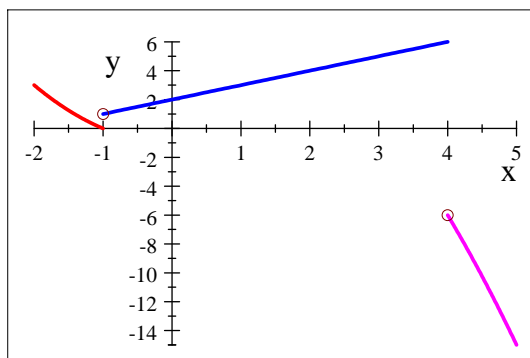


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$f(x)$  is not continuous at  $x = -1$  and  $x = 4$  but  $f(x)$  is continuous at left at  $x = -1$  and is continuous at right

6. at  $x = 4$ :

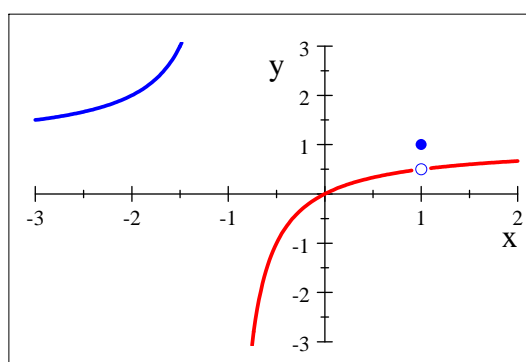
$$f(x) = \begin{cases} x^2 - 1 & \text{if } x \leq -1 \\ x + 2 & \text{if } -1 < x < 4 \\ 10 - x^2 & \text{if } x \geq 4 \end{cases}$$



$$f(x) = \begin{cases} \frac{x^2 - x}{x^2 - 1} & \text{if } x \neq 1 \\ 1 & \text{if } x = 1 \end{cases}$$

20.  $f(x)$  is not continuous at  $x = 1$  because  $f(1) = 1$  and

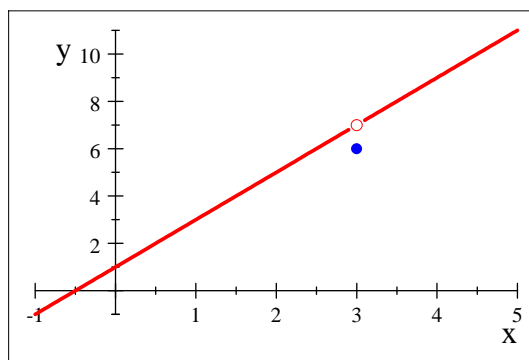
$$\begin{aligned} \lim_{x \rightarrow 1} \frac{x^2 - x}{x^2 - 1} &\stackrel{0}{=} \lim_{x \rightarrow 1} \frac{x(x-1)}{(x-1)(x+1)} \\ &\stackrel{0}{=} \lim_{x \rightarrow 1} \frac{x}{x+1} = \frac{1}{2} \neq 1 \end{aligned}$$



$$f(x) = \begin{cases} \frac{2x^2 - 5x - 3}{x - 3} & \text{if } x \neq 3 \\ 6 & \text{if } x = 3 \end{cases}$$

22.  $f(x)$  is not continuous at  $x = 3$  because  $f(3) = 6$  and

$$\begin{aligned} \lim_{x \rightarrow 3} \frac{2x^2 - 5x - 3}{x - 3} &\stackrel{0}{=} \lim_{x \rightarrow 3} \frac{(2x+1)(x-3)}{x-3} \\ &= \lim_{x \rightarrow 3} 2x + 1 = 7 \neq 6 \end{aligned}$$



24.  $f(x) = \frac{x^3 - 8}{x^2 - 4}$

$$\lim_{x \rightarrow 2} \frac{x^3 - 8}{x^2 - 4} \stackrel{0}{=} \lim_{x \rightarrow 2} \frac{(x-2)(x^2 + 2x + 4)}{(x-2)(x+2)} = \lim_{x \rightarrow 2} \frac{x^2 + 2x + 4}{x+2} = \frac{12}{4} = 3$$

Define  $f(2) = 3$ . Since  $\lim_{x \rightarrow 2} \frac{x^3 - 8}{x^2 - 4} = 3 = f(2)$ ,  $f(x)$  is continuous at  $x = 2$ .