Precalculus B

Precalculus B is intended to prepare students planning to pursue a degree in the fields of science, technology, engineering or mathematics as well as other fields that require a high level of algebraic reasoning or would require Calculus. *Precalculus B* includes the *trigonometry* component of a precalculus course. It should be noted that while for some students this might be a terminal course, it is intended to prepare students for higher level mathematics courses. Topics include geometric reasoning and trigonometry.

I. Geometric Reasoning

- Students will use geometric formulas and proportional reasoning to model and solve problems . Specifically students will be able to a*pply the Pythagorean Theorem*
- *Determine the distance between points in the plane*
- *Find missing lengths or angles in similar triangles*

II. Trigonometry

Students will model and solve meaningful problems using trigonometric functions and their properties. Specifically, students will be able to:

- **Demonstrate an understanding of the properties of angles and of the basic trigonometric functions.**
  - *Understand the definition of radian measure and be able to convert between radians and degrees*
  - *Apply the concepts of radian measure to arc length and area of the sector of a circle*
  - *Apply radian measure to linear and angular velocity*
  - *Interpret sine and cosine as coordinates on a unit circle*
  - *Understand definitions of sine, cosine, tangent, cotangent, secant and cosecant*
  - *Apply right triangle trigonometry in real-world contexts and on the rectangular coordinate system*
  - *Immediately recall the values of $\sin\theta$, $\cos\theta$, $\tan\theta$, $\sec\theta$, $\csc\theta$ and $\cot\theta$ for the special angles*
- **Prove and use trigonometric identities**
  - *Use the Pythagorean identity (and its variations)*
  - *Use double and half-angle identities*
  - *Use angle addition and subtraction formulas to convert and simplify trigonometric expressions*
- **Identify important properties of the graphs of trigonometric functions**
  - *Identify amplitude, period, frequency, phase shift (domain shift) and vertical and horizontal shifts and stretches*
  - *Graph trigonometric functions using the properties of the graph*
- **Solve equations involving trigonometric functions.**
  - *Use identities, properties and factoring to simplify a trigonometric equation*
  - *Find general solutions to a trigonometric equation as well as solutions within a given interval*
- **Solve for missing lengths or angles of oblique triangles.**
  - *Apply the Law of Sines or the Law of Cosines*
- **Use and describe inverse trigonometric functions.**
  - *Use a calculator and reference angle to evaluate inverse trigonometric functions*
  - *Solve equations using properties of inverse trigonometric functions*

- *Describe domain and range of inverse trigonometric functions*

- **Vectors and Polar Coordinates**
  - *Find the magnitude and direction for the vector, given its initial point and its terminal point*
  - *Find the horizontal and vertical components of a vector, given its magnitude and direction*
  - *Perform vector operations*
  - *Represent vectors in polar form*