

Precalculus, Section 6.1, #102
Angles and Their Measure

Distance between Cities Charleston, West Virginia, is due north of Jacksonville, Florida. Find the distance between Charleston ($38^\circ 21'$ north latitude) and Jacksonville ($30^\circ 20'$ north latitude). Assume that the radius of the Earth is 3960 miles.¹

We will use the arc length formula: $s = r\theta$. To use this formula, θ must be measured in radians.

The measure of the central angle between the two cities is $38^\circ 21' - 30^\circ 20' = 8^\circ 1'$. To convert to radians

$$\theta = 8^\circ 1' = 8^\circ + 1 \cdot \left(\frac{1}{60}\right)^\circ \approx 8.0167^\circ = 8.0167 \cdot \frac{\pi}{180} \approx 0.1399 \text{ radians}$$

So

$$s = r\theta$$

$$s = 3960 \cdot 0.1399$$

$$s \approx 554 \text{ miles}$$

¹Sullivan, *Precalculus: Enhanced with Graphing Utilities*, p. 366, #102.