**Welcome**

**To Integrated Adv. Algebra/Geometry (IM VI)**

**With Mr. Meyer**

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| *Grading* |
| Quizzes/Projects | 60% |
| Homework/Participation/In-class | 15% |
| Exam  | 25% |

***Required Materials***  ***Recommended Material***

* TI-NSPIRE CX graphing calculator – Students will want this to take the ACT or SAT. (The school has a **classroom** set available. However, students are *not* allowed to take them home).
1. Math Book
2. Lined paper
3. Planner
4. **Writing Utensil (readable please)**
5. **3-ring binder/folder to store**

**your work.**

*Graphing calculator – Students will want this to take the ACT or SAT. (The school has a classroom set available. However, students are not allowed to take them home.) Black River recommends the TI-NSPIRE CX or TI 84. Other brands are acceptable, but the teachers may not be able to provide assistance as quickly. Some graphing calculators are available as inexpensive smart phone applications – these apps are adequate for homework, but will not be allowed on standardized test or in class assessments. A great online site for graphing calculators is www.desoms.com/calculator*

**Quizzes/Projects**

Each unit will have approximately three quizzes. Quizzes will be taken in class and may involve an additional project component. Quizzes will be announced at the beginning of a week, but occasionally a smaller quiz will be given unannounced to check student understanding. Projects may be assigned in place of a quiz or unit test as a way to evaluate student understanding. A project may have a presentation component included. Clearly defined grading objectives and clear expectations will be provided.

**Sometimes** retakes are allowed, however the maximum score achievable on a retake is an 86%. The retake score will be multiplied by .86 and then put into infinite campus only if it is higher than the original score.

**Investigations**

Your investigation/participation grade consists of individual and group work done in class. If you do not finish an investigation during class, it should be completed and brought to class the next class day for full credit. Evaluations (the warm-up and formative assessments) should be turned in at the end of every class period, regardless of whether or not the investigation has been completed. Late investigations will not be accepted. The only exceptions are for excused absences or specific accommodations set forth by an official IEP’s.

**Warm-Ups**

These problems must be attempted when you first walk into the room. They will give you extra practice in computation and may prep you for the kind of problems and skills you will see or need later in the class, or for standardized tests.

**Homework**

Homework will be assigned almost every day. It should take approximately 30-45 minutes to complete. All of the homework for a lesson is due on quiz day. Suggested due dates are given for each assignment. Students should check the solutions at the beginning of class or during help sessions. As homework is meant to be a time for practice of skills learned in class, it is scored as complete or incomplete. ***Corrected homework is subject to a quiz score at any time…be ready to make the corrections needed to learn from your mistakes. A Random HW solution will be selected from each set, graded for correctness, and placed as a grade in the assessments category. It is in your best interest to make corrections to your homework. Any complete assignment copied from solutions sets will be marked with a zero. If you change a solution cross off your incorrect one and the correct one may be written in. Copying solutions without crossing off your attempt will result in a zero.***

**Problems of the Lesson**

These problems are intended to review and/or preview concepts that will be tested on high stakes standardized tests. They will be prepared in the format similar to ACT or SAT questions, some WITH multiple choice options, some WITHOUT the multiple choice options however to stimulate the growth of solution strategies. These problems may be worked on in groups, using any resource necessary. Not all questions will relate to covered topics and students are expected to look up strategies online, seek help from more experienced colleagues, parents, teachers, or tutors. Solutions will be provided the week after each set is due. The sets are graded on correctness as well as completeness.

**Exams**

Exams will be given at the end of each semester. These will be cumulative for the semester and will be reflective of the quizzes and homework completed during the current semester.

**Integrated Advanced Algebra/Geometry (11th Grade Mathematics)**

**A Summary of the Units, Lessons and Objectives taught at Black River Public School during the 2016-2017 School Year**

**Main Resource: *Core-Plus Mathematics, Contemporary Mathematics in Context Course 3***

***Semester 1:***

**Unit 1: Reasoning and Proof**

Lesson 1: Reasoning Strategies

* Recognize the role of inductive reasoning in making conjectures and recognize the limitations of inductive reasoning
* Recognize the need for proof and be able to create a simple deductive argument to prove a mathematical assertion
* Create a counterexample to prove a claim is false
* Write if-then statements and their converses and use if-then reasoning patterns in arguments

Lesson 2: Geometric Reasoning and Proof

* Know and be able to use the angle relationship theorems involving two intersecting lines
* Know and be able to use the theorems justifying the construction of a line perpendicular to a given line through a given point and the construction of a line parallel to a given line through a given point
* Know and be able to use the angle relationship theorems involving two parallel lines cut by a transversal and their converses
* Know and be able to use the angle sum theorem and the exterior angle theorem for triangles

Lesson 3: Algebraic Reasoning and Proof

* Use algebraic notation – letters, expressions, equations, and inequalities – to represent general patterns and relationships among variables
* Use algebraic transformations of expressions, equations, and inequalities to establish general propositions about quantitative relationships

**Unit 2: Inequalities and Linear Programming**

Lesson 1: Inequalities in one variable

* Write inequalities to express questions about functions of one or two variables
* Given a graph of one or more functions, solve inequalities related to the function(s)
* Solve quadratic inequalities in one variable by solving the corresponding equation algebraically and reasoning about the graph of the related function(s)
* Describe the solution set of an inequality in one variable symbolically, as a graph on a number line, and using interval notation

Lesson 2: Inequalities in Two Variables

* Graph the solution set of a linear inequality in two variables
* Graph the solution set of a system of inequalities in two variables
* Solve linear programming problems involving two independent variables

**Unit 3: Similarity and Congruence**

Lesson 1: Reasoning about Similar Triangles

* Identify similar polygons and determine the scale factor of similar polygons
* Review and extend understanding of the Laws of Sines and Cosines
* Know and be able to use the three theorems providing sufficient conditions to prove triangles are similar (SSS, SAS, AA)
* Continue to develop the ability to write both synthetic and analytic arguments

Lesson 2: Reasoning about Congruent Triangles

* Understand congruence of figures as a special case of similarity of figures
* Know and be able to use the four theorems providing sufficient conditions to prove triangles are congruent (SSS, SAS, AAS, ASA)
* Know and be able to use properties of the incenter, circumcenter, and centroid of a triangle
* Continue to develop the ability to write both synthetic and analytic arguments
* Know and be able to use both necessary and sufficient conditions for quadrilaterals to be (special) parallelograms

**Unit 8: Inverse Functions**

Lesson 1: What Is An Inverse Function?

* Solve problems involving direct and inverse variation
* Discover conditions that guarantee existence of an inverse for a given function
* Develop and use strategies for recognizing i8nvertible functions from study of tables of values and/or graphs of those functions
* Develop and use strategies for finding rules of inverses for linear and power functions

Lesson 2: Common Logarithms and Their Properties

* Express a positive number as a power of 10
* Define and evaluate common logarithms
* Use logarithms to solve exponential equations
* Develop and use basic properties of the logarithmic function

***Semester 2:***

**Unit 6: Circles and Circular Functions**

Lesson 2: Circular Motion and Periodic functions

* Use sine and cosine functions to describe rotations of circular objects
* Use radian and degree measures to measure angles and rotations
* Define sine and cosine as functions of real numbers and analyze the resulting periodic graphs

Lesson 1: Properties of Circles

* Determine that a line tangent to a circle is perpendicular to the radius at the point of tangency and that the two tangent segments to a circle from the same external point are congruent
* State and apply the relationships among the measures of central angles, their chords, and their arcs
* State and apply the properties relating a radius, a chord, and the midpoint and perpendicular bisector of the chord
* State and apply the Inscribed Angle Theorem and the property that angles that intercept the same or congruent arcs are congruent

**Unit 8: Inverse Functions**

Lesson 3: Inverse Trigonometric functions

* Know and be able to use the definition of the inverse sine, inverse cosine, and inverse tangent functions
* Know and be able to use properties of the inverse sine, inverse cosine, and inverse tangent functions
* Use the inverse functions, to find one solution (when one exists) of $a⋅f\left(bx\right)+c=d$, where $f(x)$ is the sine, cosine, or tangent
* Express the general solutions of a trigonometric equation in forms such as $x=k+2πn$ or $x=k+360°n$ for any integer $n$
* Use trigonometric equations and their solutions to model and answer questions about periodic phenomena

**Unit 5: Polynomial and Rational Functions**

Lesson 1: Polynomial Expressions and Functions

* Model problem situations using polynomial functions
* Identify patterns relating rules and graphs of polynomial functions – connecting polynomial degree to local maximum and local minimum values and zeroes
* Add, subtract, and multiply polynomials – connecting degrees of component polynomials to degrees of sums, differences, and products
* Find zeroes of polynomial functions with prescribed zeroes

Lesson 2: Quadratic Polynomials

* Express quadratic function rules in vertex form
* Use vertex form of quadratic expressions to solve quadratic equations and locate the vertex of parabolic graphs
* Use completing the square to prove the quadratic formula
* Use the quadratic formula to analyze solution possibilities for quadratic equations and indicate the rationale for extending the number system to include complex numbers

Lesson 3: Rational Expressions and Functions

* Create rational functions to model problem situations
* Analyze graphs of rational functions and their asymptotes
* Simplify rational expressions
* Add, subtract, multiply, and divide rational expressions
* Use the sine and cosine functions to model periodic patterns of change in various physical phenomena

**Unit 7: Recursion and Iteration**

Lesson 1: Modeling Sequential change Using Recursion and Iteration

* Use iteration and recursion to model real-world situations involving sequential change
* Understand the basic concepts of recursive formulas, particularly those of the form $A\_{n}=A\_{n-1}+b$
* Understand the effects of changing certain parameters on the long-term behavior of recursive formulas and the situations they model
* Use subscript notation to represent formulas the use the words *NOW* and *NEXT* and to take advantage of this notation to analyze recursive formulas more efficiently

Lesson 2: A Recursive View of Functions

* Understand arithmetic sequences and their connections to linear functions, using recursive formulas, functions formulas, and applications
* Understand geometric sequences and their connections to exponential functions, using recursive formulas, function formulas, and applications
* Understand and apply arithmetic and geometric series (sums of sequences)
* *Use finite differences tables to find function formulas for certain recursive formulas and to describe the connection between such tables and polynomial functions* – only 2 sections of students

All chapter names and lists of objectives have been taken from:

James T. Fey, Christian R. Hirsch, Eric W. Hart, Harold L. Schoen, and Ann Watkins. *Core-Plus Mathematics Contemporary Mathematics in Context Teacher’s Guide Part A and B*. McGraw Hill Companies 2009. ISBN: 978-0-07-877262-7 and 978-0-07-877263-4