Intermediate Value Theorem

For #1 & 2, write TRUE or FALSE. If FALSE, explain why.
1. If $f(1) < 0$ and $f(5) > 0$, then there must be a number c in the interval $(1,5)$ such that $f(c) = 0$.

2. If f is continuous on $[1,5]$, $f(1) > 0$ and $f(5) < 0$, then there must be a number c in $(1,5)$ such that $f(c) = 0$.

3. Suppose that f is defined on $[-5,5]$, that $f(-5) = 2$ and $f(5) = -2$. If f assumes every value in $[-2,2]$, must f be continuous? Explain.
   [*HINT*: The answer is NO. Draw a graphical example to illustrate this.]

t (sec)	0	15	25	30	35	50	60
$v(t)$ (ft/sec)	-20	-30	-20	-14	-10	0	10
$a(t)$ (ft/sec^2)	1	5	2	1	2	4	2

1. A car travels on a straight track. During the time interval $0 \leq t \leq 60$ seconds, the car's velocity, v, measured in feet per second, and acceleration, a, measured in feet per second per second, are continuous functions. The table above shows selected values of these functions.

    (c) For $0 < t < 60$, must there be a time t when $v(t) = -5$? Justify your answer.