Continuity and One-sided Limits
Section 1.4b

One of the major concepts tested on the AP Calculus AB exam is the Intermediate Value Theorem.

THEOREM 1.13 Intermediate Value Theorem

If $f$ is continuous on the closed interval $[a, b]$ and $k$ is any number between $f(a)$ and $f(b)$, then there is at least one number $c$ in $[a, b]$ such that $f(c) = k$.

Example 8: Use the Intermediate Value Theorem to show that the polynomial function $f(x) = x^3 + 2x - 1$ has a zero in the closed interval $[0,1]$. Then find the $x$-value of the zero.
Try this one: Use the Intermediate Value Theorem to show that the polynomial function \( f(x) = x^2 - 3x - 4 \) has a value of \(-2\) somewhere in the closed interval \([1, 4]\). Then find the \( x \) – value of the coordinate.