

Related rate problems use the concept of derivatives to describe scenarios in which multiple things are changing at once. Some common applications are ladders sliding down walls, volumes increasing, or boats being pulled to dock. When one thing is changing- for example, the bottom of a ladder is being pulled out at a certain rate- it affects other things- the rate at which the top of the ladder is falling. Because these factors are always changing, we must look at one instant in time, and this can be done by taking the derivative (with respect to time) of an equation that links all parts of the diagram together. The Pythagorean theorem, trigonometric functions, and volume formulas often serve as these linking equations. The chain rule must be followed in order to correctly represent all of the rates corresponding to certain parts of the diagram. After the derivative is taken, we can plug in the known rates and values for a certain moment and solve for a missing rate.