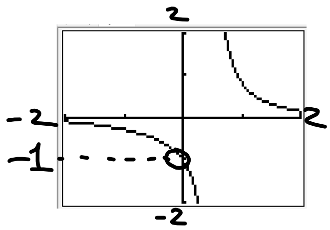
#25 p. 66

$\lim_{x\to 0} \frac{\sin x}{2x^2-x} = -1$ graphically



Know: $\lim_{x\to 0} \frac{\sin x}{x} = 1$

$$\lim_{x\to 0} \frac{\sin x}{2x^2-x} = \lim_{x\to 0} \frac{\sin x}{x(2x-1)}$$

$$= \lim_{x\to 0} \frac{\sin x}{x} \cdot \frac{1}{2x-1}$$

$$= \underbrace{\lim_{x\to 0} \frac{\sin x}{x}}_{1} \cdot \lim_{x\to 0} \frac{1}{2x-1} = \frac{1}{2(0)-1}$$

$$= \frac{1}{-1}$$

$$= -1$$

Graph $\sin^2 x$ as $\sin(x)^2$

" $\ln^2 x$ as $\ln(x)^2$

" $\tan^2 x$ as $\tan(x)^2$

any "named" fcn

Topic: left- and right- sided limits

$$\lim_{x \to 1^-} f(x) = 0$$

$$\lim_{x \to 1^+} f(x) = 1$$

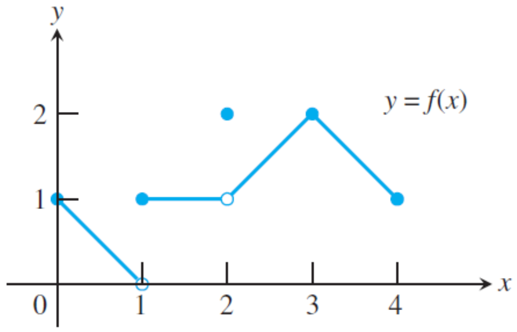


Figure 2.6 The graph of the function

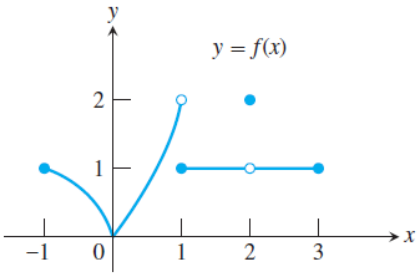
$$f(x) = \begin{cases} -x + 1, & 0 \le x < 1 \\ 1, & 1 \le x < 2 \\ 2, & x = 2 \\ x - 1, & 2 < x \le 3 \\ -x + 5, & 3 < x \le 4. \end{cases}$$

(Example 8)

$\lim_{x \to c} f(x)$ exists iff

$$\lim_{x \to c^-} f(x) = \lim_{x \to c^+} f(x)$$

38.



(a) $\lim_{x \to -1^+} f(x) = 1$ True

(b) $\lim_{x \to 2} f(x)$ does not exist. False

(c) $\lim_{x \to 2} f(x) = 2$ False

(d) $\lim_{x \to 1^-} f(x) = 2$ True

(e) $\lim_{x \to 1^+} f(x) = 1$ True

(f) $\lim_{x \to 1} f(x)$ does not exist. True

(g) $\lim_{x \to 0^+} f(x) = \lim_{x \to 0^-} f(x)$ True

(h) $\lim_{x \to c} f(x)$ exists at every c in $(-1, 1)$. True

(i) $\lim_{x \to c} f(x)$ exists at every c in $(1, 3)$. True