

# Analyzing Functions Using Limits

## Activity Guide

### Purpose

Students develop their understanding of limit notation and meaning by analyzing familiar functions within the frame of limits.

### Context

Students in a Calculus 1 course will be ready to analyze functions using limits very early in the course and once they have been introduced to limit notation. This activity serves to establish a classroom environment in which students are encouraged to contribute their ideas publicly in a low stakes setting.

### Details

This activity could serve as a warm-up after the intuitive definition of limit has been introduced and before more technical methods of evaluating limits are explored. At the start of class, or just before, write all the limits on the boards in the classroom and pass out several markers to different students willing to write an answer on the board. Have those students pass their markers along to other students. You could provide guidance and hints to students who come to the board but might not be confident in their answer since their understanding of limits may just be emerging. The idea is to have several students working at the board at the same time to increase engagement and momentum.

Once students have responded to most of the limits, discuss each answer and whether an answer needs to be updated and why. With several students contributing answers on the board, students worry less about who wrote what answer and whether they were correct; it becomes a group project.

This activity may take about 15 to 20 minutes at the start of a lecture on finding absolute and local extrema using the derivative.

### Alternative Mode of Instruction Adaptation

This activity may be adapted to a synchronous online lesson using a shared google doc that students can update "real-time" with a whole group discussion when students are done contributing and updating answers.

*Additional activities and guides are available:*

*Context-Driven Tasks for Calculus:* <https://www.csulb.edu/math/context-driven-tasks-for-calculus>