

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

SECTION 4.6

Math 1000 Worksheet

FALL 2022

For practice only. Not to be submitted.

1. Use l'Hôpital's Rule to evaluate each of the following limits.

- (a) $\lim_{x \rightarrow 0} \frac{6^x - 2^x}{x}$
- (b) $\lim_{x \rightarrow 0^+} \frac{1 - \cos(\sqrt{x})}{x}$
- (c) $\lim_{x \rightarrow 0} \frac{\sin(mx)}{\sin(nx)}$, where m and n are constants
- (d) $\lim_{x \rightarrow \infty} \frac{\ln(1 + e^{2x})}{x}$
- (e) $\lim_{x \rightarrow \infty} \frac{[\ln(x)]^3}{x^2}$
- (f) $\lim_{x \rightarrow \infty} \frac{x^2 + 1}{x \ln(x)}$
- (g) $\lim_{x \rightarrow \frac{\pi}{2}^-} \sec(7x) \cos(3x)$
- (h) $\lim_{x \rightarrow 1} \left[\frac{1}{\ln(x)} - \frac{1}{x-1} \right]$
- (i) $\lim_{x \rightarrow 0^+} [\sin(x)]^{\tan(x)}$
- (j) $\lim_{x \rightarrow \infty} (x + e^x)^{\frac{1}{x}}$
- (k) $\lim_{x \rightarrow 0} [\cos(3x)]^{\frac{5}{x}}$
- (l) $\lim_{x \rightarrow \infty} \left(1 + \frac{a}{x} \right)^{bx}$, where a and b are constants