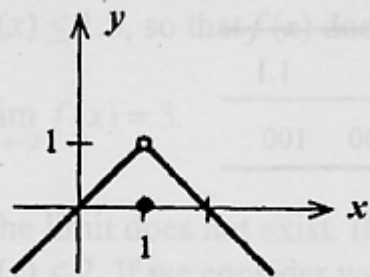


2.4 limits

19. $\lim_{x \rightarrow 1} f(x)$ does not exist, if we con

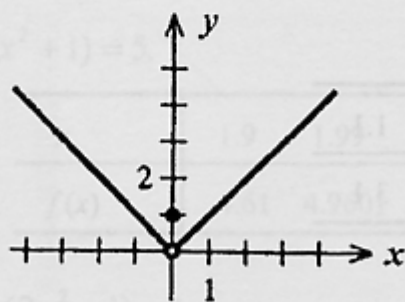
that $f(x) = 3$. On the other hand, if

$f(x) = 1$ so that $f(x)$ does not ap



$$\lim_{x \rightarrow 1} f(x) = 1$$

21. The limit does not exist.



$$\lim_{x \rightarrow 0} f(x) = 0$$

$$39. \lim_{x \rightarrow -1} \frac{\sqrt{x^2 + 8}}{2x + 4} = \frac{\sqrt{(-1)^2 + 8}}{2(-1) + 4} = \frac{\sqrt{9}}{2} = \frac{3}{2}.$$

$$50. \lim_{x \rightarrow -2} \frac{x^2 - 4}{x + 2} = \lim_{x \rightarrow -2} \frac{(x-2)(x+2)}{x+2} = \lim_{x \rightarrow -2} (x-2) = -2 - 2 = -4.$$

$$57. \lim_{x \rightarrow -2} \frac{x^2 - x - 6}{x^2 + x - 2} = \lim_{x \rightarrow -2} \frac{(x-3)(x+2)}{(x+2)(x-1)} = \lim_{x \rightarrow -2} \frac{x-3}{x-1} = \frac{-2-3}{-2-1} = \frac{5}{3}.$$

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$$\lim_{x \rightarrow 1} \frac{\sqrt{x} - 1}{x - 1} = \lim_{x \rightarrow 1} \frac{\sqrt{x} - 1}{x - 1} \cdot \frac{\sqrt{x} + 1}{\sqrt{x} + 1} = \lim_{x \rightarrow 1} \frac{x - 1}{(x - 1)(\sqrt{x} + 1)} = \lim_{x \rightarrow 1} \frac{1}{\sqrt{x} + 1} = \frac{1}{2}.$$

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$$\lim_{x \rightarrow 1} \frac{x - 1}{x^3 + x^2 - 2x} = \lim_{x \rightarrow 1} \frac{x - 1}{x(x-1)(x+2)} = \lim_{x \rightarrow 1} \frac{1}{x(x+2)} = \frac{1}{3}.$$