

Infinite limits

2.2.1

In each of the following cases, determine whether or not the given limit exists. If not, explain why the limit does not exist. In particular if the trend is to $\pm\infty$, indicate so.

a) $\lim_{x \rightarrow -2\pi^-} x \csc x$

b) $\lim_{x \rightarrow \frac{1}{2}^-} \frac{2x-1}{|2x^3-x^2|}$

c) $\lim_{x \rightarrow 0} \left(\frac{1}{x} - \frac{1}{|x|} \right)$

d)

$$\lim_{x \rightarrow 4} \frac{x^2 - 25}{x - 4}$$

2.2.2

Determine the following limits. (a and b are constant real numbers)

a) $\lim_{x \rightarrow +\infty} (\sqrt{x^2 + ax} - \sqrt{x^2 + bx})$

b) $\lim_{x \rightarrow -\infty} (\sqrt{x^2 + ax} - \sqrt{x^2 + bx})$