Applications of Circle Theorems with Marine Navigation

INTRODUCTION

The earth is a big circle. Consider the fact that we humans have lived there for hundred thousands of years, yet we have not explored it all completely, hence we decided to settle on this topic area. In this project, we investigate and explore the applications of circle theorems with marine navigation. Our mathematical focus is on circle theorems and Trigonometry, what we utilize for this project will be elaborated further in the Research Design section.

In general, circle theorems are properties of circles which are proved true by a chain of reasoning (hence the word theorem). The topic area in Core Mathematics is Trigonometry (sine, cosine, tangent). The topic area of Additional Mathematics is primarily Pythagoras, and circle theorems, including but not limited to tangents, sectors, and angles. However, in this project we will be specifically looking on how we can find the distance to the horizon from a ship. We will be using circles, tangents, triangles, and much more. The completed project will have an A2 poster, and a website made by us.

Did you ever know that the curvature of the earth can visually affect our vision of things that are far away in the horizon, for example, on a clear day you can see Mt. Rainier from Canada, but because of the Earth's curvature, you can only see the tip (Figure 1)? Also, try seeing the Chicago skyline from Michigan City, where you can only see the top halves of the buildings, again, because of the curvature of the Earth.

Figure 1

These are just some of the many interesting facts that sparked our curiosity of this complicated topic. Our planet Earth is a very complex and mildly interesting subject that has been studied from the ancient times to today, and it will still continue to be a perplexing topic in the future.

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