DATE: _____

AP FRQs & M/C for Candidates Test (Absolute Extrema)

1. The rate at which gasoline flows out of the storage tank into trucks at time t can be modeled by the function R defined by $R(t) = \frac{100t}{t^2+4}$, where t is measured in hours, and $R(t)$ is measured in thousands of gallons. Based on the model, at what time t, for $0 \le t \le 10$, is the rate at which gasoline flows out of the storage tank an absolute maximum? Justify your answer.

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2. If $f(x) = \frac{1}{3}x^3 - 4x^2 + 12x - 5$ and the domain is the set of all x such that $0 \le x \le 9$, then the absolute maximum value of the function f occurs when x is

(A) 0

(B) 2

(C) 4

(D) 6

(E) 9

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3. Let g be a continuous function on the closed interval $[0, 1]$. Let $g(0) = 1$ and $g(1) = 0$. Which of the following is NOT necessarily true?

(A) There exists a number h in $[0, 1]$ such that $g(h) \ge g(x)$ for all x in $[0, 1]$.

(B) For all a and b in $[0, 1]$, if $a = b$, then $g(a) = g(b)$.

(C) There exists a number h in $[0, 1]$ such that $g(h) = \frac{1}{2}$.

(D) There exists a number h in $[0, 1]$ such that $g(h) = \frac{3}{2}$.

(E) For all h in the open interval $(0, 1)$, $\lim_{x \to h} g(x) = g(h)$.