**PRIMO Lesson Six Handout**

**Trigonometric Formulas**

Trigonometry, the branch of mathematics dealing with the relationships of the sides and angles of [triangles](https://www.google.com/search?sca_esv=691261aa57c4f8d5&sxsrf=ADLYWILJQqKLfsuN-legzWo-TRDnBnclVQ:1730003409993&q=triangles&si=ACC90nytWkp8tIhRuqKAL6XWXX-NX9jTgR88tWCJDW4SX75ScNzRlsdPeWLUNirwDjnydbId6oFIw6ZIa_TZjFm2gANAhqX78bZB1-S518ULhr3w9tJTr9U=&expnd=1&sa=X&ved=2ahUKEwi-x9n13K2JAxVaoGMGHU71C9QQyecJegQIGBAO) is often seen as a way to represent the ratio of sides in triangles, typically right triangles. However, the trigonometry that most of us have witnessed is only the surface of it. Although trigonometry is more often thought as a geometric term, it is also often used when solving algebraic problems. Trigonometry, to its very root, is a relevant function of any angle.

The most commonly used trigonometric functions are sine, cosine, and tangent, each represented by the abbreviations sin, cos, and tan, respectively. In a right triangle, the sine value of an angle is equivalent to the ratio between its opposite side and the hypotenuse, the cosine value is equivalent to the ratio between the adjacent side and the hypotenuse, and the tangent value is equivalent to the ratio between the opposite side and the adjacent side.

However, this does not mean that there is no trigonometric values for angles larger than 90°(or in radian). For larger angles, their trigonometric values are represented by the unit circle. The unit circle is a circle with radius 1 and center at the origin on a coordinate plane. Each point on the circle will represent the trigonometric values for a specific angle, which can be found by connecting the point with origin and measuring the counterclockwise angle between the line segment and the positive-x axis. This angle is often represented with the symbol θ.

Common trigonometric formulas:

**Q1.** Find the value of .

**Q2.** Find the value of .

**Q3.** Find the largest possible value of and the that results in that value.

**Q4.** Given , find the sum of all possible .

**Q5.** In acute , AD is the angle bisector of , given = = 0.8, find .