AP Calculus AB   Name: ____________________

Week 2 FRQ

1) Determine whether $f(x)$ is continuous at the given point.

a) $f(x) = \begin{cases} x^3+3x, & x \neq 0 \\ 1, & x = 0 \end{cases}$ at $x=0$

b) $f(x) = \begin{cases} \dfrac{x^2-6x}{x^2+6x}, & x \neq 0 \\ -2, & x = 0 \end{cases}$ at $x=0$

c) $f(x) = \begin{cases} \dfrac{x^3-1}{x^2-1}, & x < 1 \\ 2, & x = 1 \\ \dfrac{3}{x+1}, & x > 1 \end{cases}$ at $x=1$

2) 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? Completely explain your answer.

A) There exists a number h in $[0,1]$ such that $g(h) \geq g(x)$ 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 $(0,1)$, $\lim_{x \to h} g(x) = g(h)$.

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3) If $\lim_{x \to a} f(x) = L$ and L is a real number, which of the following must be true? Completely explain your answer.

A) $f(x)$ is continuous at $x=a$.

B) $f(x)$ is defined at $x=a$.

C) $f(a)=L$

D) None of the above

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