

## 2.4 Continuity and One-Sided Limits

Name:

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**P 8.** Find the limit (if it exists). If it does not exist, explain why.

$$\lim_{x \rightarrow 2^-} \frac{2}{x + 2}$$

**P 10.** Find the limit (if it exists). If it does not exist, explain why.

$$\lim_{x \rightarrow 4^+} \frac{4 - x}{x^2 - 16}$$

**P 12.** Find the limit (if it exists). If it does not exist, explain why.

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

**P 14.** Find the limit (if it exists). If it does not exist, explain why.

$$\lim_{x \rightarrow 10^+} \frac{|x - 10|}{x - 10}$$

**P 18.** Find the limit (if it exists). If it does not exist, explain why. Let

$$f(x) = \begin{cases} x^2 + 4x + 6, & x < 3 \\ -x^2 + 4x - 2, & x \geq 3 \end{cases}$$

Find

$$\lim_{x \rightarrow 3} f(x).$$

**P 20.** Find the limit (if it exists). If it does not exist, explain why.

$$\lim_{x \rightarrow \pi/2} \sec x$$

**P 34.** Discuss the continuity of  $f(t) = 3 - \sqrt{9 - t^2}$  on the closed interval  $[-3, 3]$ .

**P 36.** Discuss the continuity of  $g(x) = \frac{1}{x^2 - 4}$  on the closed interval  $[-1, 2]$ .

**P 38.** Find the  $x$ -values (if any) at which

$$f(x) = \frac{4}{x - 6}$$

is not continuous. Which of the discontinuities are removable?

**P 40.** Find the  $x$ -values (if any) at which

$$f(x) = x^2 - 4x + 4$$

is not continuous. Which of the discontinuities are removable?

**P 52.** Find the  $x$ -values (if any) at which

$$f(x) = \begin{cases} -2x + 3, & x < 1 \\ x^2, & x \geq 1 \end{cases}$$

is not continuous. Which of the discontinuities are removable?

**P 57.** Find the  $x$ -values (if any) at which

$$f(x) = \begin{cases} \ln(x + 1), & x \geq 0 \\ 1 - x^2, & x < 0 \end{cases}$$

is not continuous. Which of the discontinuities are removable?

**P 67.** Find the constant  $a$  such that the function is continuous on the entire real number line.

$$f(x) = \begin{cases} ae^{x-1} + 3, & x < 1 \\ \arctan(x - 1) + 2, & x \geq 1 \end{cases}$$

**P 92.** Explain why  $g(t) = (t^3 + 2t - 2) \ln(t^2 + 4)$  has a zero on the interval  $[0, 1]$ .