1. Consider the function
$$f(x) = \frac{2^x - 8}{\sqrt{x^2+1} - \sqrt{10}}.$$
   (a) Numerically compute the left-hand limits, right-hand limits, and limits at -3 and at 3. If any discrepancies occur, identify them and explain why you think they occurred. Use complete sentences.
   (b) The same as above, but do so graphically rather than numerically.
   (c) The same as above, but do so symbolically rather than numerically or graphically. If a full limit does exist, evaluate the function at that point.
   (d) Does the function have any horizontal asymptotes? Justify.

2. Determine, if possible, the left-hand limit, right-hand limit, and limit for
$$g(x) = \begin{cases} \dfrac{\tan 4x}{3x} & \text{if } x < 0 \\ \\ (1+4x)^{\frac{1}{3x}} & \text{if } x \geq 0 \end{cases}$$
   at 0. Evaluate g at 0. Also, determine the limit of the function g as x grows without bound to the left and right.

3. Evaluate each limt, if possible. Use the same variable as given.
   (a) $\lim\limits_{t\to\infty} \dfrac{4t-3}{\sqrt{t^2+1}}$
   (b) $\lim\limits_{t\to-\infty} \dfrac{4t-3}{\sqrt{t^2+1}}$
   (c) $\lim\limits_{\varphi\to 0} (\cot\varphi)^{\tan\varphi}$
   (d) $\lim\limits_{x\to 0^+} (1+3x)^{\csc x}$
   (e) $\lim\limits_{\theta\to\frac{\pi}{2}} \dfrac{1+\sin\theta}{\cos^2\theta}$
   (f) $\lim\limits_{x\to 0^+} \left(\dfrac{1}{\sqrt{x^2+1}} - \dfrac{1}{x}\right)$
   (g) $\lim\limits_{t\to 0^-} \left(\dfrac{1}{t} - \csc t\right)$
   (h) $\lim\limits_{\theta\to\frac{\pi}{2}^-} \left(\sec^2\theta - \tan^2\theta\right)$