A Brief Note on Trigonometry and its Functions

John Robert*

Department of Applied Mathematics and Theoretical Physics, University of Cambridge, Cambridge, UK

Editorial

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***For Correspondence:** John Robert, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, Cambridge, UK

E-mail: Johnrobert@sheffield.ac.uk

EDITORIAL NOTE

Trigonometry is a branch of mathematics that examines the connections between side lengths and angles of triangles (from Greek trignon, "triangle," and metron, "measure"). Applications of geometry to astronomical research gave rise to the discipline in the Hellenistic civilization during the 3rd century BC. The Greeks concentrated on chord calculations, whereas Indian mathematicians established the first tables of values for trigonometric ratios (also known as trigonometric functions) like sine.Trigonometry is a branch of mathematics that deals with the application of particular angle functions in calculations. Sine (sin), cosine (cos), tangent (tan), cotangent (cot), secant (sec), and cosecant are their names and acronyms (csc).

All through historically, trigonometry has been applied in geological mapping, surveying, celestial mechanics, and navigation. Trigonometry has a lot of different identities [1-3]. These trigonometric identities are frequently used to rewrite trigonometrically formulas in order to simplify them, discover a more usable form of them, or solve an equation.

The ratios between the edges of a right triangle are known as trigonometric ratios. The following trigonometric functions of the known angle A, where a, b, and c correspond to the lengths of the sides in the accompanying diagram, provide these ratios:

- The ratio of the side opposite the angle to the hypotenuse is known as the sine function (sin).

- The ratio of the neighbouring leg (the side of the triangle linking the angle to the right angle) to the hypotenuse is known as the cosine function (cos).
- The ratio of the opposing leg to the neighbouring leg is known as the tangent function (tan).

The image depicts these six trigonometric functions in respect to a right triangle [4]. The ratio of the side opposed to A and the side opposite to the right angle (the hypotenuse) in a triangle is known as the sine of A, or sin A. These functions are features of the angle A that are independent of the triangle's size, and calculated values for many angles were tabulated before computers rendered trigonometry tables obsolete [5-7]. Trigonometric functions are used to determine unknown angles and distances from known or measured angles in geometric forms.

Trigonometry evolved from the need to determine angles and distances in professions such as astronomy, mapmaking, surveying, and artillery range finding. Problems involving angles and lengths in a single plane are dealt with in plane trigonometry. Spherical trigonometry considers applications to similar issues in more than one plane of three-dimensional space [8].

Classical trigonometry

The Greek words trigonon ("triangle") and metron ("to measure") are used to form the word trigonometry. Trigonometry was primarily concerned with determining the numerical values of missing portions of a triangle (or any geometry that can be split into triangles) when the values of other parts were known until around the 16th century [9]. You can compute the third side and the two remaining angles if you know the lengths of two sides of a triangle and the measure of the contained angle. These calculations distinguish trigonometry from geometry, which is concerned with qualitative relationships. Of course, this separation is not necessarily absolute: the Pythagorean Theorem, for example, is a quantitative statement regarding the lengths of the three sides of a right triangle. Still, trigonometry was mostly an offshoot of geometry in its early stages; the two fields of mathematics did not become independent until the 16th century [10].

Trigonometric functions

In mathematics, trigonometric functions (also known as circle functions, angle functions, or goniometric functions) connect the angle of a right-angled triangle to ratios of two side lengths. They're used in a wide range of geodetic disciplines, including navigation, solid mechanics, celestial mechanics, geodesy, and many more. They are among the simplest periodic functions, and as a result, they are frequently used in Fourier analysis to examine periodic phenomena [11]. The sine, cosine, and tangent are the most extensively utilised trigonometric functions in modern mathematics.

Trigonometry is one of the most important branches of mathematics that has a wide range of applications. The field of mathematics known as "trigonometry" studies the relationship between the sides and angles of a right-angle triangle. As a result, using trigonometric formulas, functions, or identities, it is possible to find the missing or unknown angles or sides of a right triangle [12]. The angles in trigonometry can be measured in degrees or radians. 0°, 30°, 45°, 60°, and 90° are some of the most regularly utilised trigonometric angles in calculations.

Trigonometry is further divided into two subcategories. The following are the two types of trigonometry:

- Trigonometry in plane
- Spherical trigonometry is a type of spherical trigonometry

Let's look at the six key trigonometric functions, ratios, trigonometry table, formulas, and identities that can be used to identify the missing angles or sides of a right triangle in this article.

Applications

- Astronomy
- Navigation
- Surveying
- Periodic functions
- Optics and acoustics
- Other applications

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