Flow Chart for Evaluating \( \lim_{x \to b} f(x) \)

Is \( b \) a number?

- Yes: Divide numerator and denominator by highest power of \( x \) in denominator.
- No, \( b = \pm \infty \): Take limit in numerator and denominator separately, using \( \lim_{x \to \pm \infty} \frac{a}{x^n} = 0 \).

Near \( x = b \), is \( f(x) \) given by a single formula made up of continuous functions?

- Yes: Evaluate \( \lim_{x \to b} f(x) \) \( x \to b^- \) and \( \lim_{x \to b^+} f(x) \) separately.
- No: \( f(b) \) defined?
  - Yes: \( \lim_{x \to b} f(x) = f(b) \). \( f(b) \) looks like \( \frac{k}{0} \). Does \( k = 0 \)?
    - Yes: Factor numerator and denominator and cancel. Then take the limit.
    - No: \( \lim_{x \to b} f(x) \) does not exist.
  - No: Analyze further to decide if limit is \( \pm \infty \) on each side.