

Closing Fri, Jan 8 (11:59pm): 10.1

Closing Mon, Jan 11: 2.1

Closing Wed, Jan 13: 2.2

Closing Fri, Jan 15: 2.3

Read the weekly email and newsletter.

Today: **2.1 and 2.2 Limit Intro**

Entry Task: (More motivation with rates)

Consider the function $f(x) = x^2$.

- (1) Find the slope of the *secant* line from $x = 1$ to $x = 2$.
- (2) Find the slope of the secant line from $x = 1$ to $x = 1.1$.

2.2 Limits

When we write

$$\lim_{x \rightarrow a} f(x) = L$$

we say

“the limit of $f(x)$, as x approaches a , is L ”

and we mean

as x takes on values closer and closer to a ,
 $f(x)$ takes on values closer and closer to L .

This notation gives us a way to discuss
what is happen “near” a value $x = a$ (but
not at the value).

We also define the “limit from the left”

$$\lim_{x \rightarrow a^-} f(x) = L$$

and the “limit from the right”

$$\lim_{x \rightarrow a^+} f(x) = L$$

Note that

$$\lim_{x \rightarrow a} f(x) = L$$

if and only if both

$$\lim_{x \rightarrow a^-} f(x) = L \quad \text{and} \quad \lim_{x \rightarrow a^+} f(x) = L$$