

§4.7: L'HÔPITAL'S RULE

1.] Determine the indeterminate form of the limits below, then evaluate them using L'Hôpital's Rule.

a.) $\lim_{x \rightarrow 5} \frac{4x - 20}{2x - 10}$

b.) $\lim_{x \rightarrow 0} \frac{3^x - 1}{x}$

c.) $\lim_{x \rightarrow 0} \frac{\sqrt{9 + 3x} - 3}{x}$

2.] Determine the indeterminate form of the limits below, then evaluate them using L'Hôpital's Rule.

a.) $\lim_{x \rightarrow \infty} \frac{3x^4 + x}{6x^4 + 12}$

b.) $\lim_{x \rightarrow \pi/2^+} \frac{\tan(x)}{2 \sec^2(x)}$

c.) $\lim_{x \rightarrow \infty} \frac{x^2 - \ln\left(\frac{1}{x}\right)}{3x^2 + 2x}$

3.] Determine the indeterminate form of the limits below, then evaluate them using L'Hôpital's Rule.

a.) $\lim_{x \rightarrow 0^+} x \ln(x)$

b.) $\lim_{x \rightarrow 0^+} \cot(x) - \frac{1}{x}$

4.] Determine the indeterminate form of the limits below, then evaluate them using L'Hôpital's Rule.

a.) $\lim_{x \rightarrow 0^+} x^{2x}$

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