

TEACHER MASTERY GUIDE

PRECALCULUS

FIRST TERM

Understanding Functions

- * represent and analyze a variety of functions and their characteristics graphically, algebraically, verbally, and numerically;
- * graph a variety of functions using transformations;
- * solve a variety of equations using appropriate methods;
- * solve linear, quadratic, and polynomial inequalities using appropriate methods;
- * solve real-world problems modeled by linear, quadratic, radical, rational, polynomial, exponential, and logarithmic functions;
- * use data analysis techniques to model real-world phenomena using functions.

Applications of Matrices

- * demonstrate an understanding of operations on matrices;
- * solve real-world problems involving networks, finite graphs, and geometric transformations.

Sequences and Series

- * recognize the difference between continuous and discrete situations;
- * demonstrate an understanding of recursive and explicit definitions of functions and sequences;
- * apply sigma notation with arithmetic and geometric series;
- * represent a sequence using a list, graph, symbols, and words.

SECOND TERM

Trigonometric Functions

- * define six circular functions;
- * sketch graphs of the six trigonometric functions involving period change, amplitude change, phase shift, and/or vertical shift;
- * use trigonometric functions to model periodic phenomena;
- * use graphs to develop and verify trigonometric identities;
- * find values of inverse trigonometric functions, applying appropriate domain and range restrictions;
- * solve trigonometric equations and inequalities either algebraically or using an automatic grapher.

Applications of Trigonometry

- * derive the Law of Sines and the Law of Cosines and apply them to solve problems involving triangles and vectors;
- * derive and apply the formulas for the area of a triangle and the sector of a circle;
- * understand the relationship between measurements in radians and degrees;
- * apply radian measures in problems related to linear and angular velocity;
- * understand and apply vectors to solve real world problems;
- * represent complex numbers in both rectangular and polar form;
- * apply the trigonometric form of complex number in calculations;
- * prove and apply DeMoivre's Theorem to find roots and powers of complex numbers.

Sequences and Series

- * demonstrate an understanding of sequences by representing them recursively and explicitly;
- * use sigma notation to represent a series;
- * determine whether a given series converges or diverges;
- * find the sum of an infinite series that converge;
- * find the sum of an infinite geometric series.