

MEMORIAL UNIVERSITY OF NEWFOUNDLAND  
DEPARTMENT OF MATHEMATICS AND STATISTICS

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SECTION 4.6

**Math 1000 Worksheet**

FALL 2025

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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