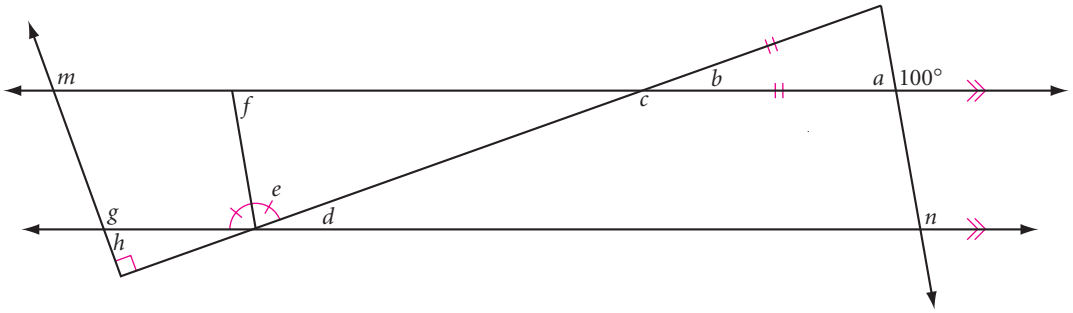
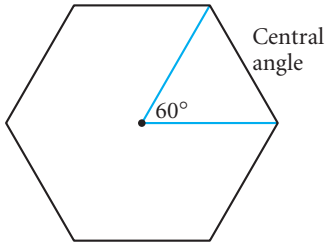
Review

17. Trace the figure below. Calculate the measure of each lettered angle.



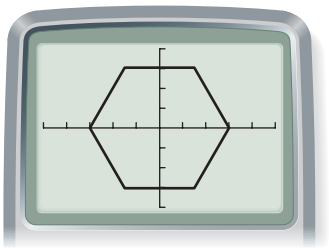
project

DRAWING REGULAR POLYGONS



You can draw a regular polygon's central angle by extending segments from the center of the polygon to its consecutive vertices. For example, the measure of each central angle of a hexagon is 60°.

Using central angles, you can draw regular polygons on a graphing calculator. This is done with parametric equations, which give the x- and y-coordinates of a point in terms of a third variable, or parameter, t.



Set your calculator's mode to degrees and parametric. Set a friendly window with an x-range of -4.7 to 4.7 and a y-range of -3.1 to 3.1. Set a t-range of 0 to 360, and t-step of 60. Enter the equations $x = 3\cos t$ and $y = 3\sin t$, and graph them. You should get a hexagon.

The equations you graphed are actually the parametric equations for a circle. By using a t-step of 60 for t-values from 0 to 360, you tell the calculator to compute only six points for the circle.

Use your calculator to investigate the following. Summarize your findings.

- Choose different t-steps to draw different regular polygons, such as an equilateral triangle, a square, a regular pentagon, and so on. What is the measure of each central angle of an n-gon?
- What happens as the measure of each central angle of a regular polygon decreases?
- What happens as you draw polygons with more and more sides?
- Experiment with rotating your polygons by choosing different t-min and t-max values. For example, set a t-range of -45 to 315, then draw a square.
- Find a way to draw star polygons on your calculator. Can you explain how this works?