

Math 111 — Graph Techniques

Rolling Ruler

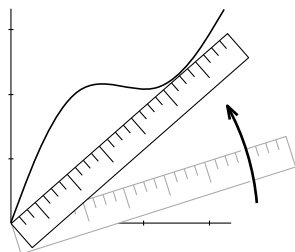
- Finds the *diagonal line* through the graph with the largest or smallest slope
- Used to find highest/lowest AR, AC, or ATS

Finding the smallest slope

Put your ruler at the origin $(0,0)$. Then, rotate it upward until it just touches the graph, always keeping one end at $(0,0)$. Draw this line.

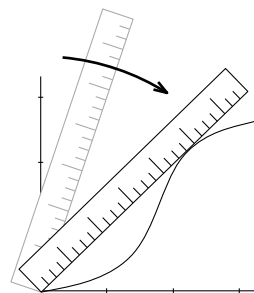
If the problem asks you for the smallest *value* of AR or ATS, then measure the slope of this line.

If the problem asks you for the *quantity* or *time* where AR/AC/ATS is smallest, locate the point where this line intersects the graph and find its x -coordinate.



Finding the largest slope

This is just like finding the smallest slope, except that you start with the ruler above the graph, and rotate it downward until it touches the graph:



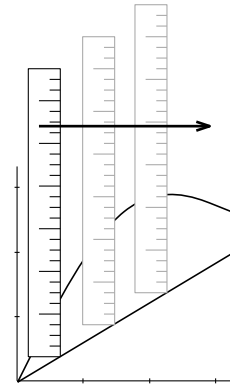
To show your work: Write something like “I used rolling ruler to find the smallest slope of a diagonal line to the graph.” Don’t forget to draw the line you found.

Vertical Ruler Method

- Finds the *largest vertical distance* between two graphs
- Used to find maximum/minimum profit, shortage (in reservoir problems), etc. (whenever you need to find where two quantities are furthest apart)

Hold your ruler vertically, with one end on the lower graph. Now, move your ruler across the graph, always keeping one end on the lower graph. As you do this, watch where the *upper* graph crosses the ruler.

When the upper graph hits its highest point on the ruler, you've found the place where the graphs are farthest apart. Draw the vertical line you just found (this tells you the x-coordinate). Find the y-coordinates for the two graphs there, then subtract to get the distance between them.



To show your work: Write something like “I used the vertical ruler method to find where graphs A and B were farthest apart.” Also, draw the vertical line you found, as usual.