

Using GSP to Estimate Instantaneous Rate of Change

1. Open New Sketch in Geometer's Sketchpad.
2. Turn on Grid: Graph → Grid Form → Rectangular Grid
3. Plot Function: Graph → Plot New Function → (select own Function)
4. Plot the point where you want to find the instantaneous rate of change: Graph → Plot Points (make sure point is on the function, you may have to calculate it first.)
This point will not move on the function.
5. Select point, then: Measure → Coordinates
6. Put another point on the function: click on function first, then Construct → Point on Function Plot
This is a moveable point that will stay on the function.
7. Select point, then: Measure → Coordinates
8. Select **only** the two points on function and draw a line connecting them. Construct → Line
This is the Secant Line.
9. Select only this Secant Line, and calculate the slope of the line. Measure → Slope
This is the **Average Rate of Change** between these two points.
10. Move the "moveable" point closer to the plotted point. When the points are on top of each other, the measure of the slope will give you a good estimate of the **Instantaneous Rate of Change** at the given point.

Example: A golf ball lying on the grass is hit so that its initial velocity is 25 m/s. The height, h , in metres, of the ball after t seconds can be modelled by the quadratic function $h(t) = 25t - 4.9t^2$.

Find an estimate for the instantaneous rate of change at

a) $t = 2$ sec.

b) $t = 3$