Predictive AP Calculus AB Paper

May 2025

CALCULUS AB
SECTION II, Part A
Time—30 minutes
2 Questions

A GRAPHING CALCULATOR IS REQUIRED FOR THESE QUESTIONS.

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1. The rate at which water flows into a storage tank is modeled by the function $W(t) = 15\sin^2(0.1t^2 + 1)$ liters per hour for $0 \leq t \leq 8$ hours. At time $t = 0$, the tank contains 500 liters of water. Water is removed from the tank at a rate modeled by the function $R(t)$, where $R(t)$ is differentiable and decreasing on $0 \leq t \leq 8$. Selected values of $R(t)$ are shown in the table below.

t (hours)	0	2	4	6	8
$R(t)$ (liters/hour)	25	22	18	15	10

   (a) Find the total amount of water that flows into the tank during the interval $0 \leq t \leq 8$. Show the setup for your calculation.

   (b) Use the data in the table to estimate $R'(3)$. Show the work that leads to your answer. Indicate units of measure.