1. (7 points) Each circle below has radius 5 and the origin of the coordinate system is at the center. Find the angle $\theta$ in each of the three pictures below:

- $x = 4$
- $y = 3$
- slope = -0.4 perpendicular to radial line
2. (7 points) Find the angles $\alpha, \beta, \gamma$ in the picture. 
(Note, The “square” indicates a right angle):
3. (6 points) A thermal cycler is a biotech machine which precisely varies the temperature of a very small chamber containing DNA samples. Suppose the temperature $^\circ$C in the container at time $t$ minutes is given by the function:

$$y = 36\cos\left(\frac{\pi}{3}t - \pi\right) + 59.$$

Here is a graph of this function for the first 12 minutes.

During the this 12 minute time period, find the total amount of time the DNA chamber has a temperature of at least $70^\circ$C.