For practice only. Not to be submitted.

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

    (a) $\displaystyle\lim_{x\to 0}\frac{6^x - 2^x}{x}$

    (b) $\displaystyle\lim_{x\to 0^+}\frac{1 - \cos\left(\sqrt{x}\right)}{x}$

    (c) $\displaystyle\lim_{x\to 0}\frac{\sin(mx)}{\sin(nx)}$, where m and n are constants

    (d) $\displaystyle\lim_{x\to\infty}\frac{\ln(1 + e^{2x})}{x}$

    (e) $\displaystyle\lim_{x\to\infty}\frac{[\ln(x)]^3}{x^2}$

    (f) $\displaystyle\lim_{x\to\infty}\frac{x^2 + 1}{x\ln(x)}$

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

    (h) $\displaystyle\lim_{x\to 1}\left[\frac{1}{\ln(x)} - \frac{1}{x - 1}\right]$

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

    (j) $\displaystyle\lim_{x\to\infty}(x + e^x)^{\frac{1}{x}}$

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

    (ℓ) $\displaystyle\lim_{x\to\infty}\left(1 + \frac{a}{x}\right)^{bx}$, where a and b are constants