10.1 Limits and Motion: The Tangent Problem

Precalc 12-13

Velocity:

Average velocity:

A car travels 120 miles in 2 hours and thirty minutes. What is its average velocity?

Average velocity does not tell us _____
_____

Galileo and other scientists who studied motion prior to Newton and Leivniz were looking for formulas that would give velocity as a function of time (give instantaneous values for v for individual values of *t).*

A ball rolls a distance of 16 feet in 4 seconds. What is the instantaneous velocity of the ball at a moment of time 3 seconds after it starts to roll?

Newton invented "Fluxions" and Leibniz invented "differentials" to explain instantaneous rates of change without resorting to zero denominators. These have both led to our modern limit notation.

EX: A ball rolls down a ramp so that $d = t^2$. *What is its instantaneous velocity after 3 seconds?*

Secant line:

Tangent line:

Average rate of change:

Derivative of the function f at $x=a$

Derivative of a function f with respect to x: