

OBJECTIVE This course emphasizes the algebraic and procedural aspects of mathematics and student success is directly linked to the learner having mastered the skills of Pure Math 10. Students are expected to communicate solutions clearly and be able to use technology to explore, model and apply mathematical concepts and procedures to real-life problems. A strong emphasis is placed on exact solutions determined by algebraic computations. **Students are recommended to maintain a minimum mark of 65% to prepare for Pure Math 30.**

OUTLINE The following is an approximate order and time frame for what we will be studying:

GRADE 10 REVIEW		3 classes
UNIT 1 - Systems (Graphical/Algebraic Solutions, Applications)		13 classes
UNIT 2 - Quadratics (Solving Equations, Properties of the Parabola)		17 classes
UNIT 3 - Polynomials (Graphing, Equations)		14 classes
UNIT 4 - Functions (Properties of Equations and their Graphs)		14 classes
UNIT 5 - Circle Geometry & Reasoning (Circle Properties, Proofs)		21 classes
UNIT 6 - Coordinate Geometry & Finances (DMS, Budgets, Loans, Annuities)		11 classes
YEAR REVIEW AND PRACTICE FINAL EXAM		

Some of the activities and assignments that we will be involved in as a class are listed below:

- Class Discussions
- Group Work
- Exams & Quizzes
- Weekend Assignments
- Calculator Activities
- Computer Activities

MATERIALS NEEDED

Each student is expected to bring the following items to every class:

- **Mathpower 11 Text (Western Edition)**
- **Graphing Calculator (REQUIRED)**
- **Binder, Pen, Pencil, Eraser, Ruler**
- **Non-metric Graph and Lined Paper**

COURSE EVALUATION

Your grade will be determined according to your marks on:

- **Assignments** (20% of school mark)
- **Quizzes** (10% of school mark)
- **Unit Exams** (70% of school mark)
- **Final Exam** (30% of course mark)

CLASSROOM RULES AND EXPECTATIONS

- **Attendance:** Do not be late for or skip class. *Students with poor attendance are usually unsuccessful in this course. If you are absent, it is your responsibility to catch up on what you missed.*
- **Come to class prepared:** *Come prepared to learn and participate.* You will need to bring all necessary books, texts, and materials to every class.
- **Homework:** Daily homework will not be collected or marked, but those who faithfully choose to do their homework will greatly increase their chances for success on the assignments and exams. Short take home assignments will be given every other weekend and taken in for marks.
- **Testing:** Each unit will consist of one or two quizzes and a unit exam. The quizzes are yours to keep and full answer keys will be posted in the room for your reference. There will always be at least one full day of in-class review before any major unit exam. If you know you will be absent for any exam or quiz, you must notify Mr. Davidson prior to the day of the exam to arrange an alternate time to write. Any student with an *unexplained absence for any test, project, or assignment* will receive a mark of 0%. There will be **no re-tests**.

If you are having any difficulties at any time throughout the semester, please attend the daily help sessions right away so we can clear things up before it gets too late!!!

UNIT 1 – SYSTEMS OF LINEAR EQUATIONS

LESSON 1 – Review of Linear Functions

- Review properties of linear functions (slope, intercepts, etc) and how to graph without technology
- Discuss how to convert between general and standard form
- *Pgs. 3*

LESSON 2 – Solving Linear Inequalities

- Discuss how to solve one-variable inequalities and how to graph solution on a number line
- Discuss the graphical solutions of two-variable linear inequalities with and w/o technology
- *Pgs. 63-64, 75-76*

LESSON 3 – Intro to linear Systems

- Define Linear Systems and their solution(s) (*Handout*)
- Discuss how to find solution with and w/o technology
- *Pgs. 11-12*

LESSON 4 – Solving by Substitution

- Discuss advantages over graphing and why coefficients of 1 or -1 are ideal
- Discuss the importance of perfecting your algebra
- *Pgs. 25-27*

LESSON 5 – Solving by Elimination

- Discuss how \pm of the equations or multiplying an equation produces new/different equations but does not change the solution of the system
- *Pgs. 38-40*

LESSON 6/7 – Problem Solving

- Discuss the process of problem solving...how to think through the problem
- *Pgs. 25-27, 38-40*

LESSON 8 – Solving with Matrices

- Discuss how to use the calculator (*Handout*)
- *Pgs. 25-27, 38-40 (also Pgs. 44-47 if done after the 3 equations lesson)*

LESSON 9/10 – Solving 3 Equations

- Discuss algebraic and technological solutions
- Include problem solving and other extensions
- *Pgs. 44-47*

LESSON 11 – Quiz

LESSON 12 – Review

- *Pgs. 52-54, 94-96*

LESSON 13 – Unit Final

UNIT 2 – QUADRATIC FUNCTIONS & EQUATIONS

LESSON 1 – Intro to Quadratic Functions: General Form

- Discuss the definitions of quadratic functions $f(x) = ax^2 + bx + c$, vertex, axis of symmetry
- Discuss how to use calculator to find coordinates of the vertex and all intercepts
- *Handout: Introduction to Quadratic Functions*

LESSON 2 – Intro to Quadratic Functions: Standard Form

- Extend the ideas to include quadratic functions in standard form... $y - k = a(x - h)^2$
- *Handout: Introduction to Quadratic Functions: Part 2*

LESSON 3/4 – Graphing Quadratic Functions by Hand

- Summarize the properties of the standard and general equations and review the ideas of domain and range
- Discuss how the pattern of $y = x^2$ is extended to graph any parabola
- *Pgs. 118-121*

LESSON 5 – Writing the Equations of Quadratic Functions

- Discuss how to use the ideas of direction, shape, and vertex to write equations
- *Pgs. 109-111, 118-121, 229*

LESSON 6 – Completing the Square

- Discuss the process of completing the square...lots of examples!
- *Pgs. 131-134*

LESSON 7 – Max/Min Problems

- Focus on looking for clues in the wording of the question
- A vertex of (x, y) means the max/min value is the y -coordinate and the x -coordinate is when it occurs
- *Pgs. 131-134*

LESSON 8 – Quiz

LESSON 9 – Solving QE by Graphing

- Discuss why the x -intercepts are the solutions for a quadratic equation
- *Pgs. 155-156*

LESSON 10 – Solving QE by Factoring

- Link factoring to equations with no real solution, two equal real roots, or two distinct real roots
- *Pgs. 160-162*

LESSON 11 – Solving QE by Completing the Square

- Focus on advantages (exact) and disadvantages (time)
- *Pgs. 172-173*

LESSON 12 – Solving QE Using the Quadratic Formula

- Discuss how formula is derived by completing the square
- *Pgs. 178-180*

LESSON 13 – The Discriminant

- *Handout: The Nature of the Roots – The Discriminant*

LESSON 14 – Applications of Quadratic Equations

- Discuss why the x -intercepts provide the solution and not the vertex
- *Handout: Problem Solving with Quadratic Equations*

LESSON 15/16/17 – Quiz/Review/Unit Final

- *Pgs. 52-54, 94-96*

UNIT 3 – POLYNOMIAL FUNCTIONS & EQUATIONS

LESSON 1 – Review of Polynomial Division

- Review long division, but focus on synthetic...remember descending order and no missing terms!
- *Handout: Polynomial Division*

LESSON 2/3 – Remainder, Factor, & Rational Root Theorems

- Discuss how the zero of the divisor provides valuable info about the remainder
- *Pgs. 202, 209*

LESSON 4 – Polynomial Factoring

- Focus on 3rd degree polynomials, but extend to higher degree
- *Pgs. 209*

LESSON 5 – Solving Polynomial Equations Algebraically

- Extend ideas of solving polynomial equations by factoring
- *Pgs. 219*

LESSON 6 – Solving Polynomial Equations Graphically

- Use technology to find solutions and discuss how the degree tells you how many roots are possible
- *Pgs. 221-222*

LESSON 7 – Polynomial Inequalities

- Discuss symbolic and graphically representations of the solutions
- *Pgs. 283*

LESSON 8 – Polynomial Problem Solving

- Discuss questions that use equations or inequalities and use both algebra and technology to solve
- *Pgs. 221, 284*

LESSON 9/10 – Intro to Polynomial Functions

- Discuss properties of polynomial functions and discuss how to find information from the equation
- *Handout: Properties of Polynomial Functions & Investigating Polynomial Functions*

LESSON 11 – Equations of Polynomial Functions

- Discuss how to write the equation of a polynomial function based on written descriptions or graphs
- *Handout: Equations of Polynomial Functions*

LESSON 12 – Quiz

LESSON 13 – Review

LESSON 14 – Unit Final

UNIT 4 – FUNCTIONS & RELATIONS

LESSON 1 – Review of Function Notation

- Review the concept of $y = f(x)$ as a means of writing the equation of a function and discuss how to perform algebraic operations on basic functions
- *Pgs. 247*

LESSON 2/3 – Function Composition

- Introduce $(f \circ g)(x) = f(g(x))$
- *Pgs. 256*

LESSON 4 – The Inverse of a Function

- Introduce $y = f^{-1}(x)$ and $x = f(y)$ as the notation of the inverse based on if it is a function or not
- Discuss graphing, writing equations, domain & range and invariant points
- *Handout: The Inverse of a Function*

LESSON 5 – Graphing Absolute Value Functions

- Discuss properties of $y - k = a|x - h|$ and how to graph with and without the calculator
- *Handout: The Absolute Value Function*

LESSON 6 – Solving Absolute Value Equations

- Algebraically solve single absolute value questions and use technology for multiple AV questions
- *Pgs. 296*

LESSON 7 – Graphing Rational Functions

- Discuss properties of $y - k = a\sqrt{x - h}$ and its relationship to a quadratic function
- *Pgs. 323*

LESSON 8 – Solving Rational Equations & Inequalities

- Solve single radical equations and discuss extraneous roots
- *Pgs. 323*

LESSON 9 – Graphing Rational Functions

- Define rational functions, asymptotes, pinholes, and continuity...heavy use of calculator to graph!
- *Pgs. 308*

LESSON 10 – Solving Rational Equations & Inequalities

- Remember to check solutions using the original equation or inequality
- *Pgs. 309*

LESSON 11 – Solving Non-Linear Systems by Graphing

- Discuss algebraic and technological solutions
- Include problem solving and other extensions
- *Pgs. 47*

LESSON 12/13/14 – Quiz/Review/Unit Exam

UNIT 5 – CIRCLE GEOMETRY & REASONING

LESSON 1 – Geometry Review...BOOK THE COMPUTER ROOM!

- Review properties triangles and quadrilaterals, parallel lines and congruency
- *Handout: Geometry you should know... & Geometry Review*

LESSON 2 – Properties of Polygons

- *Handout: Properties of Polygons*

LESSON 3/4/5 – Properties of Circle Geometry

- Introduce how to use Geometer's Sketchpad and have students discover the properties of circle geometry
- *Handout: Discovering the Geometric Properties of a Circle*

LESSON 6 – Chord Properties

- The perpendicular bisector of a chord passes through the center of a circle
- *Handout: Chord Properties*

LESSON 7 – Central & Inscribed Angles

- Central/inscribed angles from the same or equal chords/arcs are equal
- Central angles are twice the size of inscribed angles from the same/equal chord
- Inscribed angles from a diameter are 90°
- *Handout: Central and Inscribed Angles*

LESSON 8 – Cyclic Quadrilaterals

- Opposite angles in a cyclic quadrilateral are supplementary
- *Handout: Cyclic Quadrilaterals*

LESSON 9/10 – Tangents

- A radius and tangent are perpendicular at their point of intersection
- Tangents from an external point are equal in length
- The angle between a tangent and a chord is equal to the inscribed angle opposite the same chord
- *Handout: Tangents*

LESSON 11 – Review & Reasoning

- Must be able to provide a reason along with a measurement for any angle
- *Handout: Common Geometry Reasons & Properties of Circles*

LESSON 12 – Quiz

LESSON 13/14 – Inductive Reasoning (really need two classes for this)

- Watch *Cyberchase*:
- Discuss how to use counter-examples to prove a conjecture false
- *Pgs. 340, 346*

LESSON 15 – Deductive Reasoning

- Introduce how to write a simple proof to show that a conjecture is always true
- *Pgs. 349*

LESSON 16 – Compound Statements

- Introduce Venn Diagrams as a means of organizing *and*, *or*, and *not* statements
- *Pgs. 354*

LESSON 17 – If/then Statements

- Discuss conditional, converse, contrapositive, and biconditional statements
- *Handout: If/Then Statements*

LESSON 18 – Indirect Proofs

- Discuss proofs by contradiction
- *Pgs. 372*

LESSON 19 – Deductive Reasoning

- Use geometry to introduce how to write a simple proof using statements and reasons
- *Handout: Guided Proofs*

LESSON 20/21/22 – Quiz, Review, Unit Exam

UNIT 6 – COORDINATE GEOMETRY & FINANCES

LESSON 1 – Coordinate Geometry Review

- Review formulas and uses of slope, distance, and midpoint
- *Handout: Coordinate Geometry Review*

LESSON 2 – Equation of a Circle

- Discuss how the distance formula is extended to determine the equation of a circle
- *Pgs. 481*

LESSON 3 – Trigonometry Review

- Review ratios and laws and combine the properties of circles...nice for a double period
- *Handout: Trigonometry Review*

LESSON 4 – Financing & Credit Charges

- Discuss simple interest and how credit charges are paid
- *Handout: Finances & Credit Charges*

LESSON 5 – Basic Finance Skills

- Review compound interest and discuss gross vs. net income
- *Handout: Basic Finance Skills*

LESSON 6/7 – Annuities, Loans, & Mortgages

- Discuss how to use the finance application to solve problems using regular investments or payment
- *Handout: Annuities, Mortgages, & Loans*

LESSON 8 – Budgets

- Discuss how to use budgets to organize funds
- *Pgs. 565*

LESSON 9 – Quiz

LESSON 10 – Review

LESSON 11 – Unit Final