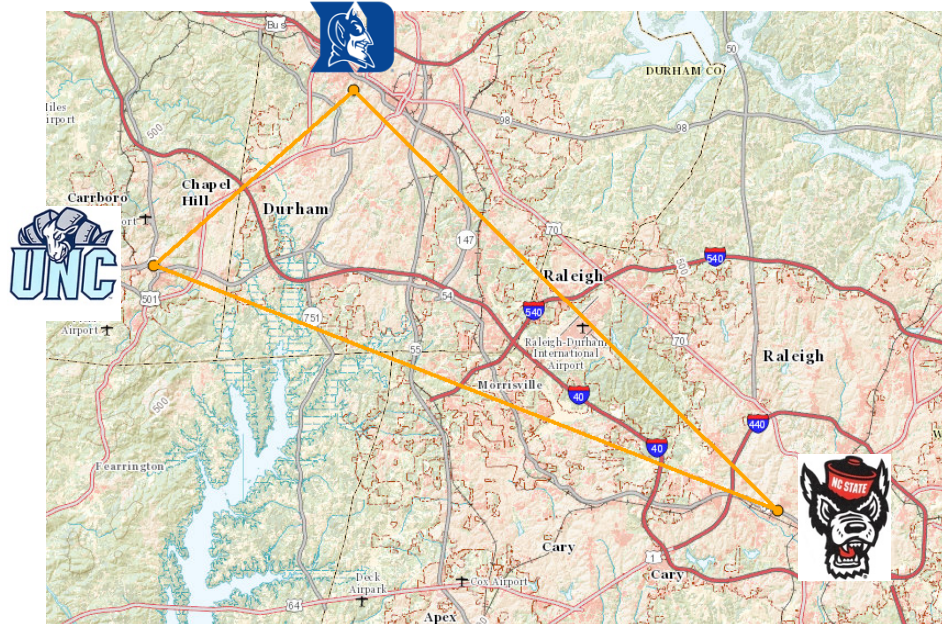# How Far is that Commute?

The Research Triangle is a region in North Carolina that is anchored by three major research universities: North Carolina State University, Duke University, and the University of North Carolina. The 2019 census recorded a population of 2,079,687 for this region.


1. A professor from UNC drives 9.8 miles to give a symposium at Duke in the morning. He then turns and drives 23.9 miles to give the same talk at NCSU. The two roads make a 100° angle. Use the Law of Sines or Law of Cosines to determine how far he will have to drive to get from NCSU back to UNC.

2. Check Google Maps to find the shortest distance between NCSU and UNC. How does this distance compare to your answer? What might be the cause for any differences?

3. Find the angles made at the University of North Carolina and North Carolina State University.

4. What is the area of this triangular region (in square miles)?

5. One important statistic about a region is its population density, or the number of people per square mile. Calculate the population density of the Research Triangle region. Do you think this is a valid measure? Explain why or why not.

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Important Ideas:

Check Your Understanding!

1. Find the area of the triangle below.
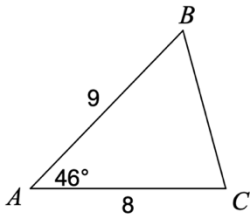
2. The fence around a triangular park measures 110 yards, 165 yards, and 200 yards for the three sides. If 1 acre = 4840 square yards, find the area of the park, in acres.

3. A group of hikers is driving east to the base of a mountain to begin their hike. When they are still 1300 meters away, they estimate the angle of elevation to the top of the mountain to be 18˚. When they get to the base of the mountain, they estimate the angle of elevation to be 34˚.

   Find the altitude of the mountain, in meters.

4. Two airplanes leave JFK airport at the same time. The first plane travels 380 mph and the second plane travels 450 mph. After 2 hours, they are 1600 miles apart. What angle is made by their flight paths?

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