

Reading Public Schools

Instilling a joy of learning and inspiring the innovative leaders of tomorrow



Course

Functions, Statistics, and Trigonometry

Course Description

This course involves the further study of advanced algebra topics, including the study of elementary functions such as exponential functions and logarithmic functions. Topics in trigonometry include the trigonometry of a right triangle, identities, radian measure, graphs of trigonometric functions, solving equations, and laws of sines and cosines. Students will also be introduced to statistics and analysis.

Content Standards

Algebra

Seeing Structure in Expressions

1. Interpret the structure of polynomial and rational expressions.
2. Write expressions in equivalent forms to solve problems.

Arithmetic with Polynomials and Rational Expressions

1. Perform arithmetic operations on polynomials.
2. Understand the relationship between zeros and factors of polynomials.
3. Rewrite rational expressions.

Functions

Interpreting Functions

1. Analyze functions using different representations.

Building Functions

1. Build a function that models a relationship between two quantities.
2. Build new functions from existing functions.

Trigonometric Functions

1. Extend the domain of trigonometric functions using the unit circle.
2. Model periodic phenomena with trigonometric functions.

Geometry

Similarity, Right Triangles, and Trigonometry

1. Apply trigonometry to general triangles.

Statistics and Probability

Conditional Probability and the Rules of Probability

1. Use the rules of probability to compute probabilities of compound events in a uniform probability model.

Using Probability to Make Decisions

Math Practice Standards

- Making sense of problems and persevering in solving them
- Reasoning abstractly and quantitatively
- Constructing viable arguments and critiquing the reasoning of others
- Modeling with mathematics
- Using appropriate tools strategically
- Attending to precision
- Looking for and making use of structure
- Looking for and expressing regularity in repeated reasoning



Units	Essential Questions	Key Activities <u>MAY</u> include:
Polynomials	<ul style="list-style-type: none"> • How can polynomials be simplified and applied to solve problems? • Can two algebraic expressions that appear to be different be equivalent? • How are the properties of real numbers related to polynomials? • What strategies can be used to multiply polynomial expressions? • How can finding patterns help in the process of multiplying polynomials? 	
Rational Expressions	<ul style="list-style-type: none"> • Why do asymptotes exist? • Are a rational expression and its simplified form equivalent? • Why are rational functions useful in the real world? • Why do extraneous solutions sometimes arise when solving rational equations? 	<ul style="list-style-type: none"> ⇒ Whole class instruction ⇒ Small group instruction
Trigonometry	<ul style="list-style-type: none"> • What is a radian? • How are radians and degrees different? • How can your calculator fool you into thinking a wrong answer is correct? • How does tangent relate to sine and cosine? • How does cotangent relate to secant and cosecant? • How can reflection over the y-axis, origin, and x-axis be used to easily determine the values of the six basic trig functions in any quadrant of the Cartesian plane? • What is the unit circle? • How can symmetry and reflections be used to help you quickly memorize the unit circle? • What effect does changing the value of the four parameters of a trigonometric function have on its graph compared to the graph of its parent function? • How can we find unknown values in oblique triangles? 	<ul style="list-style-type: none"> ⇒ Formative assessments ⇒ Summative assessments ⇒ Performance tasks ⇒ Group projects ⇒ Explorations with technology ⇒ Real-world application problems
Statistics	<ul style="list-style-type: none"> • How can data be gathered, organized and displayed to communicate and justify results in real life situations? • What aspects of the data collection process are important? • How can data be analyzed to make inferences or predictions based on various data collection means? • How can probability be used to predict future events? 	

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Curriculum Guide Overview

Curriculum Guide

Curriculum guides are public documents aligned with the Massachusetts Department of Education Curriculum Frameworks. They focus on the set of standards that students will learn within certain disciplines at appropriate grade levels. Each area of the curriculum is divided into general strands (broad categories) under which the standards fall. When we discuss “standards-based education” we mean that students are measured against their proficiency and growth towards meeting these standards. Curriculum Guides are intended for teachers, parents, and the wider school community as an overview document of the course of study for the year.

Curriculum Map

Curriculum maps are internal documents utilized as planning tools for teachers. Curriculum maps keep a focus on the end-of-year standards and chart a course for the teaching and learning over the year. They are typically organized in a grade-level overview organized by month or marking period. Curriculum maps typically include; standards and expectations for the grade/content, essential skills/concepts, methods of assessment, and major content resources. Maps are never “done” as ongoing work of educators include revisions, additions, and revisits to the maps. They provide an overview for the year while also allowing educators to see a vertical picture of how the content develops as students progress through each grade.

Standards

The standards used as the foundation of our curriculum come directly from the Massachusetts Department of Education Curriculum Frameworks. State standards may be viewed here: <http://www.doe.mass.edu/frameworks/>

Priority Areas

Priority areas are defined by the state of Massachusetts as the most critical areas in each grade level on which instructional time should focus.

Mathematical Practice Standards

Mathematical Practice Standards are a set of skills/behaviors that are replicated in grades preK-12. These standards describe ways in which students engage with the mathematical content and the level of application grows increasingly complex as students progress vertically throughout their education.

Content Standards

The Content Standards describe what students should know and be able to do once within the area of mathematics.

Essential Questions

Essential questions are questions that are not answerable with an easy answer or a simple instruction. The purpose of essential questions is to provide opportunities for inquiry into the learning and act as an umbrella to anchor the unit/lesson.

Resources

Resources identified in Curriculum Guides are not intended to be exhaustive, nor are they intended to be prescriptive. The resources identified may function as a menu of curriculum resources from which educators identify the most appropriate tools to utilized in their classrooms. More specifics about identified resources are identified within the curriculum map documents.