THREE-STEP DEFINITION: Function \( y = f(x) \) is continuous at \( x = a \) if

i.) \( f(a) \) exists (is a finite number)

ii.) \( \lim_{{x \to a}} f(x) \) exists (is a finite number)

iii.) \( \lim_{{x \to a}} f(x) = f(a) \)

SHORTCUT 1: Every polynomial is continuous for all values of \( x \).

SHORTCUT 2: Sums, differences, products, quotients (denominator \( \neq 0 \)), and compositions of continuous functions are continuous.

HERE is a short list of WELL-KNOWN CONTINUOUS FUNCTIONS:

1. \( \sin x \) (for all \( x \)-values)
2. \( \cos x \) (for all \( x \)-values)
3. \( \sqrt{x} \) (for all \( x \geq 0 \))
4. \( x^{1/3} \) (for all \( x \)-values)
5. \( e^x \) (for all \( x \)-values) – formally introduced in Math 16B
6. \( \ln x \) (for all \( x > 0 \)) – formally introduced in Math 16B