MFH4U – Unit 3: Trigonometric Functions

**Lesson 1: Radian Measure**

The figure shows the location and approximate coordinates of four cities with longitude 10° E. The cities are Oslo, Norway; Cremona, Italy; Ghadamis, Libya and Libreville, Gabon. The figure shows the central angles formed by connecting these cities with the earth’s centre.



1. The radius of the earth is approximately 6378 km. What is the straight-line distance (through the earth!) from Oslo (O) to Libreville (L)?

1. The figure to the right shows the relative positions of Libreville (L) and Alborg, Denmark (A), both at longitude 10°E. The distance between the cities along arc *AL* is about 6378 km. Is the measure (θ) of the central angle ∠ACL greater than 60° or less than 60°. Is Alborg north or south of Oslo? Explain.
2. Determine the circumference of the earth.
3. Write a proportion involving θ, 360°, and the earth’s radius and circumference that you can solve to find θ to the nearest thousandth of a degree.
4. If two cities form a central angle with measure 0.5θ, how far apart are they along the surface of the earth? Explain how the value of θ could be a convenient unit of measurement when applying angles to measure distances of the earth.