Curriculum Sample Template – 8 Pages Max. (12 pages for integrated ELA sample)

Grade Level	12	**Content Area**	Math
Course Title (grades 9-12 Only)	AP Calculus AB		
Expected Prior Knowledge *List the knowledge/skills mastered earlier in the year that are foundational to the mastery of the Required Standard(s).*	Prior to this lesson, students are expected to have mastered the following: Pythagorean Theorem, Definition of Sine, Cosine and Tangent, special right triangles, reference angle and triangle in degrees or radians.		
Alignment to Program of Instruction *Describe how the methods of instruction found in this sequence of lessons align to the Program of Instruction described in the application package.*	This sample aligns with the program of instruction because it is delivered by scaffolding through a group work, Cooperative learning. The content is aligned to STEM. Team work and problem solving, structured inquiry are expected while learning concepts.		
Standard Number* and Description *The standard number and description of the Required Standard(s) being instructed and assessed to mastery in the curriculum sample.*	Functions Trigonometric Functions (F-TF) F-TF.A.3 - Use special triangles to determine geometrically the values of sine, cosine, tangent for π/3, π/4 and π/6, and use the unit circle to express the values of sine, cosine, and tangent for π - *x*, π + *x*, and 2π - *x* in terms of their values for *x*, where *x* is any real number.		
Materials/Resources Needed *List all items the teacher and students will need for the entire sequence of instruction (excluding common consumables)*	Teacher white board, individual student white boards, individual unit circle dry erase boards, dry erase pens, laminated unit circle.		

* ***Standard Number****: For English Language Arts (Reading and Writing), use Grade, Strand, Standard (e.g., 3.RI.2). For K-8 Math, use Grade, Domain, Cluster, Standard (e.g., 6.EE.B.7). For HS Math, use Conceptual Category-Domain, Cluster, Standard (e.g., A-REI.C.6).*

Lesson (add as needed)	**Instructional Strategies -** *List and describe teacher actions, lesson by lesson, which will provide students with opportunities to engage the grade-level rigor defined by the Required Standard(s). Indicate alignment of instructional strategies to specific component(s) or content/skill(s) of the Required Standard/component.*	**Student Activities -** *Describe the activities, lesson by lesson, in which students will engage to allow them to master the grade-level rigor defined by the Required Standard(s). Indicate alignment of student activities to specific component(s) or content/skill(s) of the Required Standard/component.*
1	**Activation of prior knowledge:** Teacher will direct students to write the definition of sine, cosine and tangent and solve using the Pythagorean theorem.	**SW** write the definitions of sine, cosine, and tangent and solve the given problem using Pythagorean theorem.
	Objective: Students will (SW) learn the values of six trigonometric functions and values of trigonometric functions defined in terms of the unit circle.	**SW** write the objective in their interactive notebook.
	Key points: Special Right triangle. Reference Angle. Triangle in Degrees or radians. Pythagorean Theorem.	**SW** listen as teacher explain today's key points and take notes.
	Introduction to new material: TW remind the students of the acronym SohCahToa. Teacher will explain the three additional trigonometric ratios that are reciprocals of sine, cosine and tangent.	**SW** actively listen to the teacher. SW copy the notes and examples given by the teacher.
	Guided Practice: TW guide the students to determine the values of the six trigonometric functions by using Pythagorean theorem and definitions of sine, cosine and tangent and their reciprocals. TW show a few examples related to finding the values of trigonometric functions. Students will be challenged to determine the values of trigonometric functions from the given right triangles. The teacher will pull the students who are not ready for the independent practice and ELL students and students with special needs to form a small group intervention in the class and reteach the concept.	**SW** work on examples with the guidance of teacher by finding the missing side from the right triangles using Pythagorean theorem and will determine the values of trigonometric functions.
	Independent practice: TW give questions related to determining the six trigonometric functions.	**SW** work on some Practice questions given by the teacher.

	Assessment: TW give a quick "exit ticket" in which students have to answer a few questions and reflect on what they learnt in the class. TW will review the concepts in the next class based on the reflection.	**SW** complete the exit ticket by answering the questions.
2	**Activation of prior knowledge:** TW direct students to find the missing side from a right triangle using Pythagorean theorem and determine the values of six trigonometric functions. **Objective:** SW learn to sketch the reference angle and the trigonometric functions in all the first and second quadrants of a unit circle. **Key points:** Quadrantile Angle. Reference Angle. Triangle in Degrees or radians. Pythagorean Theorem. **Introduction to new material:** TW demonstrate to sketch the reference angle and explain that all trigonometric functions are positive in quadrant 1 and only Sine and Cosecant are positive in quadrant 2 by using 30^0, 45^0, and 60^0 reference angles in a unit circle. TW show finger tricks to remember the special angles in the first quadrant. **Guided Practice and Exploration:** TW guide the students to determine the values of trigonometric functions and their reciprocals in the first and second quadrants of a unit circle. TW show a few examples related to finding the trigonometric functions values in 1st and 2nd quadrants of a unit circle. The teacher will pull the students who are not ready for the independent practice and ELL students and students with special needs to form a small group intervention in the class and reteach the concept. **Independent practice:** Teacher will give questions for the students to practice.	**SW** use the Pythagorean theorem to find the missing side of right triangle and determine the values of six trigonometric functions using the acronym SohCahToa. **SW** write the objective in their interactive notebook. **SW** listen as teacher explains today's key points and take notes. **SW** actively listen to the teacher. SW copy the notes and examples given by the teacher. SW practice the finger tricks to remember the special angles in the first quadrant. **SW** work on Practice questions given by the teacher under the teacher guidance on the laminated unit circle. **SW** answer the questions given by the teacher and show their work on small white boards.

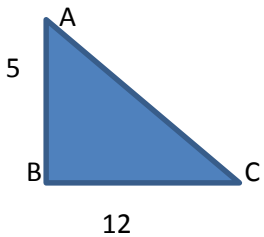
	Assessment: Teacher will give a few questions to answer and ask the students to show work on student's small white boards. TW review the concept based on the student work in the Activation of prior knowledge in tomorrow's lesson.	**SW** answer the questions on individual white boards and show it to the teacher.
3	**Activation of prior knowledge:** TW direct students to find the trigonometric values in first and second quadrants. **Objective:** SW learn the quadrants and the trigonometric functions in all the 3rd quadrant of a unit circle. **Key points:** Quadrantile Angle. Reference Angle. Triangle in Degrees or radians. Pythagorean Theorem. **Introduction to new material:** TW demonstrate to sketch the reference angle and explain that only tan, cot values are positive in third quadrant reference angles in a unit circle. **Guided Practice and Exploration:** TW guide the students to determine the values of trigonometric functions and their reciprocals in the third quadrant of a unit circle. TW show a few examples related to finding the trigonometric functions values in 3rdquadrant of a unit circle. The teacher will pull the students who are not ready for the independent practice and ELL students and students with special needs to form a small group intervention in the class and reteach the concept. **Independent practice:** Teacher will give questions for the students to practice. **Assessment:** TW give a quick "exit ticket" in which students have to answer a few questions and reflect on what they learnt in the class TW review the concept based on the student work.	**SW u**se the unit circle to find the trig values in first and second quadrants. **SW** write the objective in their interactive notebook. **SW** listen as teacher explains today's key points and take notes. **SW** actively listen to the teacher. SW copy the notes and examples given by the teacher. **SW** work on Practice questions given by the teacher under the teacher guidance on the laminated unit circle. **SW** answer the questions given by the teacher and show their work on small white boards. **SW** complete the exit ticket by answering the questions in it.

4	**Activation of prior knowledge:** TW direct students to find the trigonometric values in first and second and third quadrants. **Objective:** SW learn the quadrants and the trigonometric functions in all the 4th quadrant of a unit circle. **Key points:** Quadrantile Angle. Reference Angle. Triangle in Degrees or radians. Pythagorean Theorem. **Introduction to new material:** TW explain that only cos and Secant values are positive in fourth quadrant reference angles in a unit circle. **Guided Practice and Exploration:** TW guide the students to determine the values of trigonometric functions and their reciprocals in the fourth quadrant of a unit circle. TW show a few examples related to finding the trigonometric functions values in 4th quadrant of a unit circle. The teacher will pull the students who are not ready for the independent practice and ELL students and students with special needs to form a small group intervention in the class and reteach the concept. **Independent practice:** Teacher will give questions for the students to practice. **Assessment:** TW give a quick "exit ticket" in which students have to answer a few questions and reflect on what they learnt in the class TW review the concept based on the student work.	**SW** use the unit circle to find the trig values in first and second and third quadrants. **SW** write the objective in their interactive notebook. **SW** listen as teacher explains today's key points and take notes. **SW** actively listen to the teacher. SW copy the notes and examples given by the teacher. **SW** work on Practice questions given by the teacher under the teacher guidance on the laminated unit circle. **SW** answer the questions given by the teacher and show their work on small white boards. **SW** complete the exit ticket by answering the questions in it.
5	**Objective:** TW will quickly review the last 4 days lessons. TW instruct students to complete the summative assessment. .	**SW** actively listen to the teacher review. **SW** complete the summative assessment.

S.A.	*Provide an opportunity for the student to complete the summative assessment items which is clearly separate from instruction and guided or independent practice, and in which the student is assessed independently. In the Student Activities column, provide a brief description of the summative assessment (S.A) items that will allow students to demonstrate mastery of the rigor of the Required Standard(s)/components, and the context in which the items will be administered.*	SW demonstrate the values of six trigonometric functions and values of trigonometric functions defined in terms of the unit circle. SW learn to sketch the reference angle and the trigonometric functions in all the first, second, third, and fourth quadrants of a unit circle. SW work individually and TW provide unit circle.

Summative Assessment Items and Scoring: 3 points each.

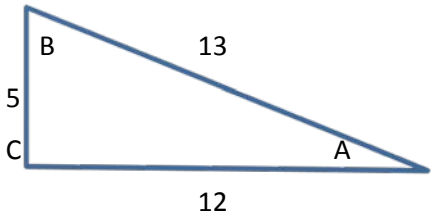
1. Below is a right triangle with the angles A, B and C. and a side Length of 5 units and the second side of length 12 units. Determine the sine, cosine, and tangent of Angle A.



sine A= _____ cosine A=_____ tangent A=_____

2. Find sin B and tan A in the triangle below.

sin A=_____ tan A=_____



3. Explain how you can use the unit circle to find the value of cos θ for any angle on the unit circle.

4. Use the unit circle to give exact value of each of the following.

A. Cos 45^0 B. Sin $\frac{2\pi}{3}$ C. Sin 180^0

5. Use the unit circle and the definition of tangent of θ to give the exact value of each of the following.

   A. Tan 45^0 B. Tan $\frac{2\pi}{3}$ C. Tan 180^0

6. Compare the values of Tan 0^0 and Tan 90^0

7. Use the unit circle and the definition of the reciprocal trigonometric functions to give the exact value of each of the following.

   A. sec 45° B. cot 2π/3 C. sec 270° D. csc 7π/6

8. Find the values of the six trigonometric value of θ, given the following information.

   A. Tan θ = 4/3 ; the terminal side of θ is in Quadrant 3
   B. Sec θ = 6/5 ; Sin θ < 0

9. Give the exact values of each of the following trigonometric values

   A. Cos 60^0 B. cosecant 120^0 C. Tan 90^0 D. Tan 315^0

Rubric for all questions

	3 points	2 Points	1 Point	0 - points
Problem Solving	**Answer is correct and accurate**	**Answer is correct and accurate**	**Answer is correct and accurate**	**Answer is incorrect.**
Math Communication	**Formula/Explanation/reasoning is clearly provided.**	**Formula/explanation/reasoning is provided, but not in detail.**	**Formula/explanation/reasoning is not provided.**	**Formula/explanation/reasoning is not provided.**
Presentation	**Step by step process is clearly written**	**Step by step process is written with some missing steps.**	**The sequential process is not written.**	**The sequential process is not written.**

Total: _____/27

Grading scale:

27-24 = 90-100% Mastery **19-18=70-79% Proficient = Reteach/Retest**

23-21 = 80-89%Mastery **17 and Below= 69% or less Reteach/Retest**

Answer Key

1. sine= 12/13 cosine= 5/13 tangent= 12/5

2. sin B = 12/13 tan A = 5/12

3. Since r = 1 for any point on the unit circle, cos θ =x / r = x/1 = x so for any angle θ on the unit circle, cosine of θ will be the x-coordinate of the point associated with that angle.

4. A. √2/2 B. √3/2 C. 0

5. A. 1 B. -√3 C. 0

6. Tan 0^0 is 0 and Tan 90^0 is 1/0 = is undefined.

7. A. 2/√2 or √2 B. - 1/√3 or - √3/3 C. undefined D. -2

8. A. sin θ = -4/5 , cos θ = -3/5 ; csc θ = -5/4 , sec θ = - 5/3 ; cot θ = ¾
   B. sin θ = -√ 11/6 ; cos θ =5/6 ; tan θ = -√11/5 ; csc θ = - 6/√11 or - 6√11/11 ; cot θ =- 5/√11 or -5√11 / 11

9. A. ½ B. 2/√3 or 2√3 / 3 C. Undefined D. -1