SECTION HEADING

MATH 1113: Pre-Calculus

Description

Precalculus reviews the concepts of college algebra and then extends those ideas to trigonometry and analytic geometry. Exponential, logarithmic, and polynomial functions are emphasized in the review. The course explores rectangular coordinates and angles, solutions of right triangles, unit circles, radian measure, trigonometric functions and their inverses, trigonometric graphs, trigonometric equations and identities, complex numbers, conic sections, and other analytic geometry topics such as polar coordinates, parametric equations, sums and geometric series, and vectors.

Credits

4

Prerequisite

MATH 1111 or placement by multiple measures

Corequisite

None

Topics to be Covered

1. Concept of a function and their graphs

2. Function notation, including piecewise defined functions and absolute value functions

3. Proportionality, rates, and rates of change

4. Linear functions and data modeling

5. Complex numbers

6. Fundamental Theorem of Algebra

7. Polynomial, power, and rational functions

8. Transformations of functions and their graphs

9. Compositions, Inverses, and Combinations of functions

10. Exponential and logarithm functions and modeling

11. Trigonometric functions of real numbers

12. The unit circle concept and trigonometric graphs

13. Inverse Trig functions

14. Trigonometric functions of angles and right triangle definitions

15. Trigonometric identities, equations, and modeling periodic behavior

16. Law of Sines and Cosines

17. Vectors and the Dot product

18. Polar coordinate system

19. Polar equations of conics

20. Parametric equations

21. Trig form of complex numbers

22. Systems of Equations of two and several variables

23. Systems of inequalities

24. Systems of linear equations and matrices

25. Inverses of matrices and matrix equations

26. Determinants and Cramer's Rule

27. Conic Sections—parabolas, ellipses, hyperbolas

28. Arithmetic sequences and series

29. Geometric series and applications

30. Mathematical Induction

31. Partial Fractions

Learning Outcomes

1. Define algebraic and trigonometric concepts in four ways: verbally, analytically, numerically and visually.

2. Demonstrate skills to solve equations and inequalities and to simplify or expand expressions.

3. Recognize and apply different types of functions and relations.

4. Recognize and apply different types of functions and relations. Implement functions and relations to model real-world applications and predict outcomes from modeling data.

5. Communicate mathematical ideas in writing.

Credit Details

Lecture: 4

Lab: 0

OJT: 0

MnTC Goal Area(s): Goal Area 04- Mathematics/Logical Reasoning

Minnesota Transfer Curriculum Goal Area(s) and Competencies

Goal Area 04: Mathematics/Logical Reasoning

1. illustrate historical and contemporary applications of mathematical/logical systems.

2. clearly express mathematical/logical ideas in writing.

3. explain what constitutes a valid mathematical/logical argument (proof).

4. apply higher-order problem-solving and/or modeling strategies.