Strategies to compute: $\lim\limits_{x \to a} \left[\dfrac{f(x)}{g(x)}\right]$

Special note: If given two fractions, combine them (common denom).

Try plugging in the value:
1. **If denominator ≠ 0, done!**
2. **If denom = 0 & numerator ≠ 0**,
   the answer is -∞, +∞ or DNE. Examine the sign of the output from each side.
3. **If denom = 0 & numerator = 0**,
   Use algebra to simplify and cancel until either the numerator or denominator is not zero.

Strategy 1: Factor/Cancel
Strategy 2: Simplify Fractions
Strategy 3: Expand/Simplify
Strategy 4: Multiply by Conjugate
          (if you see radicals)

Strategies to compute: $\lim\limits_{x \to \infty} f(x)$

Special note: Combine into one fraction (might need conjugate if given two terms involving a radical).

1. Is it a known limit?

$$\lim_{x \to \infty} \frac{1}{x^a} = 0, \text{ if } a > 0; \quad \lim_{x \to \infty} e^{-x} = 0;$$

$$\lim_{x \to \infty} \ln(x) = \infty; \quad \lim_{x \to \infty} \tan^{-1}(x) = \frac{\pi}{2}.$$

2. **Rewrite in terms of known limits**:

Strategy 1: Multiply top/bottom by $\dfrac{1}{x^a}$,
               where a is the largest power.
Strategy 2: Multiply top/bottom by e^{-rx}.

Special note:
If x is positive, then $x = \sqrt{x^2}$.
If x is negative, then $x = -\sqrt{x^2}$.