

1. Find $\lim_{x \rightarrow 2} \frac{x^2 - x - 2}{x - 2}$.

2. Find $\lim_{x \rightarrow 0} \frac{\sin x}{x}$.

3. Explain why the “tower of power” works. That is, explain why, if f is higher on the tower than g that

$$\lim_{x \rightarrow \infty} \frac{f(x)}{g(x)} = \infty$$

and

$$\lim_{x \rightarrow \infty} \frac{g(x)}{f(x)} = 0.$$

Provide several examples.

4. Find $\lim_{x \rightarrow \infty} (1 + 4x)^{\frac{3}{x}}$.

5. Find $\lim_{x \rightarrow 0^+} \frac{1}{x} - \frac{1}{\sin x}$.

6. Find $\lim_{x \rightarrow \infty} \left(1 + \frac{3}{x}\right)^{2x}$.