



MTH or MATH 112Z Precalculus: Trigonometry

MEMORANDUM

TO: Transfer Council

FROM: Nikki Gavin & Celeste Petersen, Co-Chairs of CCN Math Subcommittee

DATE: March 8, 2022

SUBJECT: MTH 112z course learning outcomes

On January 19, 2023, Transfer Council conditionally approved MTH 112Z, asking that the subcommittee consult with an assessment expert to reduce the number of learning outcomes from the original nine recommended by the Math Subcommittee. The Transfer Council asked that HECC staff identify one or more individuals with outcomes and assessment expertise to advise the Math Subcommittee on this work. With guidance from Transfer Council Co-chairs Teresa Rivenes and Susan Jeffords, two people were identified as having extensive experience with outcomes and assessment: Ann Cary from Portland Community College; and Kristin Nagy Catz from Oregon State University.

On January 27, Jane Denison-Furness, from HECC, and Kristin Nagy Catz met to discuss options for working with the Math Subcommittee to revise course learning outcomes for MTH112Z. On February 15, the subcommittee met to discuss reducing the number of course learning outcomes. The committee attempted to condense the nine outcomes to seven but ultimately determined that it was ineffective, misleading, and confusing to condense the previously recommended outcomes into fewer outcomes.

The subcommittee believes that the lack of an assessment framework prior to the alignment of MTH 112Z impinged upon the work of the Math Subcommittee throughout the process of constructing the 2022 recommendation, as well as during this process of attempting to reduce the number of outcomes. In order for the construction, assessment, reflection, and improvement of the courses going through the CCN process to be effective and for the framework to have meaning and longevity, there must be agreement on assessment terminology and best practices. The significant variation in the terminology and practices in curriculum and assessment around the State is complicating and confounding the goals of the CCN process. Thus, this subcommittee recommends that the newly forming Outcomes and Assessment Subcommittee (OAS) be charged with creating an outcomes and assessment framework. Much like the framework and guidance provided by the Systems and Operations Subcommittee, this guidance will provide structure to the current and ongoing outcomes work of the CCN discipline subcommittees. This framework should minimally include evidence-based definitions for concepts and metrics critical to valid and sound assessment (e.g., outcome, objective, topic, content), as well as guidance on best practices for structure and grammar, Bloom's taxonomy, and a range for the optimal number of outcomes. Finally, the OAS should clarify the assessment language used in SB 233 and provide a framework within the legislation's scope. Many of the terms and structures identified above are used regularly in the world of curriculum and assessment. Still, they are not prescribed by SB 233, prompting the question of whether norming these concepts is in the scope of the faculty charge.

Kristin Nagy Catz supports this decision noting that it seemed like an impossible task in the very short amount of time we had to try to merge and reduce the number of outcomes. No justification or rationale was able to be provided demonstrating how five to seven outcomes are an improvement over the nine carefully and purposefully written outcomes previously recommended.

In conclusion, the Math Subcommittee voted to retain the originally recommended nine outcomes and to revisit the outcomes in an upcoming review cycle when assessment definitions and a framework have been provided: Yes, 12; No, 0; Abstain, 0.

For more detailed information, see [CCN Reports & Memos](#) on the [Resources for CCN](#) webpage.

CCN Course/Course Information

Course Number and Prefix: MTH or MATH 112Z

Course Title: Precalculus II: Trigonometry

Course Credits: 4

Course Description:

A course primarily designed for students preparing for calculus and related disciplines. This course explores trigonometric functions and their applications as well as the language and measurement of angles, triangles, circles, and vectors. These topics will be explored symbolically, numerically, and graphically in real-life applications and interpreted in context. This course emphasizes skill building, problem solving, modeling, reasoning, communication, connections with other disciplines, and the appropriate use of present-day technology.

Learning Outcomes:

At the end of this course, students will be able to:

1. Translate among various systems of measure for angles including radians, degrees, and revolutions.
2. Represent, manipulate, and evaluate trigonometric expressions in terms of sides of a right triangle and in terms of the coordinates of a unit circle.
3. Graph, transform, and analyze trigonometric functions using amplitude, shifts, symmetry, and periodicity.
4. Manipulate trigonometric expressions and prove trigonometric identities.
5. Solve trigonometric equations using inverses, periodicity, and identities.
6. Define, represent, and operate with vectors both geometrically and algebraically.
7. Apply the law of sines and the law of cosines to determine lengths and angles.
8. Use variables, trigonometric functions, and vectors to represent quantities, create models, find solutions, and communicate an interpretation of the results.
9. Determine the reasonableness and implications of mathematical methods, solutions, and approximations in context.

Review Cycle Recommendation:

This subcommittee recommends the following schedule, structure, and goals for the reflection, maintenance, and enhancement of the recommendations made in this report:

1. Annual CCN Math Subcommittee Check-ins beginning in Winter 2025 to gather qualitative and/or quantitative data on faculty and student experiences, make requests for institutional and statewide data, discuss challenges, and raise concerns to review the transfer effectiveness of the CCN Math courses. The scope of annual check-ins will focus on the statewide and collaborative nature of this work to facilitate

- 2. Triennial CCN Math Subcommittee Workshops beginning in Winter 2027 with the purpose of analyzing qualitative and quantitative data, drafting and approving modifications to the CCN Math Recommendations, and problem-solving implementation issues to strive to improve the effectiveness, inclusiveness, equity, and implementation of the recommendations and framework.**
- 3. Efforts and results in engaging statewide entities in supporting and facilitating the work of the CCN Math Subcommittee. Statewide and regional conferences, gatherings, and workgroups, such as the Oregon Mathematical Association of Two Years Colleges (ORMATYC) and Oregon Math Chairs (OMC), are opportunities for data collection, collaboration, and networking critical to the success of the mandates in SB 233. Additionally, the development and maintenance of a statewide working-state repository for sharing inter-institutional information on math pathways, course outlines and updates, math placement practices, prerequisites, curriculum, and other information needed for successful statewide collaborative efforts.**
- 4. Efforts and results in maintaining the continuity of the membership of the CCN Math Subcommittee and in improving equitable representation. The significant impacts of the work produced by this subcommittee necessitate efforts to actively engage all OR CCs and OPUs in this work.**

**Copies: Donna Lewelling, HECC
Veronica Dujon, HECC
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Members of Transfer Council
Members of the CCN Math Subcommittee**