Math 1A Calculus Fall, 2004
Prof. Haiman

Quiz 2 Solution (Version B)

In each of the following, (1) decide whether the limit exists as a number, as an infinite limit, or not at all, and (2) evaluate the limit if it exists.

(a)

$$\lim_{x\to 2} \frac{\sqrt[3]{x^2-4}}{\sqrt[3]{x-2}}$$

(b)

$$\lim_{x\to 0^+} \frac{|x|-x}{x^2}$$

(c)

$$\lim_{x\to 0^-} \frac{|x|-x}{x^2}$$

(a) For $x \neq 2$, $\sqrt[3]{x^2-4}/\sqrt[3]{x-2} = \sqrt[3]{x+2}$. Substituting $x = 2$ gives $\lim_{x\to 2} \frac{\sqrt[3]{x^2-4}}{\sqrt[3]{x-2}} = \sqrt[3]{4}$.

(b) For $x > 0$, $|x| = x$, so $(|x| - x)/x^2 = 0$, which gives $\lim_{x\to 0^+} \frac{|x|-x}{x^2} = 0$.

(c) For $x < 0$ $|x| = -x$, so $(|x| - x)/x^2 = -2/x$, which becomes large and positive for x negative and approaching zero. Therefore $\lim_{x\to 0^-} \frac{|x|-x}{x^2} = +\infty$.