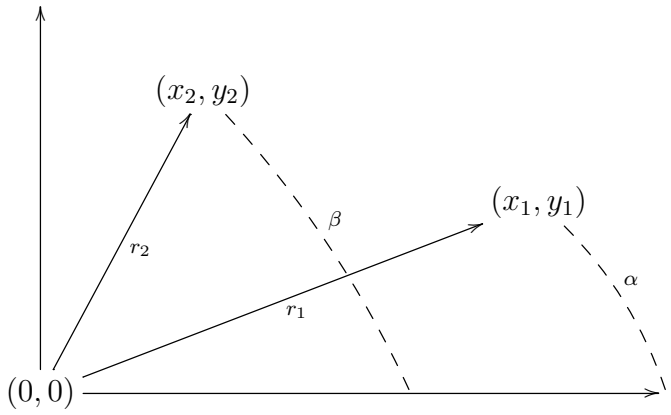
Math 8
Winter 2020

Preliminary Homework
Assigned Wednesday, January 29

Note: Preliminary homework is always graded credit or no credit. **You get full credit for completing the assignment, whether or not your answers are correct, as long as your work shows you have thought about the problem.** The purpose of preliminary homework is to start you thinking about the topic of the next class.

You may use your preliminary homework for in-class activities with your classmates. You should be sure to think about these questions so you will be prepared.

Preliminary homework is always due at the *beginning* of the next class.



(1.) Suppose the vector in $\mathbb{R}^2$ from $(0, 0)$ to (x_1, y_1) has length r_1 and makes an angle of α with the x-axis, where $0 < \alpha < \dfrac{\pi}{2}$. Express the sine and cosine of α in terms of x_1, y_1, and r_1.

Hint: Use the right triangle with corners $(0, 0)$ $(x_1, 0)$, (x_1, y_1).

(2.) Suppose the vector in $\mathbb{R}^2$ from $(0, 0)$ to (x_2, y_2) has length r_2 and makes an angle of β with the x-axis, where $\alpha < \beta < \dfrac{\pi}{2}$. Express the sine and cosine of β in terms of x_2, y_2, and r_2.

(3.) Let θ be the angle between the vector from $(0, 0)$ to (x_1, y_1) and the vector from $(0, 0)$ to (x_2, y_2). Express the cosine of θ in terms of x_1, x_2, y_1, y_2, r_1, and r_2.

Hint: Notice that $\theta = \beta + (-\alpha)$ and use the trigonometric identity

$$\cos(\theta_1 + \theta_2) = \cos(\theta_1)\cos(\theta_2) - \sin(\theta_1)\sin(\theta_2).$$