

4.8 L'Hospital's Rule

Goal: Given a limit of indeterminate form ($0/0$, ∞/∞ , etc) with differentiable functions, find the limit.

L'Hospital's Rule: If f and g are differentiable and $g'(x) \neq 0$ on an open interval I that contains a (except possibly at a), and $\lim_{x \rightarrow a} f(x) = \lim_{x \rightarrow a} g(x) = 0$ or $\lim_{x \rightarrow a} f(x) = \pm\infty$ and $\lim_{x \rightarrow a} g(x) = \pm\infty$, then

Examples:

Find each of the following limits:

$$\lim_{t \rightarrow -2} \frac{t^3 - t^2 - t + 10}{t^2 + 3t + 2}$$

$$\lim_{x \rightarrow 0^+} x \ln x$$

$$\lim_{x \rightarrow 0} x^{\sin x}$$

On Your Own: #3, 9, 13, 17, 19, 25, 39, 41, 47, 55, 57, 61, 65