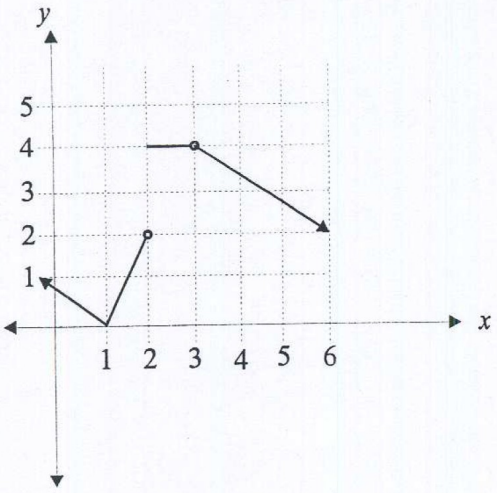
Limits

2.1.1
Use the graph below to evaluate the following limits, if they exist.



(a) $\lim_{x\to 3^-} f(x) =$ (b) $\lim_{x\to 3^+} f(x) =$

(c) $\lim_{x\to 3} f(x) =$ (d) $\lim_{x\to 2^-} f(x) =$

(e) $\lim_{x\to 2^+} f(x) =$ (f) $\lim_{x\to 2} f(x) =$

2.1.2
In each of the following cases, determine whether or not the given limit exists. If not, explain why the limit does not exist.
(a)

$$\lim_{x\to -2} \frac{x^3+8}{x+2}$$

(b)

$$\lim_{x\to 1} \frac{x^4-1}{x-1}$$

(c)

$$\lim_{x\to 1^-} \frac{x-1}{\sqrt{x}-1}$$

(d)

$$\lim_{x\to 3} \left(\frac{\frac{1}{x}-\frac{1}{3}}{x-3} \right)$$

2.1.3

A function $f(x)$ is defined as:

$$f(x)=\begin{cases} 1-x & x>2 \\ -(x-1)^2 & x\le 2 \end{cases}$$

(a) Find $\lim_{x\to 2^-} f(x)$ (b) Find $\lim_{x\to 2^+} f(x)$

(c) Does $\lim_{x\to 2} f(x)$ exist? Give a reason for your answer.

2.1.4

Let $m(x)=\dfrac{|x-2|}{x^2-4}$. In each of the following cases, find the limit if it exists.

(a) $\lim_{x\to 2^-} m(x)$ (b) $\lim_{x\to 2^+} m(x)$ (c) $\lim_{x\to 2} m(x)$