

## AI, ChatGPT, and Trigonometry

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The following question is intended to assess the technical “savvy” of ChatGPT. Learning math has many benefits. Some math concepts are used extensively, and some are not. I will argue that having an overall understanding of things “math” is beneficial, whether we use them or not. For example, when I began my job as a draftsman for a surveying/engineering company, the field crews actually used logarithmic trig functions to compute a field traverse. The concepts are straight forward and still legitimate. But, unless you are into physics, thermodynamics, or some other discipline that uses (natural) logarithms, chances are you have little need for logarithms.

To a lesser extent, the same can be said for spherical trigonometry. When I first started teaching geodetic astronomy at the Oregon Institute of Technology, we used spherical trigonometry in solving the PZS triangle. The PZS triangle also comes into play when reducing solar observations for azimuth. Some surveyors may still use spherical trigonometry, but my guess is that few surveying programs still teach spherical trigonometry – the time is used for more beneficially for learning other concepts.

Here is what ChatGPT has to say about the difference between plane trigonometry and spherical trigonometry. Again, if you ask the question differently, a better answer might be obtained.

What is the difference between plane trigonometry and spherical trigonometry?

The difference between plane trigonometry and spherical trigonometry is that plane trigonometry deals with two-dimensional or planar triangles, whereas spherical trigonometry deals with triangles on the surface of a sphere. In plane trigonometry, the three sides and three angles of a two-dimensional triangle are measured and calculated, using the six trigonometric functions: sine, cosine, tangent, cosecant, secant, and cotangent. In spherical trigonometry, on the other hand, the vertices of the triangle lie on the surface of a sphere rather than a plane. This kind of trigonometry is used to solve navigation and astronomy problems, as well as to accurately map features of the Earth. In spherical trigonometry, the basic triangle is defined by three arcs of great circles (the equivalent of straight lines on a sphere) instead of three line segments, and the trigonometric functions are modified to work on spherical coordinates instead of Cartesian coordinates.

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