

Open the program and take a moment or two to become familiar with the screen and the tool bar. A status line is on the bottom of the window and tells you what the program is about to do. Use this to make sure the program is about to do what you want. The Control-Z key stroke undoes the most recent action if you start doing something that you didn't want to do.

1. Create any three points on the screen with the point tool. Connect the three points with line segments. You may use:
 - (a) the line segment tool
 - (b) click the points one by one and use the Construct-Segments option
 - (c) click the points one by one and use Control-L
2. Label the points M,N and O with the text-tool (it looks like a letter) by clicking on the points one by one. You may change a label by:
 - (a) double clicking on the item
 - (b) right-clicking on the item and selecting Label ...
 - (c) choose the Display-Label Points option
3. Right click on the label for the point O. Click the box saying "show label." Note that you can hide labels for any points. To bring the point's label back either:
 - (a) right click on the point and select "Show Label"
 - (b) choose Display-Show Label
4. Use the selection tool to move some of the points around. If you do this, it may be hard to see the label, so you can use the text tool to click and drag the labels around to make it easier to read.
5. Click on the line segment \overline{MN} . (be sure you *only* click on the line-segment). Then choose the Construct menu bar. What options are possible?
 - (a) Construct the midpoint, Label is J.
 - (b) Construct a point on the line segment. Label is P.
 - (c) Select point P and choose Display-Animate point.
 - (d) *What happens to the point P?*

6. Click on the point M and then click on the line segment \overline{MN} . *What options are available on the Construct menu?*

7. Use the compass tool to create a circle with radius MN.
 - (a) *What point(s) must you use as the center of the circle? Why?*

 - (b) *Is there another circle that can be made with radius MN? Why? If so, construct it.*

 - (c) Move the point O around so that the circles intersect with a line segment. Click on the circle and the object it intersects. *What options are possible on the construct menu?*

 - (d) Find the intersection point identified above and label it Z.

8. Use the compass tool to create a circle with diameter MN. *What point must you use as the center of the circle? Why?*

9. Click on all the objects except the triangle MNO. Choose Display-Hide (or Control-H). Your screen should be only the triangle now. If more remains, right click on each object and select the hide option.

10. Click on the three vertices one by one (order matters). Then, choose the Measure menu.
 - (a) *What options are possible?*

 - (b) Choose “Angle”. Repeat for all three angles.

11. Using the Measure menu, choose the Calculate option. While in the Calculate option, click on one of the angle measures already on screen and then click on the + symbol on the keypad. Click on the next angle and then click on the + symbol. Then select the final angle and select OK.
12. *Does the result make sense? Why?* Click on any point and move it around to see if the sum changes. Create acute, right, and obtuse triangles to see if there is any change.
13. *State what this shows. Why does this work?*
14. Choose a New Sketch (Control-N). Create and label three points so that point A is to the left of point B and point C is above both A and B. Create rays \overline{AB} , \overline{BC} , and \overline{CA} .
15. Select ray \overline{AB} and then click on the Construct-Point on Ray option. Label this point D. Drag the point to the right until it is outside the triangle ABC. Create point E on the ray \overline{CA} and F on ray \overline{BC} in the same fashion so the new points are outside the triangle.
16. Angles DBC, FCA, and EAB are called “Exterior angles of the triangle.” Create the measure of each of these.
17. Use the Calculate option of the measure menu to create the sum of the three exterior angles.
18. Click on point A, B, or C and move the point around. *What is the sum of the exterior angles of a triangle? Does this make sense? Why?*
19. Take one vertex-let’s choose A. There is an interior and exterior angle formed at A. *What type of angles are these? How do you know?*
20. Generalize *If you took the three pairs of the angles (from the previous question) and added them together, what degree measure should you end up with? Is this always true? Why?*

21. Repeat parts 14 through 20 on the computer for the quadrilateral, a pentagon, and a hexagon. *When finished, fill out the table below:*

Shape	Sum of Interior Angles	Sum of Exterior Angles	Sum of Interior and Exterior Angles
Triangles			
Quadrilateral			
Pentagon			
Hexagon			
generalize...			
n -gon			

22. *If you had a regular n -gon, what would the measure of each exterior angle be? Why?*
23. *Knowing the answer to # 22, create a formula to determine the measure of the interior angle of a regular n -gon. Verify your formula with the section surrounding Theorem 9-6 from the text.*
24. *Without GSP, solve the following. What is the measure of an exterior angle of a regular 120-gon?*
25. *Without GSP, what is the measure of an interior angle of a regular 120-gon?*
26. *Without GSP, what is the sum of the measures of the interior angles of a regular 120-gon?*
27. *Without GSP, what is the sum of the measures of the exterior angles of a regular 120-gon?*