

# MEMORIAL UNIVERSITY OF NEWFOUNDLAND

## DEPARTMENT OF MATHEMATICS AND STATISTICS

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SECTION 4.6

Math 1000 Worksheet

FALL 2023

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**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