**Marietta City Schools**

**2025–2026 District Unit Planner**

*Precalculus*

| **Unit title** | *Unit 3: Applying Trigonometric Identities and Equations* | **Unit duration (hours)** | *15-18.75* |
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**Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit):** ***What will students learn?***

**GA DoE Standards**

**Standards**

**PC.AGR.4:** Manipulate, prove, and apply trigonometric identities and equations to solve contextual mathematical problems.

- **PC.FGR.4.1 Apply the fundamental trigonometric identities to simplify expressions and verify other identities.**
- **PC.FGR.4.2** Use sum, difference, double-angle, and half-angle formulas for sine, cosine, and tangent to establish other identities and apply them to solve problems.
- **PC.FGR.4.3** Solve trigonometric equations arising in modeling contexts.
- **PC.FGR.4.4** Prove and apply the Law of Sines and Law of Cosines to find unknown measurements in right and non-right triangles.
- **PC.FGR.4.5** Determine the area of an oblique triangle.

**PC.MM.1:** Apply mathematics to real-life situations; model real-life phenomena using mathematics.

- **PC.MM.1.1** Explain contextual, mathematical problems using a mathematical model.
- **PC.MM.1.2** Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
- **PC.MM.1.3** Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
- **PC.MM.1.4** Use various mathematical representations and structures with this information to represent and solve real-life problems.

**Concepts/Skills to be Mastered by Students**

Use the quotient, reciprocal, and Pythagorean identities.

Investigate the connections between the identities as they are derived.
Investigate the visual idea that solving sin(x) = ½ finds the graphical intersection of y = sin(x) and y = ½.
Investigate contexts such as a Ferris Wheel ride, pendulum motion, tides, predator-prey models, sound waves, etc.
Solve trigonometric equations using algebraic techniques such as factoring, root methods, etc.
Prove and apply (surveying problems, resultant forces, etc) the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles.
Determine the area of an oblique triangle.

**Vocabulary**

Altitude of a Triangle, Ambiguous Case, Heron's Formula, Identity, Included Angle, Law of Cosines, Law of Sines, Oblique Triangle, Verify

**Essential Questions**

1.How can we as mathematicians derive the Pythagorean identities from the unit circle and then apply that knowledge to find other forms?

2. How can we as mathematicians use the relationship between the six trigonometric functions to solve problems?

3. What tools and strategies are most effective to us as mathematicians when solving contextual trigonometric problems, and how do we know we have arrived at the correct and most precise answer?

4. How do we as mathematicians connect the law of sines and law of cosines to other areas of mathematics, including geometry and algebra?

**Assessment Tasks**

*List of common formative and summative assessments.*

**Formative Assessment(s):** Unit 3 Quiz, Skill checks, Warm-ups

**Summative Assessment(s):** Unit 3 Assessment

| **Learning Experiences**<br>Add additional rows below as needed. | | |
|---|---|---|
| **Objective or Content** | **Learning Experiences** | **Personalized Learning and Differentiation**<br>All information included by PLC in the differentiation box is the responsibility and ownership of the local school to review and approve per Board Policy IKB. |
| **PC.AGR.4:** Manipulate, prove, and apply trigonometric identities and equations to solve contextual mathematical problems.<br>● **PC.FGR.4.1 Apply the fundamental trigonometric identities to simplify expressions and verify other identities.** | Discovering the Pythagorean Identities Learning task<br>● I can investigate the identities as they are derived and apply that knowledge to find other forms. | **Supporting the Learning:**<br>● Make explicit connections to the Unit Circle.<br>**Extending the Learning**:<br>● Make a game to practice the skills and concepts experienced today. Make a list of needed materials. Think about rules for the game. Be prepared to explain to your teacher how the game works.<br>**Language Supports:**<br>● Provide multiple opportunities for structured peer interactions or conversations (pairs or triads) to negotiate meaning using charts, graphic organizers, a word bank, and/or sentence frames.<br>● Provide I can statements at the start of the unit to encourage mastery of content and vocabulary. |
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| Content Resources |
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| **Delta Math** |
| **Math Medic** |
| **Savvas** |