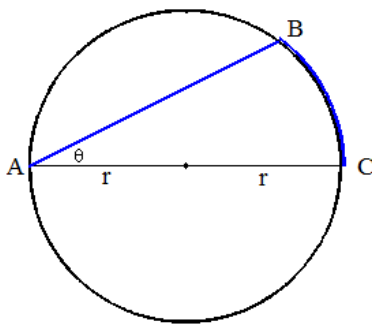


## Assignment 8

To be done on a **separate** piece of paper! Please **do not** cram all of your answers onto this worksheet!

Due **Wednesday 11/5/14** in class.

1. Find the point on the line  $y = 4x + 7$  that is closest to the origin.
2. A rectangular storage container with an open top is to have a volume of  $10 \text{ m}^3$ . The length of its base is twice the width. Material for the base costs  $\$10/\text{m}^2$ , and material for the sides costs  $\$6/\text{m}^2$ . Find the cost of materials for the cheapest such container.
3. A woman at a point  $A$  on the shore of a circular lake with radius  $r$  miles wants to arrive at the point  $C$  diametrically opposite  $A$  on the other side of the lake. She can walk at a rate of 4 miles per hour and row a boat at 2 miles per hour. *Hint:* draw a radius from the center of the circular lake to the point  $B$  where she lands.



- (a) Express the distance she must boat as a function of  $r$  and  $\theta$ .
- (b) Express the distance she must walk as a function of  $r$  and  $\theta$ .
- (c) Which path should she take if she wants to minimize the total distance she travels? What is the minimum distance?
- (d) Find the angle  $\theta$  which minimizes the total *time* required to travel to point  $C$ . In terms of  $r$ , what is the minimum time?