

Evaluate the following limits using l'Hôpital's Rule

1.  $\lim_{x \rightarrow 0} x \csc x$

2.  $\lim_{x \rightarrow \infty} \left( x - \sqrt{x^2 + 4x} \right)$

3.  $\lim_{\theta \rightarrow 0^+} (\sin \theta)^{\tan \theta}$

4.  $\lim_{x \rightarrow \infty} \left( 1 + \frac{10}{x^2} \right)^{x^2}$

5.  $\lim_{x \rightarrow \infty} \frac{100x^3 - 3}{x^4 - 2}$

6.  $\lim_{x \rightarrow \infty} \frac{2x^3 - x^2 + 1}{5x^3 + 2x}$

7.  $\lim_{x \rightarrow 6} \frac{\sqrt[5]{5x+2} - 2}{\frac{1}{x} - \frac{1}{6}}$

8.  $\lim_{t \rightarrow \pi/2^+} \frac{\tan 3t}{\sec 5t}$

9.  $\lim_{x \rightarrow \infty} \left( \sqrt{x-2} - \sqrt{x-4} \right)$

10.  $\lim_{x \rightarrow \pi/2} (\pi - 2x) \tan x$

11.  $\lim_{x \rightarrow \infty} x^3 \left( \frac{1}{x} - \sin \frac{1}{x} \right)$

12.  $\lim_{x \rightarrow \infty} \left( x^2 e^{1/x} - x^2 - x \right)$

13.  $\lim_{x \rightarrow 1^+} \left( \frac{1}{x-1} - \frac{1}{\sqrt{x-1}} \right)$

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

15.  $\lim_{x \rightarrow \infty} \frac{\log_2 x}{\log_3 x}$

16.  $\lim_{x \rightarrow \infty} \left( \log_2 x - \log_3 x \right)$

17.  $\lim_{n \rightarrow \infty} \frac{1+2+\cdots+n}{n^2}$

18.  $\lim_{x \rightarrow 0} \left( \frac{\sin x}{x} \right)^{1/x^2}$