The entire exam should be in radians. Also, your work is part of your answer; these problems can require several of steps and if I can’t understand your work then you may not receive full credit.

1. (5pt) First, find $\theta$ in the triangle below and leave your answer in exact form (otherwise no credit will be given). Then find $\ell$ and round to two decimal places.

2. (5pt) A bank is replacing a security camera and the manager is trying to decide which one to buy. The layout of the room is shown in the diagram below; the teller is 29 ft from the camera, the vault is 50 ft from the camera, and the teller is 43 ft from the vault. The angle $\theta$ in the diagram – called the camera’s viewing angle – is different for each camera. The bank manager wants to buy a camera which is capable of observing both the teller window and the vault at the same time. What is the minimum required viewing angle of the camera that she buys? Round to two decimal places.
3. (4pt) Find \( x \) in the triangle below and leave your answer in exact form. Note that depending on how you do this problem the number that you get at the end can be complicated. Simplify as best you can but don’t worry about finding the most simplified form possible.

![Triangle with unknown side \( x \)](image)

4. (6pt) A microphone in a recording studio is being hung from the ceiling by affixing it to two cables as shown in the diagram below. The cables are mounted to the ceiling at points which are 50 in apart, the microphone hangs 30 in from the ceiling, and the shorter cable is 34 in long. Find the angle (\( \theta \) in the diagram) that the longer cable makes with the ceiling. Round to two decimal places.

![Diagram with cables and microphone](image)