Unit 6 - End of Unit FRQ Review

Calc. AB/BC

Warmup: Questions from Lesson 6.14?

If you haven’t finished the CA worksheet from yesterday take it out and continue to work on it during this time.

t (hours)	0	$\frac{1}{3}$	$\frac{2}{3}$	1
$R(t)$ (gallons per hour)	11	8	5	0

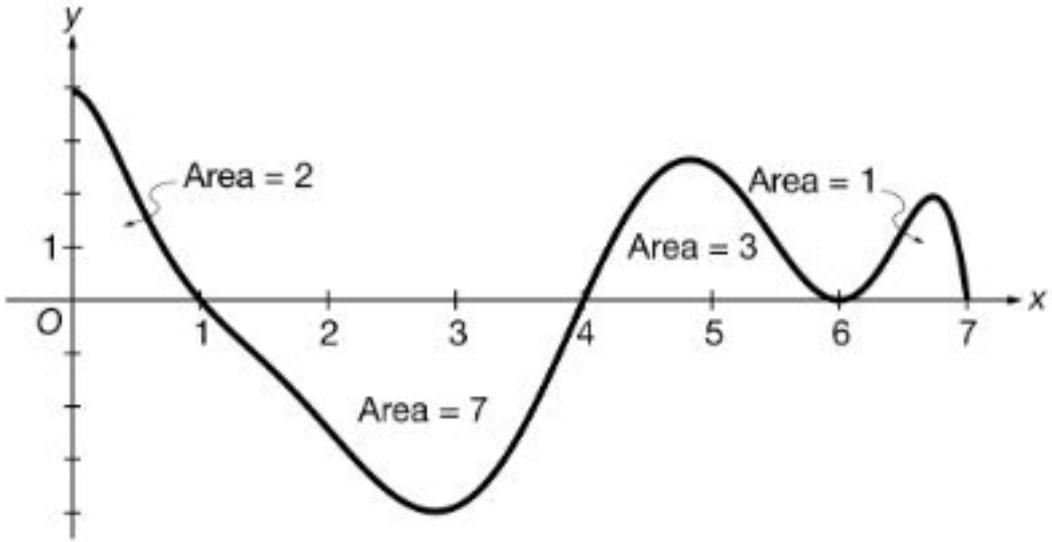
The rate at which water leaks from a container is modeled by the twice-differentiable function R, where $R(t)$ is measured in gallons per hour and t is measured in hours for $0 \leq t \leq 1$. Values of $R(t)$ are given in the table above for selected values of t.

(a) Use the data in the table to find an approximation for $R'\left(\frac{1}{2}\right)$. Show the computations that lead to your answer. Indicate units of measure.

(b) Use a left Riemann sum with the three subintervals indicated by the data in the table to approximate $\int_0^1 R(t)dt$. Indicate units of measure.

(c) Use the data in the table to evaluate $\int_0^{\frac{1}{3}} R'(t)dt$.

(d) The sum $\sum_{k=1}^{n} R\left(\frac{1}{4}+\frac{k}{2n}\right)\frac{1}{2n}$ is a right Riemann sum with n subintervals of equal length. The limit of this sum as n goes to infinity can be interpreted as a definite integral. Express the limit as a definite integral.



Graph of f'

The figure above shows the graph of f', the derivative of a differentiable function f, on the closed interval $0 \leq x \leq 7$. The areas of the regions between the graph of f' and the x-axis are labeled in the figure. The function f is defined for all real numbers and satisfies $f\left(4\right) = 10$.

Let g be the function defined by $g\left(x\right) = 5 - x^2$.

(a) Find the value of $\int_0^7 f'(x)dx$.

(b) Given that $f(4) = 10$, write an expression for $f(x)$ that involves an integral. Use this expression to find the absolute minimum value of f and the absolute maximum value of f on the closed interval $0 \leq x \leq 7$. Justify your answers.

(c) Find $\int g(x)dx$.

(d) Find the value of $\int_1^2 x\, f'(g(x))dx$.

Notes Filled In:

AP Calc. AB - Unit 6 FRQ Review - Filled In