










## How to draw a parabola using Geometer's Sketchpad

1. Draw a point (anywhere) using the point tool. Label it  $A$ .
  - a. Click on the point tool on the left: . Then just click anywhere on the screen. A point will appear.
  - b. Right-click the point, and select "Label Point"
2. Draw a line (using the straightedge tool) that doesn't go through the point.
  - a. Click on this tool on the left: . Hold it down until you see three buttons appear: . These buttons are for drawing segments, rays or lines. We want to draw a line, so select this one: 
3. Put a point on the line with the point tool. Label it  $B$ .
4. Move the point around on the line and make sure that it stays on the line and doesn't move the line itself.
  - a. With your arrow selection tool , select the point and move it around. It should not leave the line.
5. Construct a line perpendicular to your line that goes through  $B$ .
  - a. With your arrow selection tool , click on some blank space so that you're not selecting anything.
  - b. Now select the line you drew, and point  $B$ .
  - c. Select Construct/Perpendicular Line, and a perpendicular line should appear.
6. Construct a segment  from  $A$  to  $B$ .
7. Construct the midpoint of  $\overline{AB}$ .
  - a. With your arrow selection tool , select *only*  $\overline{AB}$ , and select Construct/Midpoint.
  - b. Label the midpoint  $M$ .
8. Construct a line perpendicular to the segment that goes through  $M$ .
  - a. Select *only*  $\overline{AB}$  and  $M$ .
  - b. Select Construct/Perpendicular Line.
9. Label the intersection of the two perpendicular lines that you constructed  $P$ .
10. Move  $B$  around and notice how point  $P$  moves. Cool, isn't it?
11. Construct a segment  from  $A$  to  $P$ .
12. Measure the distances  $AP$  and  $BP$ .
  - a. Select *only* points  $A$  and  $P$ .
  - b. Select Measure/Distance. The distance between the points should appear in the upper left corner.
  - c. Do the same with points  $B$  and  $P$ .
  - d. How do the distances compare?
13. Trace  $P$  and notice the shape that it creates.
  - a. Select *only*  $P$ , and select Display/Trace Intersection.
  - b. Move  $B$  around, and  $P$  will draw a shape. What shape is it?
  - c. If you need to erase the traces, type Ctrl-B.

14. Construct the locus of  $P$ .
  - a. Select points  $B$  and  $P$ , and select Construct/Locus.
  - b. Move  $A$  around and see how the locus changes.
  - c. Move the line around and see how it changes.
15. For a really cool effect, select  $\overline{MP}$  (the line, but not the points), and select Display/Trace Perpendicular Line. What does this tell you about the line  $\overline{MP}$  and its relationship with the parabola you constructed?