2.5 Defn: $f$ is continuous at $a$ if $lim_{x \to a} f(x) = f(a)$

(i.e., if $lim_{x \to a} f(x) = f(lim_{x \to a} x)$

Examples:

Read left and right continuity

If $f$, $g$ continuous at $a$, $c \in \mathcal{R}$, then $f + g$, $fg$, $cf$, $f/g$ (if $g(a) \neq 0$) are continuous.

If $g$ continuous at $a$ and $f$ continuous at $g(a)$, then $f \circ g$ continuous at $a$.

Ex: $lim_{x \to 0} \frac{x^2 - e^{x^3}}{cos(x)} =$

Intermediate value theorem: Suppose $f$ continuous on $[a, b]$, $f(a) \neq f(b)$ and $n$ is between $f(a)$ and $f(b)$, then there exists $c \in (a, b)$ such that $f(c) = N$.

Example: Show that $x^2 - 7x + 1$ has a root between 0 and 1.