

# Analyzing Functions Using Limits

Use the intuitive understanding of limits and your knowledge of the behavior of functions to analyze the given limits.

## Directions

**First use one method of analysis, then verify with a second method.** You could use a table, graph, verbal description of the function's behavior, or evaluate the limit using strategies we have learned so far.

## Activity

1.  $\lim_{x \rightarrow 3} x^2 + 1$

6.  $\lim_{x \rightarrow \infty} \sqrt[3]{x - 1}$

11.  $\lim_{x \rightarrow 0} \frac{\sin x}{x}$

2.  $\lim_{x \rightarrow \infty} x^2 + 1$

7.  $\lim_{x \rightarrow 0} e^x$

12.  $\lim_{x \rightarrow \frac{\pi}{2}} \tan x$

3.  $\lim_{x \rightarrow 5} \frac{1}{x-5}$

8.  $\lim_{x \rightarrow -\infty} e^x$

13.  $\lim_{x \rightarrow \infty} \cos x$

4.  $\lim_{x \rightarrow -\infty} \frac{1}{x-5}$

9.  $\lim_{x \rightarrow 0} \ln x$

5.  $\lim_{x \rightarrow 9} \sqrt[3]{x - 1}$

10.  $\lim_{x \rightarrow 0} \sin x$

Which of the functions could you evaluate by direct substitution?

Form a conjecture for why this works only for these functions.