MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

SECTION 4.6 **Math 1000 Worksheet** FALL 2024

For practice only. Not to be submitted.

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

   (a) $\lim\limits_{x\to 0} \dfrac{6^x - 2^x}{x}$

   (b) $\lim\limits_{x\to 0^+} \dfrac{1-\cos\left(\sqrt{x}\right)}{x}$

   (c) $\lim\limits_{x\to 0} \dfrac{\sin(mx)}{\sin(nx)}$, where m and n are constants

   (d) $\lim\limits_{x\to \infty} \dfrac{\ln(1+e^{2x})}{x}$

   (e) $\lim\limits_{x\to \infty} \dfrac{[\ln(x)]^3}{x^2}$

   (f) $\lim\limits_{x\to \infty} \dfrac{x^2+1}{x\ln(x)}$

   (g) $\lim\limits_{x\to \frac{\pi}{2}^-} \sec(7x)\cos(3x)$

   (h) $\lim\limits_{x\to 1} \left[\dfrac{1}{\ln(x)} - \dfrac{1}{x-1}\right]$

   (i) $\lim\limits_{x\to 0^+} [\sin(x)]^{\tan(x)}$

   (j) $\lim\limits_{x\to \infty} (x+e^x)^{\frac{1}{x}}$

   (k) $\lim\limits_{x\to 0} [\cos(3x)]^{\frac{5}{x}}$

   (ℓ) $\lim\limits_{x\to \infty} \left(1+\dfrac{a}{x}\right)^{bx}$, where a and b are constants