problem.

   (b) Write an integral expression that represents the total amount of grain added to the silo from time $t = 0$ to time $t = 8$. Use at right Reman sum with the four subintervals indicated by the data in the table to approximate the interval.

(c) The grain in the silo is spoiling at a rate modeled by $w(t) = 32\sqrt{\sin\left(\frac{\pi t}{74}\right)}$, where $w(t)$ is measured in cubic feet per minute for $0 \leq t \leq 8$ minutes. Using the result from part (b), approximate the amount of unsoiled grain remaining in the silo at time $t = 8$.

(d) Based on the model in part (c), is the amount of unspoiled grain in the silo increasing or decreasing at time $t = 6$? Show the work that leads to your answer.

A GRAPHING CALCULATOR IS REQUIRED.



10. During the time interval $0 \le t \le 4.5$ hours, water flows into tank *A* at a rate of $a(t) = (2t - 5) + 5^{2\sin t}$ liters per hour. During the same time interval, water flows into tank *B* at a rate of $b(t)$ liters per hour. Both tanks are empty at time $t = 0$. The graphs of $y = a(t)$ and $y = b(t)$, shown in the figure above, intersect at $t = k$ and $t = 2.416$.

(a) How much water will be tank *A* at time $t = 4.5$?

(b) During the time interval $0 \le t \le k$ hours, water flows into tank *B* at a constant rate of 20.5 liters per hour. What is the difference between the amount of water in tank *A* and the amount of water in tank *B* at time $t = k$?

(c) The area of the region bounded by the graphs of $y = a(t)$ and $y = b(t)$ for $k \leq t \leq 2.416$ is 14.470. How much water is in the tank *B* at time $t = 2.416$?

(d) During the time interval $2.7 \leq t \leq 4.5$ hours, the rate at which water flows into tank *B* is modeled by $w(t) = 21 - \dfrac{30t}{(t-8)^2}$ liters per hour. Is the difference $w(t) - a(t)$ increasing or decreasing at time $t = 3.5$? Show the work that leads to your answer.