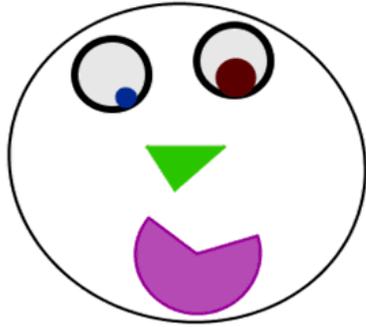


Halloween with GeoGebra – details at end are a bit sketchy 😊



All of the animations use a circle with an animated rotating point!

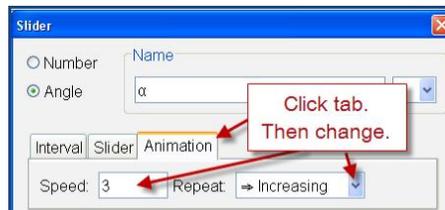
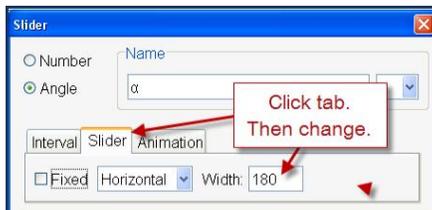
A. Rotating point on circle

1. Draw a circle using  *Circle with Center through Point tool*.
 - a. Click on the  *tool*.
 - b. Click anywhere in the drawing pad (point A will be drawn).
 - c. Move the mouse and click again (point B and the circle will be drawn).

2. Use the  *Slider tool* to insert a *angle* slider.
 - a. Click on the  and then click anywhere in the Drawing pad.
 - b. Click on dot in front of *Angle*.



- c. Click on Slider tab and change width to 180 (always a multiple of interval).
- d. Click on Animation tab and change Speed and Repeat.

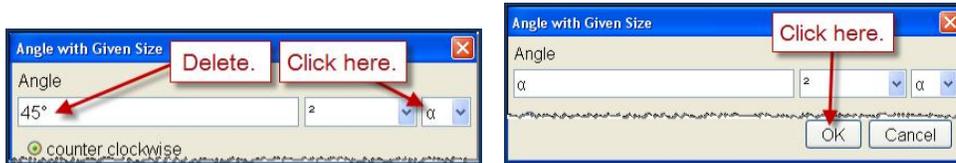


- e. Click on **Apply**.
 - f. Select  *Move tool* and click and drag slider to bigger angle (say ~45°).
3. Use the  *Angle with Given Size tool* to insert an angle of size α .
 - a. Click on the down arrow by the  *Angle tool* and click on the  *Angle with Given Size tool*.



- b. Click on point B (on circle) and then on point A (center of circle).

- c. In the dialog box, delete 45° and then click on α at right. Click on **OK**.



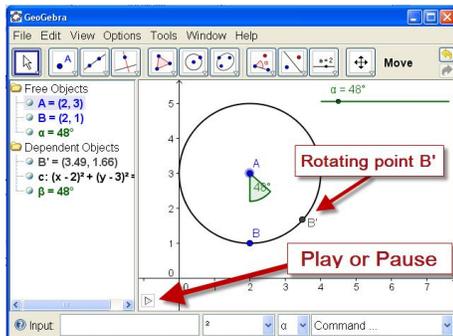
The new point B' will be our rotating point!

4. Animate B'.

- a. Right-click on the slider α . From the drop-down menu, click on **Animation On**.



- b. Click on the play  and pause  buttons at *bottom left* of drawing pad.



The point B' should rotate around the circle.

5. Save your file.

B. Rotating triangle

The idea here is to add 2 points B'' and B''' on the circle that will rotate with B' and then make triangle with vertices B', B'' and B'''.

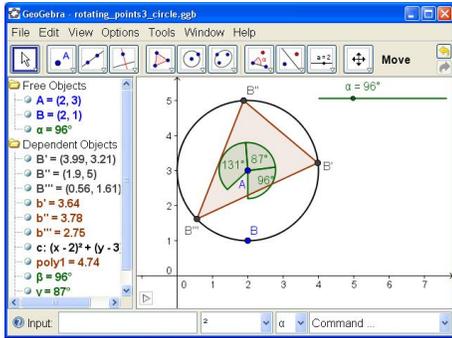
A circle has 360° and we want the triangle to “fill up” the circle. Probably we don't want an equilateral triangle (which would mean that the 3 points would be equiangular at $360^\circ/3 = 120^\circ$) so pick 2 angles that you want. I picked 87° and 131°.

1. Use the  *Angle with Given Size tool* to insert an angle of size 87° from B' (NOT B).
 - a. Click on the  *Angle with Given Size tool*.
 - b. Click on point B' (on circle) and then on point A (center of circle).
 - c. In the dialog box, use the left arrow key once and then delete 45 and type in 87. Click on **OK**.

You **MUST** have ° sign! If you delete the ° sign, click on the arrow by the exponent 2 at right and then click on the degree sign from the drop-down menu.)



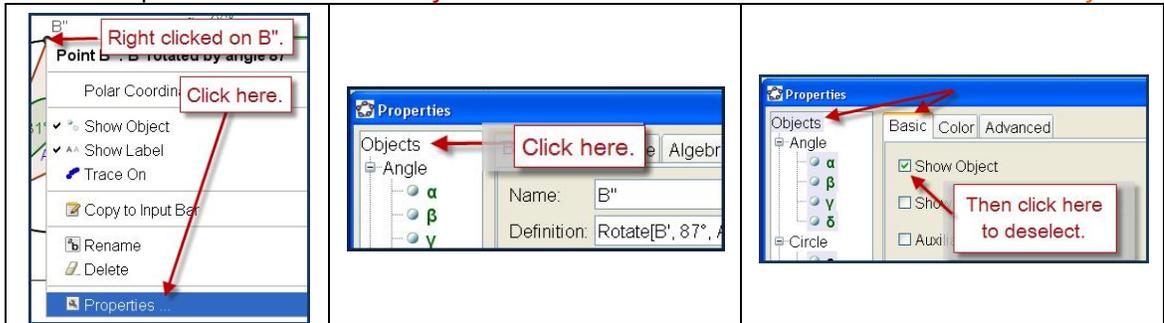
2. Use the  *Angle with Given Size tool* to insert an angle of size 131° .
 - a. Click on the  *Angle with Given Size tool*.
 - b. Click on point B'' (on circle) and then on point A (center of circle).
 - c. In the dialog box, use the left arrow key once and then delete 45 and type in 131. Click on **OK**.
3. Make the triangle.
 - a. Click on the  *Polygon tool* and then click on B' , B'' , B''' and again on B' .
 - b. Click on  *Play button* to make sure your triangle rotates properly.



4. Making it nice.

We really only want to see the triangle and the Play button *and* we want to fill the triangle with color.

 - a. *Right-click* on any object and choose *Properties* from the drop-down menu.
 - b. In the left pane, *click on section Objects*. Check *Basic* tab is selected and *deselect Show Object*.



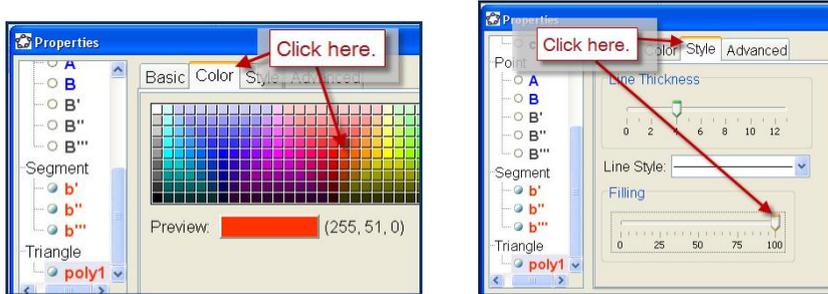
All objects are now hidden! Do NOT click on Close.

- c. In left pane, *scroll down* to section *Triangle* and then *click on Triangle*.



- d. In right pane, select "Show Object" and deselect "Show Label".

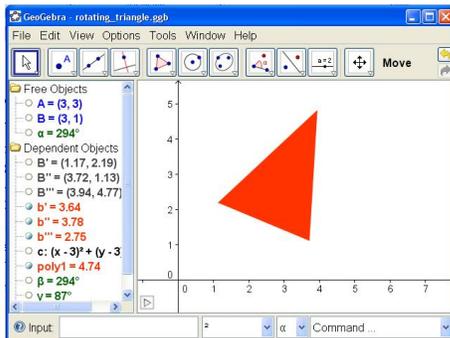
- e. Click on Color tab and then click on a color.
- f. Click on Style tab and click & drag slider for Filling to 100%.



6. Click the Play button. Your triangle should rotate.
7. Save your file.
8. Moving and reshaping the triangle.

The points A and B can be used to move and reshape your triangle.

- a. Right-click on your triangle and choose Properties from the drop-down menu.
 - b. In the left pane, **click on section Point** and then in the right pane on the Basics tab **select Show Object**. **Click on Close**.
 - c. Select the  *Move tool* and click and drag points A and B as desired.
- When done, reverse (a) and (b).
- d. That is, **right-click on your triangle and choose Properties** from the drop-down menu.
 - e. In the left pane, **click on section Point** and then in the right pane on the Basics tab **deselect Show Object**. **Click on Close**.



3. Rotating Eye

The rotating eye starts with a rotating point on a circle just as in 1 above. It simply requires another point that rotates the same. We then use these 2 points to make the smaller eyeball circle which then rotates within the big eye circle.

Start as in 1 above.

1. Draw a circle using  *Circle with Center through Point tool*.
Let's assume that the center point is C and the circle point is D.

2. Use the  *Slider tool* to insert a *angle* slider. Look at the name of this angle! Suppose it is γ .
 - a. Select  *Move tool* and click and drag slider to bigger angle (say $\sim 45^\circ$).
3. **NEW PART!** Draw the eyeball circle
 - a. Use the  *Line tool* to draw a line joining C and D.
 - b. Use the  *New Point tool* to draw a point E on this line (close to D).
Now using the angle slider as in part A, we draw 2 rotating points D' and E' (instead of just 1).
 - c. Use the  *Angle with Given Size tool* to insert an angle with vertices D and C and of size ε (we are using the names from 1 and 2 above).
 - d. Use the  *Angle with Given Size tool* to insert an angle with vertices E and C and of size ε (we are using the names from 1 and 2 above).
Finally we draw the eyeball using E' and D'.
 - e. Use the  *Circle with Center through Point tool* with E' as center and D' as point.
4. Animate the eyeball.
 - a. Right-click on the slider ε . From the drop-down menu, click on **Animation On**.
The eyeball should rotate within the eye.
5. Color as desired.

D. Mouth

1. Construct another circle with an animated rotating point as in part A above. (Probably angle slider λ and rotating point J'.)
2. Use the  *Circular Sector with Center between 2 Points tool* to draw a semi-circular sector with center J' and 2 other points of your choice.
3. Color as desired.

E. Face

1. Use the  *Ellipse tool* to draw an ellipse for the face.
2. Color as desired.