

Section 4.5: L'Hôpital's Rule - Worksheet

1. Evaluate the following limits. **Note:** L'Hôpital's Rule is not possible/necessary for every limit.

(a) $\lim_{x \rightarrow 8} \frac{\sqrt[3]{x} - 2}{64 - x^2}$

(b) $\lim_{x \rightarrow \infty} \frac{\ln(x)^2}{\sqrt{x}}$

(c) $\lim_{x \rightarrow 0} \frac{5^x - 3^x}{\sin(2x)}$

(d) $\lim_{\theta \rightarrow \frac{\pi}{2}} \frac{1 - \csc(\theta)}{1 - \sec(4\theta)}$

(e) $\lim_{x \rightarrow \infty} \ln(5x + 1) - \ln(x)$

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

(g) $\lim_{x \rightarrow 0} \frac{2^{\sin(x)} - 1}{\sin^{-1}(5x)}$

(h) $\lim_{x \rightarrow -\infty} \frac{2x + 3 \cos(x)}{5x}$

(i) $\lim_{x \rightarrow \infty} x^{1/x}$

(j) $\lim_{x \rightarrow -\infty} x^3 e^{5x+2}$

(k) $\lim_{x \rightarrow 0^+} \sqrt[3]{x} \log_2(x)$

(l) $\lim_{x \rightarrow -\infty} \frac{x}{\sqrt{x^2 + 4}}$

(m) $\lim_{x \rightarrow 0} \cos(3x)^{1/x^2}$

(n) $\lim_{x \rightarrow \infty} \left(\frac{x+5}{x+3}\right)^{4x}$

(o) $\lim_{x \rightarrow \infty} x^{1/\ln(x+1)}$