

# FLINT RIVER ACADEMY MATH STANDARDS

## Pre-Calculus

This discipline combines many of the trigonometric, geometric, and algebraic techniques needed to prepare students for the study of calculus and strengthens their conceptual understanding of problems and mathematical reasoning in solving problems. These standards take a functional point of view toward those topics. The most significant new concept is that of limits. Students will also learn the techniques of matrix manipulation so that they can solve systems of linear equations in any number of variables.

1. Students are familiar with, and can apply, polar coordinates in the plane. In particular, they can translate between polar and rectangular coordinates and can interpret polar coordinates and vectors graphically.
2. Students are adept at the arithmetic of complex numbers. They can use the trigonometric form of complex numbers and understand that a function of a complex variable can be viewed as a function of two real variables. They know the proof of DeMoivre's theorem.
3. Students can give proofs of various formulas by using the technique of mathematical induction.
4. Students know the statement of, and can apply, the fundamental theorem of algebra.
5. Students are familiar with conic sections, both analytically and geometrically:
  - a. Students can take a quadratic equation in two variables; put it in standard form by completing the square and using rotations and translations, if necessary; determine what type of conic section the equation represents; and determine its geometric components (foci, asymptotes, and so forth).
  - b. Students can take a geometric description of a conic section - for example, the locus of points whose sum of its distances from  $(1, 0)$  and  $(-1, 0)$  is 6 - and derive a quadratic equation representing it.
6. Students find the roots and poles of a rational function and can graph the function and locate its asymptotes.
7. Students demonstrate an understanding of functions and equations defined parametrically and can graph them.
8. Students are familiar with the notion of the limit of a sequence and the limit of a function as the

## Probability and Statistics

1. Students know the definitions of the notion of independent events and can use the rules for addition, multiplication, and complementation to solve for probabilities of particular events in finite sample spaces.
2. Students know the definition of conditional probability and use it to solve for probabilities in finite sample spaces.
3. Students demonstrate an understanding of the notion of discrete random variables by using them to solve for the probabilities of outcomes, such as the probability of the occurrence of five heads in 14 coin tosses.

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4. Students are familiar with the standard distributions (normal, binomial, and exponential) and can use them to solve for events in problems which the distribution belongs to those families.

5. Students know the definitions of the mean, median, and mode of a distribution of data and can compute each in particular situations.

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