Suzhou triangle

Suzhou, known for its beautiful gardens and traditional water towns, is also home to the Suzhou Industrial Park (SIP) which features the iconic Gate to the East skyscraper. Imagine you are standing at the base of the Gate to the East and looking out towards two other famous landmarks in Suzhou: the Suzhou Museum and the Humble Administrator's Garden.

From your position at the Gate to the East:

The Suzhou Museum is 2.5 km away at a bearing of 30^0 (measured clockwise from the North). The Humble Administrator's Garden is 3 km away at a bearing of 110^0

You decide to find the direct distance between the Suzhou Museum and the Humble Administrator's Garden without passing through the Gate to the East.

Questions:

- Using the sine rule or cosine rule, determine the direct distance between the Suzhou Museum and the Humble Administrator's Garden.
- Find the angle of elevation from the Suzhou Museum to the top of the Gate to the East if the skyscraper is 300 meters tall.

The Pagodas

Suzhou, located in Jiangsu Province, China, is renowned for its classical gardens, traditional water towns, and ancient landmarks. One of the most famous landmarks in Suzhou is the Master of the Nets Garden (Wangshi Yuan).

Problem:
Imagine you are standing at one corner of the Master of the Nets Garden, and you spot two beautiful pagodas in the distance. The angle between your line of sight to the two pagodas is 60° . You know that the distance between the two pagodas is 500 meters.

If you are standing 300 meters away from the closer pagoda and the line joining you and the closer pagoda makes an angle of 40° with the line joining the two pagodas, **use the sine rule to determine the distance between you and the farther pagoda.**

If the angle of elevation from your position to the top of the closer pagoda is 30° and to the top of the farther pagoda is 20°, and you know the closer pagoda is 50 meters tall, **determine the height of the farther pagoda.**