1. Guess the value of the following limits:

   (a) $\lim\limits_{s \to 5} s - 3$

   (b) $\lim\limits_{u \to -2} u^2 - \cos(\pi u)$

   (c) $\lim\limits_{v \to 4} \dfrac{v + 3}{4v - 2}$

2. Sketch the graph of a function f that satisfies all of the following: $\lim\limits_{x \to -3^-} f(x) = 2$, $\lim\limits_{x \to -3^+} f(x) = 2$, $\lim\limits_{x \to 1^-} f(x) = 4$, $\lim\limits_{x \to 1^+} f(x) = -1$, $f(-3) = 4$, $f(1) = -1$.

3. Determine the following infinite limits:

   (a) $\lim\limits_{s \to 1^-} \dfrac{s^2 - 4}{s - 1}$

   (b) $\lim\limits_{u \to 3^+} \dfrac{u^2 - 2u - 8}{u^2 - 6u + 9}$

   (c) $\lim\limits_{t \to 9^-} \dfrac{\sqrt{t}}{(t - 9)^3}$

   (d) $\lim\limits_{\theta \to \pi^+} \dfrac{\theta - 4}{\sin(\theta)}$

4. Consider the function $f(x) = \dfrac{2x - 3}{(x - 2)(x + 4)}$.

   (a) Find all the vertical asymptotes of f.

   (b) Compute $\lim\limits_{x \to 2^+} f(x)$, $\lim\limits_{x \to 2^-} f(x)$, $\lim\limits_{x \to -4^+} f(x)$, and $\lim\limits_{x \to -4^-} f(x)$.

   (c) Make a rough sketch of the function.

5. Consider the function $f(x) = \tan\left(\frac{1}{x}\right)$.

   (a) Show that $f(x) = 0$ for $x = \frac{1}{\pi}, \frac{1}{2\pi}, \frac{1}{3\pi}, \ldots$.

   (b) Show that $f(x) = 1$ for $x = \frac{4}{\pi}, \frac{4}{5\pi}, \frac{4}{9\pi}, \ldots$.

   (c) What can you conclude about $\lim\limits_{x \to 0^+} \tan\left(\frac{1}{x}\right)$?