Applications of Circle Theorems with Marine Navigation

BACKGROUND

Circle theorems are an area directly within, and related to Geometry, which involves the properties and the relations of points, lines, surfaces, and solids[1]. It all started more than 2,000 years ago, where mathematician **Euclid** first investigated the properties of a circle, he was and is also called the "Father of Geometry". There are seven circle theorems, which describes different angle properties. Circle theorems are used in geometric proofs and to calculate angles (mainly within a circle).

On the other hand, Trigonometry is the branch of mathematics dealing with the relations of the sides and angles of triangles and with the relevant functions of any angles. It was originally understood to define relations between elements of a triangle. Developed by Greek astronomer and mathematician Hipparchus, trigonometry has been proved very important in the study of triangles. Trigonometric functions have also proved useful in statistics, where it is needed for the computation of the bell curve[2].

[1] From https://www.google.co.th/search?q=geometry+meaning

[2] From https://www.reference.com/math/importance-trigonometry-863ca38da91bba65

by Son and Can, M3

Our research has found out that fields that utilize circle theorems are **navigators**, and **architects**. Therefore, in this project we will be finding out about the former. Fields that use trigonometry includes **astronomy** (accurately locating positions of objects in space, where sperical trigonometry comes into play), and **navigation** (oceanic, nauticalic, and astronomic).

In the past, most of the navigation used to be relying on coastal, celestial, and electronic marks, as roads didn't exist back then. One significant example is using stars as guides for directions, such as the north star (Polaris), which always lead you north. On an unrelated note, that also proves that the Earth is a sphere and not flat, as you cannot see the north star from the southern hemisphere. Most of the intercontinental transportation was done by ship, before times where the airplanes got invented, and the space race began.

As a result of the technological and industrial revolution, we have seen fantastic inventions in the last 150 years, such as the invention of planes which take us to anywhere in the world, or the invention of GPS (Global Positioning System), which is equipped in most cars and smartphones that we use. Nowadays we seem to take these inventions for granted, but it is still essential to learn the science behind. Ships are still setting sail, and it is important to learn about things that were used in the past, however, this technique we demonstrate in this project still works today (you only need a calculator, or maybe not if you are a mathematical genius!).