

Math 29
Homework 11

Write a 1-3 sentence summary of what we did in class the previous period.

1. There are n households in town A and n households in town B. For each $i = 1, \dots, n$, the i^{th} household in town A has consumption C_i and income R_i , and the relationship between these two values is given by $C_i = \alpha + \beta R_i$. Whereas, in town B, every household has the same consumption C and income R , and the relationship between these two values is given by $C = \alpha + \beta R$.
 - (a) Find the total level of consumption of town A.
 - (b) Find the total level of consumption of town B.
 - (c) Determine the value of R in terms of R_1, \dots, R_n such that the two towns have the same total level of consumption.

For the following problems note that the **angle of elevation**, **angle of inclination**, and **ascending angle** are angles going up from a horizontal. The **angle of depression** is the angle going down from a horizontal.

2. The angle of depression of a buoy from the top of a lighthouse 130 feet above the surface of the water is 6° . Find the distance from the base of the lighthouse to the buoy.
3. From the top of the 100-ft-tall building a man observes a car moving toward the building. If the angle of depression of the car changes from 22° to 46° during the period of observation, how far does the car travel?
4. A bridge is supported by an isosceles triangle. Its ascending angle is 47° and the base support is 2.7m long, how long are the remaining sides?
5. Two observers, who are 2 miles apart on a horizontal plane, observe a balloon between them in the same vertical plane. The angles of elevation are 50° and 65° respectively. Find the height of the balloon.

6. Amelia sees a jet heading south away from her at 42° angle of elevation. Twenty seconds later the jet is still moving away from her, heading south at a 15° angle of elevation. If the jet's elevation is constantly 6.3 km, how fast is it flying in kilometers per hour?