

STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007

SUBJECT

Proposed Amendment to IDAPA 08.02.03.004. Rules Governing Thoroughness

APPLICABLE STATUTE, RULE, OR POLICY

Section 33-105, Idaho Code; Section 33-107, Idaho Code

REFERENCE

08/9/06

M/S (Hall/Howard): To approve the Proposed Rules Governing Thoroughness – High School Graduation Requirements, as set forth in proposal 4 (c). Amended M/S (Hall/Howard): To approve the Proposed Rules Governing Thoroughness – High School Graduation Requirements, as set forth in proposal 4 (c). And, to amend the motion to include the change in the language related to the math requirement to say, “Algebra I or a class that meets Algebra I standards, Geometry or a class that meets Geometry standards and Algebra II or a class that meets Algebra II standards as approved by the State Department of Education”. Motion carried unanimously.

11/1/06

M/S (Howard/Thilo): To approve the request of the State Department of Education to approve the Idaho Content Standards and the Idaho Alternative Achievement Standards as documented to be incorporated by reference into rule. Roll call vote taken; motion carried unanimously.

BACKGROUND

The Idaho State Board of Education adopted additional math and science graduation requirements that include two credits of Algebra I, two credits of Geometry and two additional math credits taken in a student’s senior year of high school. The current Idaho math standards reflect general standards for ninth and tenth grade math but do not reflect standards for the additional courses required for the graduating class of 2013. Teachers from most of Idaho’s school districts participated in writing standards for Algebra I, Geometry, Algebra II, Math Analysis, Math Analysis of Personal Finance, Technical Math, Pre-calculus – Algebra, Pre-Calculus – Trigonometry AP Calculus and AP Statistics in order to meet the needs of Idaho students and school districts to address the additional requirements.

DISCUSSION

Math textbooks, curriculum and materials will be adopted in the summer of 2008 for 2008-2014 so standards for the new courses will need to be approved by the Board to ensure that school districts are prepared to meet the new requirements. In addition, districts that have increased requirements for current standards need state standards for Algebra I and beyond to align their courses.

**STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007**

IMPACT

Approving these standards will provide an important resource for the Idaho Board of Education, State Department of Education and local school districts in meeting the new math requirements.

ATTACHMENTS

Attachment 1 – Proposed Change to IDAPA 08.02.03.004	Page 3
Attachment 2 – Geometry Standards	Page 5
Attachment 3 – Algebra I	Page 9
Attachment 4 – Algebra II	Page 13
Attachment 5 – Math Analysis	Page 17
Attachment 6 – Math Analysis of Personal Finance	Page 21
Attachment 7 – Technical Math	Page 25
Attachment 8 – AP Statistics	Page 33
Attachment 9 – AP Calculus	Page 35
Attachment 10 – Pre-Calculus	Page 37

STAFF COMMENTS AND RECOMMENDATIONS

To approve the request of the State Department of Education to approve the Idaho Mathematics Course Standards for Secondary Mathematics courses to be incorporated by reference into rule.

The State Department of Education recommends approval of the Proposed Amendment to IDAPA 08.02.03.004 Rules Governing Thoroughness as submitted.

BOARD ACTION

Motion to approve the proposed rule change to IDAPA 08.02.03.004, Rules Governing Thoroughness, Idaho Content Standards pending approval of the Division of Financial Management.

Moved by _____ Seconded by _____ Carried Yes _____ No _____

**STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007**

IDAHO ADMINISTRATIVE CODE
State Board of Education Rules

IDAPA 08.02.03
Rules Governing Thoroughness

004. INCORPORATION BY REFERENCE.

The following documents are incorporated into this rule:

(3-30-07)

01. The Idaho Content Standards. The Idaho Content Standards as adopted by the State Board of Education on November 1, 2006 and Math Standards as of August 23, 2007. Copies of the document can be found on the State Board of Education website at <http://www.boardofed.idaho.gov/index.asp>. ~~(3-30-07)~~(8-23-07)T

02. The Idaho English Language Development Standards. The Idaho English Language Development Standards as adopted by the State Board of Education on August 10, 2006. Copies of the document can be found on the State Board of Education website at <http://www.boardofed.idaho.gov/lep/index.asp>.
(3-30-07)

03. The Limited English Proficiency Program Annual Measurable Achievement Objectives (AMAOs) and Accountability Procedures. The Limited English Proficiency Program Annual Measurable Achievement Objectives and Accountability Procedures as adopted by the State Board of Education on August 10, 2006. Copies of the document can be found on the State Board of Education website at <http://www.boardofed.idaho.gov/lep/index.asp>.
(3-30-07)

04. The Idaho English Language Assessment (IELA) Achievement Standards. The Idaho English Language Assessment (IELA) Achievement Standards as adopted by the State Board of Education on August 10, 2006. Copies of the document can be found on the State Board of Education website at <http://www.boardofed.idaho.gov/lep/index.asp>.
(3-30-07)

05. The Idaho Standards Achievement Tests (ISAT) Achievement Standards. Achievement Standards as adopted by the State Board of Education on August 10, 2006. Copies of the document can be found on the State Board of Education website at <http://www.boardofed.idaho.gov/index.asp>.
(3-30-07)

06. The Idaho Alternative Assessment Extended Content Standards. The Idaho Alternative Assessment Extended Content Standards as adopted by the State Board of Education on April 20, 2006. Copies of the document can be found at the State Board of Education website at <http://www.boardofed.idaho.gov/index.asp>.
(11-1-06)T

07. The Idaho Alternative Assessment Extended Achievement Standards. Alternative Assessment Extended Achievement Standards as adopted by the State Board of Education on April 20, 2006. Copies of the document can be found on the State Board of Education website at <http://www.boardofed.idaho.gov/index.asp>.
(11-1-06)T

THIS PAGE INTENTIONALLY LEFT BLANK

**IDAHO CONTENT STANDARDS
GEOMETRY
MATHEMATICS**

Students are expected to know content and apply skills from previous grades.

Mathematical reasoning and problem solving processes should be incorporated throughout all mathematics standards. Students should use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models to communicate mathematical information and to explain mathematical reasoning and concepts.

Standard 1: Number and Operation

Goal 1.1: Understand and use numbers.

No objectives at this grade level.

Goal 1.2: Understand and perform computations accurately.

No objectives at this grade level.

Goal 1.3: Estimate and judge reasonableness of results.

Objective(s): By the end of Geometry, the student will be able to:

- G.1.3.1 Apply number sense to everyday situations and judge reasonableness of results (10.M.1.3.1).

Standard 2: Concepts and Principles of Measurement

Goal 2.1: Understand and use U.S. customary and metric measurements

Objective(s): By the end of Geometry, the student will be able to:

- G.2.1.1 Determine the length of a segment and measure of an angle with appropriate unit labels (10.M.2.3.1).

Goal 2.2: Apply the concepts of rates, ratios, and proportions.

Objective(s): By the end of Geometry, the student will be able to:

- G.2.2.1 Solve application problems involving ratios and proportions (10.M.2.2.1).

Goal 2.3: Apply dimensional analysis.

No objectives at this grade level.

Goal 2.4: Apply appropriate techniques, tools, and formulas to determine measurements.

Objective(s): By the end of Geometry, the student will be able to:

**STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007**

- G.2.4.1 Calculate area, surface area and volume for two- and three-dimensional objects (10.M.2.1.1).
- G.2.4.1 Determine circumference, area, surface area, area of a sector, arc length, and arc measure of a circle with appropriate unit labels (10.M.2.1.2).

Standard 3: Concepts and Language of Algebra and Functions

Goal 3.1: Use algebraic symbolism as a tool to represent mathematical relationships.

No objectives at this grade level.

Goal 3.2: Evaluate algebraic expressions.

No objectives at this grade level.

Goal 3.3: Solve algebraic equations and inequalities.

No objectives at this grade level.

Goal 3.4: Solve simple linear systems of equations.

No objectives at this grade level.

Goal 3.5: Understand the concept of functions.

No objectives at this grade level.

Goal 3.6: Apply functions to a variety of problems.

No objectives at this grade level.

Standard 4: Concepts and Principles of Geometry

Goal 4.1: Apply concepts of size, shape, and spatial relationships.

Objective(s): By the end of Geometry, the student will be able to:

- G.4.1.1 Identify and apply congruency and similarity of two-dimensional figures (10.M.4.1.1).
- G.4.1.2 Formally or informally prove triangles are congruent (SSS, SAS, ASA, AAS) (10.M.4.1.1).
- G.4.1.2 Identify the scale factor of similar two-dimensional figures (10.M.4.1.2).
- G.4.1.3 Use transformational geometry to rotate, translate, and reflect figures.
- G.4.1.4 Create and use models to represent two- and three-dimensional geometric objects as a means of problem solving.

Goal 4.2: Apply the geometry of right triangles.

Objective(s): By the end of Geometry, the student will be able to:

**STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007**

- G.4.2.1 Understand and apply the Pythagorean Theorem for problem solving (10.4.2.1).
- G.4.2.2 Identify and apply special right triangle relationships (30-60-90, 45-45-90).
- G.4.2.3 Identify sine, cosine, and tangent ratios in right triangles.
- G.4.2.4 Use right triangle trigonometry to solve right triangles.

Goal 4.3: Apply graphing in two dimensions.

Objective(s): By the end of Geometry, the student will be able to:

- G.4.3.1 Determine the length and midpoint of a segment in the coordinate plane.

Goal 4.4: Apply concepts of parallel lines.

Objective(s): By the end of Geometry, the student will be able to:

- G.4.4.1 Identify the special angle pairs formed by parallel lines and a transversal.
- G.4.4.2 Apply the properties of special angle pairs formed by parallel lines and a transversal.
- G.4.4.3 Formally or informally prove lines are parallel using special angle properties (10.M.4.5.1).

Goal 4.5: Apply concepts of polygons

Objective(s): By the end of Geometry, the student will be able to:

- G.4.5.1 Classify polygons (by sides/convex/concave).
- G.4.5.2 Classify triangles and quadrilaterals based on their attributes (eg: scalene, right, isosceles, rhombus).
- G.4.5.3 Find the sum of the interior and exterior angles of a polygon.
- G.4.5.4 Find the measure of each interior and exterior angle of a regular polygon.
- G.4.5.5 Identify and draw the median, altitude, angle bisector, and perpendicular bisector of a triangle.

Goal 4.6: Understand the concepts of a circle

Objective(s): By the end of Geometry, the student will be able to:

- G.4.6.1 Identify the parts of a circle including radius, diameter, major/minor arcs, chords, secants, and tangents.
- G.4.6.2 Determine the lengths of segments and the measures of angles formed by radii, chords, secants, and tangents.
- G.4.6.3 Identify and find the measure of inscribed and central angles and their intercepted arcs.

Goal 4.7: Apply reasoning skills.

Objective(s): By the end of Geometry, the student will be able to:

- G.4.7.1 Construct logical arguments, form conjectures, judge their validity, and give counterexamples to disprove statements (10.M.4.5.1).
- G.4.7.2 Use inductive and deductive reasoning (10.M.4.5.1).

Goal 4.8: Represent and graph linear relationships.

Objective(s): By the end of Geometry, the student will be able to:

- G.4.8.1 Understand and apply slope as it pertains to parallel and perpendicular lines (10.M.4.4.1).
- G.4.8.2 Write the equations of parallel and perpendicular lines (10.M.4.4.1).
- G.4.8.3 Graph parallel and perpendicular lines from their equations (10.M.4.4.1).

Goal 4.9: Analyze characteristics and properties of angles.

Objective(s): By the end of Geometry, the student will be able to:

- G.4.9.1 Use accepted geometric notation for lines, planes, segments, rays, angles, similarity, and congruence.
- G.4.9.2 Identify and determine relationships in adjacent, complementary, supplementary, vertical angles, and linear pairs.

Standard 5: Data Analysis, Probability, and Statistics

Goal 5.1: Represent data with a variety of formats.

No objectives at this grade level.

Goal 5.2: Collect, organize, and display data.

No objectives at this grade level.

Goal 5.3: Apply simple statistical measurements.

No objectives at this grade level.

Goal 5.4: Understand basic concepts of probability.

No objectives at this grade level.

Goal 5.5: Make predictions or decisions based on data.

No objectives at this grade level.

**IDAHO CONTENT STANDARDS
ALGEBRA I
MATHEMATICS**

Students are expected to know content and apply skills from previous grades.

Mathematical reasoning and problem solving processes should be incorporated throughout all mathematics standards. Students should use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models to communicate mathematical information and to explain mathematical reasoning and concepts.

Standard 1: Number and Operation

Goal 1.1: Understand and use numbers.

Objective(s): By the end of Algebra I, the student will be able to:

- A1.1.1.1 Use integers, absolute value, fractions, decimals, percentages, and scientific notation.
- A1.1.1.2 Use squares and square roots.
- A1.1.1.3 Use the language of algebra to communicate algebraic ideas correctly.

Goal 1.2: Understand and perform computations accurately.

Objective(s): By the end of Algebra I, the student will be able to:

- A1.1.2.1 Use the order of operations to perform operations with rational numbers.
- A1.1.2.2 Apply properties of rational numbers (e.g. associative, commutative, distributive, substitution, inverses and identities).
- A1.1.2.3 Apply properties of whole number exponents.

Goal 1.3: Estimate and judge reasonableness of results.

Objective(s): By the end of Algebra I, the student will be able to:

- A1.1.3.1 Apply number sense to everyday situations and judge reasonableness of solutions.
- A1.1.3.2 Estimate square roots between consecutive integers.

Standard 2: Concepts and Principles of Measurement

Goal 2.1: Understand and use U.S. customary and metric measurements

No objectives at this grade level.

Goal 2.2: Apply the concepts of rates, ratios, and proportions.

Objective(s): By the end of Algebra I, the student will be able to:

- A1.2.2.1 Formulate and use proportions and ratios.

Goal 2.3: Apply dimensional analysis.

Objective(s): By the end of Algebra I, the student will be able to:

- A1.2.3.1 Use customary and metric units and their relationship to one another and to real world applications (e.g. length, area, volume, weight, time, and temperature).
- A1.2.3.2 Make conversions using equivalent units.

Goal 2.4: Apply appropriate techniques, tools, and formulas to determine measurements.

No objectives at this grade level.

Standard 3: Concepts and Language of Algebra and Functions

Goal 3.1: Use algebraic symbolism as a tool to represent mathematical relationships.

Objective(s): By the end of Algebra I, the student will be able to:

- A1.3.1.1 Represent mathematical relationships using variables, expressions, linear equations and inequalities.

Goal 3.2: Manipulate algebraic expressions.

Objective(s): By the end of Algebra I, the student will be able to:

- A1.3.2.1 Add, subtract, multiply, divide (by a monomial), and factor algebraic expressions involving rational numbers.

Goal 3.3: Solve algebraic equations and inequalities.

Objective(s): By the end of Algebra I, the student will be able to:

- A1.3.3.1 Use algebraic procedures to solve multi-step, first-degree equations and inequalities; such as $3(2x - 5) = 5x + 7$ or $3(2x - 5) > 5x + 7$.
- A1.3.3.2 Model and solve real-world phenomena using multi-step, first-degree equations and inequalities.
- A1.3.3.3 Find rational solutions to quadratic equations with leading coefficient of one (1) using factoring.

Goal 3.4: Solve simple linear systems of equations and inequalities.

Objective(s): By the end of Algebra I, the student will be able to:

- A1.3.4.1 Use graphing, substitution, and linear combination to solve linear systems of equations involving two variables; such as $x + y = 7$ and $2x + 3y = 21$.
- A1.3.4.2 Use graphing to solve linear systems of inequalities involving two variables; such as $x + y > 7$ and $2x + 3y < 21$.
- A1.3.4.3 Model and solve real world phenomena using linear systems involving one or two variables.

Goal 3.5: Understand the concept of functions.

Objective(s): By the end of Algebra I, the student will be able to:

- A1.3.5.1 Determine whether a relation is a function given graphs, charts, ordered pairs, mappings, or equations.

- A1.3.5.2 Evaluate functions written in function notation.
- A1.3.5.3 Identify domain and range for given graphs, charts, ordered pairs, mappings, or linear functions
- A1.3.5.4 Differentiate between linear and non-linear functions and graphs.

Goal 3.6: Apply functions to a variety of problems.

Objective(s): By the end of Algebra I, the student will be able to:

- A1.3.6.1 Model real-world phenomena with linear functions.
- A1.3.6.2 Use graphs and tables to represent and solve problems.

Standard 4: Concepts and Principles of Geometry

Goal 4.1 Apply concepts of size, shape, and spatial relationships.

No objectives at this grade level.

Goal 4.2 Apply the geometry of right triangles.

No objectives at this grade level.

Goal 4.3: Apply graphing in two dimensions.

Objective(s): By the end of Algebra I, the student will be able to:

- A1.4.3.1 Identify attributes of the Cartesian Coordinate System, such as quadrants, origin, and axes.
- A1.4.3.2 Graph scatter plots and informal trend lines (e.g. eyeball fit lines).
- A1.4.3.3 Identify correlations (positive, negative, or none).

Goal 4.4: Represent and graph linear relationships.

Objective(s): By the end of Algebra I, the student will be able to:

- A1.4.4.1 Graph linear relationships.
- A1.4.4.2 Write equations and inequalities for linear relationships.
- A1.4.4.3 Use multiple representations for linear relationships such as tables, graphs, mathematical symbols, and verbal or written descriptions.
- A1.4.4.4 Interpret the rate of change (slope) and the intercepts given a linear relationship

Goal 4.5: Use reasoning skills.

Objective(s): By the end of Algebra I, the student will be able to:

- A1.4.5.1 Use algebraic reasoning and understand logic of algebraic procedures.

Standard 5: Data Analysis, Probability, and Statistics

Goal 5.1: Represent data with a variety of formats.

Objective(s): By the end of Algebra I, the student will be able to:

A1.5.1.1 Read and interpret tables, charts, and graphs.

Goal 5.2: Collect, organize, and display data.

Objective(s): By the end of Algebra I, the student will be able to:

A1.5.2.1 Organize and display the data in tables, charts, and graphs.

Goal 5.3: Apply simple statistical measurements.

Objective(s): By the end of Algebra I, the student will be able to:

A1.5.3.1 Interpret and use basic statistical concepts including mean, median, mode, range, and distribution of data (including outliers).

A1.5.3.2 Make predictions and draw conclusions based on statistical measures.

Goal 5.4: Understand basic concepts of probability.

Objective(s): By the end of Algebra I, the student will be able to:

A1.5.4.1 Differentiate between experimental and theoretical probability.

A1.5.4.2 Find probabilities based on two independent events.

Goal 5.5: Make predictions or decisions based on data.

No objectives at this grade level.

**IDAHO CONTENT STANDARDS
ALGEBRA II
MATHEMATICS**

Students are expected to know content and apply skills from previous grades.

Mathematical reasoning and problem solving processes should be incorporated throughout all mathematics standards. Students should use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models to communicate mathematical information and to explain mathematical reasoning and concepts.

Standard 1: Number and Operation

Goal 1.1: Understand and use numbers.

Objective(s): By the end of Algebra II, the student will be able to:

- A2.1.1.1 Apply properties of exponents.
- A2.1.1.2 Simplify expressions containing negative radicands.
- A2.1.1.3 Evaluate general logarithms.

Goal 1.2: Understand and perform computations accurately.

Objective(s): By the end of Algebra II, the student will be able to:

- A2.1.2.1 Simplify expressions containing radicals and rational exponents.
- A2.1.2.2 Perform operations on radical expressions and complex numbers.
- A2.1.2.3 Apply the laws of logarithms.
- A2.1.2.4 Apply the change of base formula of logarithms.

Goal 1.3: Estimate and judge reasonableness of results.

No objectives at this grade level.

Standard 2: Concepts and Principles of Measurement

Goal 2.1: Understand and use U. S. customary and metric measurements

No objectives at this grade level.

Goal 2.2: Apply the concepts of rates, ratios, and proportions.

No objectives at this grade level.

Goal 2.3: Apply dimensional analysis.

No objectives at this grade level.

Goal 2.4: Apply appropriate techniques, tools, and formulas to determine measurements.

No objectives at this grade level.

Standard 3: Concepts and Language of Algebra and Functions

Goal 3.1: Use algebraic symbolism as a tool to represent mathematical relationships.

Objective(s): By the end of Algebra II, the student will be able to:

- A2.3.1.1 Write equations of lines (slope-intercept, point-slope, and standard form; parallel and perpendicular lines).
- A2.3.1.2 Apply the properties of exponents.
- A2.3.1.3 Simplify and classify expressions containing polynomials.
- A2.3.1.4 Add, subtract, and multiply polynomials.
- A2.3.1.5 Factor and divide polynomials.
- A2.3.1.6 Write equations in standard form (parabola, circle).
- A2.3.1.7 Simplify rational expressions, including complex fractions.
- A2.3.1.8 Apply the laws of logarithms to expand and condense expressions.

Goal 3.2: Evaluate algebraic expressions.

Objective(s): By the end of Algebra II, the student will be able to:

- A2.3.2.1 Evaluate and simplify variable expressions.
- A2.3.2.2 Add, subtract, multiply and divide radical expressions.

Goal 3.3: Solve algebraic equations and inequalities.

Objective(s): By the end of Algebra II, the student will be able to:

- A2.3.3.1 Solve single variable equations and single variable inequalities and represent solutions on a number line.
- A2.3.3.2 Solve single variable absolute value equations and absolute value inequalities and represent solutions on a number line.
- A2.3.3.3 Solve radical and rational equations including extraneous roots.
- A2.3.3.4 Solve quadratic equations using multiple methods.
- A2.3.3.5 Solve exponential and logarithmic equations.
- A2.3.3.6 Find factors and zeros of polynomial functions.

Goal 3.4: Solve simple linear systems of equations.

Objective(s): By the end of Algebra II, the student will be able to:

- A2.3.4.1 Solve systems of equations in two and three variables.
- A2.3.4.2 Solve systems of inequalities in two variables by graphing.

Goal 3.5: Understand the concept of functions.

Objective(s): By the end of Algebra II, the student will be able to:

- A2.3.5.1 Identify the domain and range (linear, absolute value, quadratic, exponential, and rational).

Goal 3.6: Apply functions to a variety of problems.

Objective(s): By the end of Algebra II, the student will be able to:

- A2.3.6.1 Apply linear programming to problem analysis.
- A2.3.6.2 Predict outcomes by applying exponential growth and decay.
- A2.3.6.3 Solve application problems using quadratic functions.
- A2.3.6.4 Determine the outcome of function compositions.
- A2.3.6.5 Determine the inverse of a given one-to-one function.

Standard 4: Concepts and Principles of Geometry

Goal 4.1 Apply concepts of size, shape, and spatial relationships.

Objective(s): By the end of Algebra II, the student will be able to:

Recognize graphs of polynomial functions (direct variation, and inverse variation, growth, decay, linear, circular, parabolic, cubic, absolute value).

Goal 4.2 Apply the geometry of right triangles.

Objective(s): By the end of Algebra II, the student will be able to:

- A2.4.2.1 Solve right triangles by applying the Pythagorean Theorem and trigonometric functions.

Goal 4.3: Apply graphing in two dimensions.

Objective(s): By the end of Algebra II, the student will be able to:

- A2.4.3.1 Graph circles and parabolas.
- A2.4.3.2 Solve quadratic inequalities by graphing.

Goal 4.4: Represent and graph linear relationships.

Objective(s): By the end of Algebra II, the student will be able to:

- A2.4.4.1 Graph equations, inequalities, and absolute value relationships on a coordinate plane.

Goal 4.5: Understand the tools of graphing.

No objectives at this grade level.

Standard 5: Data Analysis, Probability, and Statistics

Goal 5.1: Represent data with a variety of formats.

No objectives at this grade level.

Goal 5.2: Collect, organize, and display data.

No objectives at this grade level.

Goal 5.3: Apply simple statistical measurements.

No objectives at this grade level.

Goal 5.4: Understand the basic concepts of probability.

No objectives at this grade level.

Goal 5.5: Make predictions or decisions based on data.

No objectives at this grade level.

DRAFT

**IDAHO CONTENT STANDARDS
MATH ANALYSIS
MATHEMATICS**

Students are expected to know content and apply skills from previous grades.

Mathematical reasoning and problem solving processes should be incorporated throughout all mathematics standards. Students should use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models to communicate mathematical information and to explain mathematical reasoning and concepts.

Standard 1: Number and Operation

Goal 1.1: Understand and Use Numbers

Objectives: By the end of Math Analysis, the student will be able to:

- MA.1.1.1 Apply matrices to systems and use them to organize and store data.
- MA.1.1.2 Apply properties of exponents and logarithms.

Goal 1.2: Understand and perform computations accurately

Objectives: By the end of Math Analysis, the student will be able to:

- MA.1.2.1 Convert rectangular coordinates to polar coordinates and back.
- MA.1.2.2 Perform operations on real and complex numbers.
- MA.1.2.3 Perform operations on matrices.

Goal 1.3: Estimate and judge reasonableness of results

Objective(s): By the end of Math Analysis, the student will be able to:

- MA.1.3.1 Estimate in which quadrant an angle lies given its radian or degree measurement.

Standard 2: Concepts and Principles of Measurement

Goal 2.1: Understand and use U.S. customary and metric measurements.

No objectives at this grade level.

Goal 2.2: Apply the concepts of rates, ratios, and proportions.

No objectives at this grade level.

Goal 2.3: Apply dimensional analysis.

Objective(s): By the end of Math Analysis, the student will be able to:

- MA.2.3.1 Draw an angle in standard position given degree or radian measure.
- MA.2.3.2 Compute its co-terminal angles and reference angle given an angle in standard position.

Goal 2.4: Apply appropriate techniques, tools, and formulas to determine measurements.

Objective(s): By the end of Pre-Calculus, the student will be able to:

MA.2.4.1 Convert radians to degrees and degrees to radians.

Standard 3: Concepts and Language of Algebra and Functions

Goal 3.1: Use algebraic symbolism as a tool to represent mathematical relationships.

Objective(s): By the end of Math Analysis, the student will be able to:

MA.3.1.1 Manipulate and simplify the reciprocal and Pythagorean identities.

MA.3.1.2 Select and use various representations for relations and functions.

MA.3.1.3 Perform transformations such as arithmetically combining, finding the inverse, and the composition of functions.

MA.3.1.4 Use the standard and general forms of the equations of circles and parabolas.

Goal 3.2: Evaluate algebraic expressions.

No objectives at this grade level.

Goal 3.3: Solve algebraic equations and inequalities.

Objective(s): By the end of Math Analysis, the student will be able to:

MA.3.3.1 Solve trigonometric, exponential, logarithmic, rational, and polynomial equations.

MA.3.3.2 Solve systems of linear inequalities.

Goal 3.4: Solve simple linear systems of equations.

Objective(s): By the end of Math Analysis, the student will be able to:

MA.3.4.1 Solve systems of linear equations.

Goal 3.5: Understand the concept of functions.

Objective(s): By the end of Math Analysis, the student will be able to:

MA.3.5.1 Identify domain and range given a sine or cosine function.

MA.3.5.2 Define, identify, and apply relations and functions.

MA.3.5.3 Use and compare the properties of classes of functions, including polynomial, rational, exponential, and logarithmic functions.

Goal 3.6: Apply functions to a variety of problems.

Objective(s): By the end of Math Analysis, the student will be able to:

MA.3.6.1 Use the Law of Sines and Law of Cosines appropriately to solve triangles.

MA.3.6.2 Model and solve real world phenomena using trigonometric functions.

Goal 3.7: Analyze the behavior of series and sequences.

Objective(s): By the end of Math Analysis, the student will be able to:

**STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007**

- MA.3.7.1 Use arithmetic, geometric, and infinite notation.
- MA.3.7.2 Identify and find n th terms of arithmetic and geometric sequences.
- MA.3.7.3 Find sums of arithmetic, geometric, and infinite series.

Standard 4: Concepts and Principles of Geometry

Goal 4.1: Apply concepts of size, shape, and spatial relationships.

Objective(s): By the end of Math Analysis, the student will be able to:

- MA.4.1.1 Find the period and amplitude of sine and cosine functions.
- MA.4.1.2 Identify families of graphs.

Goal 4.2: Apply the geometry of right triangles.

Objective(s): By the end of Math Analysis, the student will be able to:

- MA.4.2.1 Solve right triangles using the Pythagorean Theorem and trigonometric ratios.
- MA.4.2.2 Classify and solve special 30 – 60 – 90 and 45 – 45 – 90 triangles.

Goal 4.3: Apply graphing in two dimensions.

Objective(s): By the end of Math Analysis, the student will be able to:

- MA.4.3.1 Graph trigonometric functions of the form $d + A \sin(Bx)$ and $d + A \cos(Bx)$ functions.

Goal 4.4: Represent and graph linear relationships.

No objectives at this grade level.

Goal 4.5: Understand the basic concepts of polygons.

No objectives at this grade level.

Goal 4.6: Understand basic concepts of a circle.

Objective(s): By the end of Math Analysis, the student will be able to:

- MA.4.6.1 Apply Unit Circle Trigonometry.

Standard 5: Data Analysis, Probability, and Statistics

Goal 5.1: Represent data with a variety of formats.

No objectives at this grade level.

Goal 5.2: Collect, organize, and display data.

Objective(s): By the end of Math Analysis, the student will be able to:

- MA.5.2.1 Choose an experimental design or survey sampling method appropriate to collect data.
- MA.5.2.2 Choose an appropriate table or graph to display data.

Goal 5.3: Apply simple statistical measurements.

Objective(s): By the end of Math Analysis, the student will be able to:

- MA.5.3.1 Choose and compute an appropriate measure of center and measure of spread for univariate data.
- MA.5.3.2 Compute correlation and least squares regression line for bivariate data.
- MA.5.3.3 Compute appropriate relative frequencies for categorical data.

Goal 5.4: Understand basic concepts of probability.

Objective(s): By the end of Math Analysis, the student will be able to:

- MA.5.4.1 Define an appropriate sample space or event given a random phenomenon.
- MA.5.4.2 Identify events that are equally likely, independent, or mutually exclusive.
- MA.5.4.3 Determine experimental probabilities given data and theoretical probabilities using the multiplication and addition rules.

Goal 5.5: Make predictions or decisions based on data.

Objective(s): By the end of Math Analysis, the student will be able to:

- MA.5.5.1 Predict one variable given a value for the other using the equation of a least squares regression line.
- MA.5.5.2 Decide whether two events are independent given the relative frequencies from a two way table.

**IDAHO CONTENT STANDARDS
MATH ANALYSIS OF PERSONAL FINANCE
MATHEMATICS**

Students are expected to know content and apply skills from previous grades.

Mathematical reasoning and problem solving processes should be incorporated throughout all mathematics standards. Students should use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models to communicate mathematical information and to explain mathematical reasoning and concepts.

Standard 1: Money Management

Goal 1.1: Understanding and using effective money management

Objective(s): By the end of Math Analysis of Personal Finance, the student will be able to:

- MAPF.1.1.1 Demonstrate skill in basic financial tasks, including scheduling bill payments, writing checks, reconciling a checking/debit account statements, and monitoring account statements for accuracy
- MAPF.1.1.2 Interpret appropriate financial graphs, charts and tables
- MAPF.1.1.3 Construct a cash flow statement
- MAPF.1.1.4 Create, balance and use a personal budget including fixed and variable expenses
- MAPF.1.1.5 Calculate the necessary future income to maintain a current standards of living
- MAPF.1.1.6 Compare the total cost of reducing a credit card balance to zero with minimum payments versus above minimum payments
- MAPF.1.1.7 Explain how credit card grace periods, methods of interest calculations, and fees affect borrowing costs
- MAPF.1.1.8 Explain the most cost effective option for purchasing and automobile

Standard 2: Consumerism

Goal 2.1: Making responsible financial choices

Objective(s): By the end of Math Analysis of Personal Finance, the student will be able to:

- MAPF.2.1.1 Compare, contrast and compute interest rates and fees associated with various financial institutions
- MAPF.2.1.2 Examine critically the impact of socio-cultural norms and demographics related to money, saving, and spending.
- MAPF.2.2.3 Determine the cost of various interest rates and fees to a consumer
- MAPF.2.2.4 Create measurable short, medium, and long-term financial goals
- MAPF.2.2.5 Calculate how inflation affects financial decisions
- MAPF.2.2.6 Using a scenario, calculate the amount paid on an insurance claim after applying exclusions and deductibles
- MAPF.2.2.7 Compare the costs of auto insurance for the same vehicle, given two different deductibles and two different liability coverage limits

**STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007**

Standard 3: Saving and Investment

Goal 3.1: Implement a diversified saving and investment strategy

Objective(s): By the end of Math Analysis of Personal Finance, the student will be able to:

- MAPF.3.1.1 Apply strategies for creating wealth/building assets
- MAPF.3.1.2 Demonstrate ability to use decision-making processes in making financial decisions related to planning, saving, and investing
- MAPF.3.1.3 Develop and defend the best investment and/or savings options to achieve particular goals
- MAPF.3.1.4 Describe the advantages and disadvantages of saving for short, medium, and long-term goals
- MAPF.3.1.5 Compare the risk, return, and liquidity of various investment alternatives
- MAPF.3.1.6 Evaluate the effect of compounding earned interest
- MAPF.3.1.7 Create a model for comparing savings and investment results using a graphing or internet calculator
- MAPF.3.1.8 Identify and assess various means of building wealth

Standard 4: Education and Income

Goal 4.1: Understand the relationship between education, income, career, and desired lifestyle

Objective(s): By the end of Math Analysis of Personal Finance, the student will be able to:

- MAPF.4.1.1 Explain how income reflects choices made about jobs, careers, education, and skill development
- MAPF.4.1.2 Evaluate sources of income and resources available that may substitute for income
- MAPF.4.1.3 Examine how income affects lifestyle choices and spending decisions
- MAPF.4.1.4 Explain how employee benefits relate to disposable income
- MAPF.4.1.5 Analyze how payroll deductions modify an employee's disposable income
- MAPF.4.1.6 Analyze the importance of workforce skills to society and the impact the supply and demand for qualified workers has on wages/salary

Standard 5: Taxation

Goal 5.1: Understand the purposes, roles, and responsibilities related to taxation

Objective(s): By the end of Math Analysis of Personal Finance, the student will be able to:

- MAPF.5.1.1 Compare the returns of taxable investments with those that are tax-exempt and tax-deferred
- MAPF.5.1.2 Demonstrate how taxable income impacts disposable income
- MAPF.5.1.3 Contrast the benefits of traditional IRA versus a Roth IRA
- MAPF.5.1.4 Evaluate the advantages provided by employer-sponsored retirement savings plans, including 401(k), 504(b), and other related plans.
- MAPF.5.1.5 Explain how deductions, exemptions, and credits reduce taxable income
- MAPF.5.1.6 Analyze the relationship between various forms of taxation

**STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007**

- MAPF.5.1.7 Develop personal financial planning strategies that respond to and use tax deductions and shelters
- MAPF.5.1.8 Analyze the application and impact of various forms of taxation on individuals, families, and public agencies

DRAFT

THIS PAGE LEFT INTENTIONALLY BLANK

**IDAHO CONTENT STANDARDS
TECHNICAL MATH
MATHEMATICS**

Technical Math uses problem situations, physical models, and appropriate technology to extend mathematical thinking and engage student reasoning. Problem solving situations, including those related to a variety of careers and technical fields will provide all students an environment which promotes communication and fosters connections within mathematics to other disciplines and to the technological workplace. Students will use hands-on activities to model, explore, and develop abstract concepts. The use of appropriate technology will help students apply math in an increasingly technological world. Collaboration between math and professional-technical teachers is an integral part of this course.

Completion of Algebra I is strongly recommended before taking this course. If Algebra I is not taken prior to this course, Algebra I objectives will need to be taught. Otherwise, Algebra I objectives may simply be reviewed. Technical Math is intended to fulfill the requirement for a 3rd year of math, taken in the senior year. The standards include the knowledge that students need to know in order to enter a credit bearing math class at the college level.

Standard 1: Number and Operation

Goal 1.1: Understand and use numbers.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.1.1.1 Apply properties of rational numbers. (eg necessary skill for applying numbers)
- TM.1.1.2 Perform operations using positive and negative numbers, fractions, absolute value, decimals, percentages, and scientific notation. (eg given the cost of a project, determine what percentage of the budget went for salaries)
- TM.1.1.3 Apply properties of exponents. (eg calculate the power dissipated by a resistor when its current and voltage drop are given in exponent form)
- TM.1.1.4 Identify perfect squares and their principal roots. (eg 4, 9, and 16 are perfect squares and their respective roots are 2, 3, and 4)
- TM.1.1.5 Solve problems using number theory concepts. (eg given initial expenses, money needed for reserve and start-up inventory, calculate the start up costs for a business by using the Starting Cost Calculator on the US Small Business Administration Web site)
- TM.1.1.6 Estimate the value of an irrational number expressed as a radical. (eg calculate the impedance of an inductive series circuit when given the circuit's total resistance and total inductive reactance)
- TM.1.1.7 Apply properties of common and natural logarithms. (eg determine medication absorption rate)
- TM.1.1.8 Use Fundamental Counting Principles. (eg calculate number of outfits from set number of separates)
- TM.1.1.9 Use combinations and permutations. (eg calculate the number of ways to order the digits for a phone number)

**STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007**

Goal 1.2: Understand and perform computations accurately.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.1.2.1 Perform fundamental rational expression and number operations that involve a variety of applications. (eg determine wage and benefits)
- TM.1.2.2 Read, write, and solve problems using scientific notation. (eg determine voltage of a circuit)
- TM.1.2.3 Solve problems using direct and inverse variation. (eg determine the mechanical advantage of gears)
- TM.1.2.4 Perform operations on complex numbers. (eg find amperage of current, knowing voltage and impedance if the impedance includes inductors or capacitors)
- TM.1.2.5 Calculate nth powers and nth roots. (eg compute interest on investments)

Goal 1.3: Estimate and judge reasonableness of results.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.1.3.1 Estimate square roots between consecutive integers. (eg necessary foundation information)
- TM.1.3.2 Determine relative and percent of error. (eg scale drawings must be within (+,-) 1/16th of an inch)
- TM.1.3.3 Apply number sense to everyday situations. (eg approximate grocery totals)

Standard 2: Concepts and Principles of Measurement

Goal 2.1: Understand and use U.S. customary and metric measurements.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.2.1.1 Perform metric conversions within the system. (eg convert medicine dosage from adult to child)
- TM.2.1.2 Solve problems by converting between English and metric systems. (eg trip planning from miles to kilometers and gallons to liters)
- TM.2.1.3 Determine length, distance, area, surface area, volume, and weight, with appropriate unit labels. (eg determine number of flowers needed to fill a flower bed)
- TM.2.1.4 Calculate circumference, area, radius, diameter, area of sector, arc length of a circle with appropriate unit labels. (eg develop a circular watering system)

Goal 2.2: Apply the concepts of rates, ratios, and proportions.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.2.2.1 Determine an unknown term in a ratio. (eg comparing cost of living between cities)

Goal 2.3: Apply dimensional analysis.

Objective(s): By the end of Technical Math, the student will be able to:

**STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007**

- TM.2.3.1 Solve English weights and measure problems using dimensional analysis. (eg feet per second to miles per hour)
- TM.2.3.2 By use of estimation convey knowledge of volume versus mass. (eg determine dosage of medicine per weight)

Goal 2.4: Apply appropriate techniques, tools, and formulas to determine measurements.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.2.4.1 Determine and use appropriate units. (eg using an existing recipe, calculate a recipe for a larger group, simplify and label new amounts)
- TM.2.4.2 Calculate area, surface area for two dimensional objects and volume for three-dimensional objects. (eg compute amount of cement needed for a sidewalk; calculate the cost of heating a building based on square footage)

Standard 3: Concepts and Language of Algebra and Functions

Goal 3.1: Use algebraic symbolism as a tool to represent mathematical relationships.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.3.1.1 Represent mathematical relationships using variables, expressions, linear equations and inequalities. (eg using spreadsheet functions, determine sale price of items)
- TM.3.1.2 Perform operations on polynomial expressions. (eg compute regular and overtime gross and net earnings)
- TM.3.1.3 Perform operations on radical expressions. (eg determine flow rate of water through a fire hose)
- TM.3.1.4 Perform operations on rational expressions. (eg determine earnings for a given time frame)
- TM.3.1.5 Factor quadratics and other polynomials expressions. (eg determine flight time of a rocket)
- TM.3.1.6 Represent application problems as linear equations. (eg level of education versus pay; rate of speed versus fuel consumption; caloric intake versus expenditure)

Goal 3.2: Evaluate algebraic expressions.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.3.2.1 Perform fundamental operations on polynomial expressions. (eg calculate the total cost of various items within a meal)

Goal 3.3: Solve algebraic equations and inequalities.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.3.3.1 Find solutions to simple quadratic equations. (eg calculate water content of soil based on its weight)
- TM.3.3.2 Solve exponential equations. (eg determine atmospheric pressure)

**STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007**

- TM.3.3.3 Solve logarithmic equations. (eg determine power of a satellite needed to transmit signals)
- TM.3.3.4 Solve absolute value equations. (eg stopping distance of a car)
- TM.3.3.5 Solve systems of inequalities in two variables. (eg determine needed sales for a company given overhead)
- TM.3.3.6 Solve basic one and two step rational equations. (eg determine amount of medication to administer based on packaging size)

Goal 3.4: Solve simple linear systems of equations.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.3.4.1 Solve a system of two linear equations in an application setting. (eg child care facility – sq footage to number of children; solving electrical current in a circuit with multiple paths)

Goal 3.5: Understand the concept of functions.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.3.5.1 Determine whether a relation is a function given graphs, charts, ordered pairs, mappings, or equations. (eg graph the distance a ballistic device travels at different angles and determine if the data is a function of the angle)
- TM.3.5.2 Evaluate functions written in function notation. (eg work with the function $V=I \cdot R$ and solve for different I and R)
- TM.3.5.3 Differentiate between linear and non-linear functions and graphs. (eg differentiate between a thrown object and the distance a car travels)
- TM.3.5.4 Identify domain and range for given graphs, charts, ordered pairs, mappings, or linear functions. (eg constraints of any situation such as a budget)

Goal 3.6: Apply functions to a variety of problems.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.3.6.1 Model real-world phenomena with linear functions. (eg graph fuel consumption versus speed)
- TM.3.6.2 Use graphs and tables to represent and solve problems. (eg stress test of cardiovascular system)
- TM.3.6.3 Solve application problems by isolating a specific variable in a formula and then substituting values. (eg determining interest rate on a loan)

Standard 4: Concepts and Principles of Geometry

Goal 4.1: Apply concepts of size, shape, and spatial relationships.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.4.1.1 Identify and apply congruency and similarity of two-dimensional figures. (eg compare trusses or wall panels)
- TM.4.1.2 Identify the scale factor of similar three-dimensional figures and find the ratios of their surface areas and volumes. (eg compare blueprint to actual model)

**STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007**

- TM.4.1.3 Use transformational geometry to rotate, translate, and reflect figures in a coordinate plane. (eg flip a house plan)
- TM.4.1.4 Describe and apply magnitude and direction of vectors. (eg determine resultant direction due to wind)

Goal 4.2 Apply the geometry of right triangles.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.4.2.1 Understand and apply the Pythagorean Theorem for problem solving. (eg checking accuracy on gate construction)
- TM.4.2.2 Identify and apply special right triangle relationships. (eg isometric drawing in drafting)
- TM.4.2.3 Use right triangle trigonometry to solve right triangles. (eg determine angle of elevation using sine, cosine and tangent)
- TM.4.2.4 Use trigonometric ratios to solve problems. (eg angle of depression)

Goal 4.3: Apply graphing in two dimensions.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.4.3.1 Identify attributes of the Cartesian Coordinate System, such as quadrants, origin, and axes. (eg layout of house plans or CAD drawing)
- TM.4.3.2 Graph scatter plots and informal trend lines. (eg growth of state economy)
- TM.4.3.3 Identify positive and negative correlations. (eg vehicle depreciation)
- TM.4.3.4 Determine the length and midpoint of a segment in the coordinate plane. (eg on-center carpentry from a blueprint would include the coordinate plane)
- TM.4.3.5 Graph quadratic and absolute value functions. (eg maximize profit from revenue)
- TM.4.3.6 Graph exponential functions. (eg rate of bacterial growth)
- TM.4.3.7 Graph systems of equations and inequalities in two variables. (eg mixing solutions for weed control)

Goal 4.4: Apply concepts of parallel lines.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.4.4.1 Identify the special angle pairs formed by parallel lines and a transversal. (eg building a gate; designing a quilt)
- TM.4.4.2 Apply the properties of special angle pairs formed by parallel lines and a transversal (eg building a gate; designing a quilt)

Goal 4.5: Apply concepts of polygons.

Objectives: By the end of Technical Math, the student will be able to:

- TM.4.5.1 Classify triangles and quadrilaterals based on their attributes. (eg label triangles and quadrilaterals in a house plan)
- TM.4.5.2 Find the sum of the interior and exterior angles of a polygon. (eg add the interior and exterior angles of a pentagonal swimming pool)

**STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007**

- TM.4.5.3 Find the measure of each interior and exterior angle of a regular polygon. (eg find the degree of angles to create a stop sign)
- TM.4.5.4 Determine whether or not a polygon is regular. (eg design a hexagon table using a circle)

Goal 4.6: Understand basic concepts of a circle.

Objectives: By the end of Technical Math, the student will be able to:

- TM.4.6.1 Identify the parts of a circle including radius, diameter, major/minor arcs, chords, secants and tangents. (eg necessary foundation information)
- TM.4.6.2 Determine the lengths of segments and the measures of angles formed by radii, chords, secants, and tangents. (eg calculate trim for an arched window)

Goal 4.7: Apply Reasoning Skills.

No objectives at this grade level.

Goal 4.8: Represent and graph linear relationships.

Objectives: By the end of Technical Math, the student will be able to:

- TM.4.8.1 Construct graphs and write equations and inequalities for linear relationships. (eg relationship between cost and demand)
- TM.4.8.2 Given a linear relationship, interpret the rate of change (slope) and the intercepts. (eg rate of feed to fill a grain truck)
- TM.4.8.3 Write equations of lines given various information including parallel, perpendicular, vertical, and horizontal lines. (eg alignment of restaurant with layout of city street)
- TM.4.8.4 Graph linear equations. (eg constant increase in water temperature over time; monthly changes in sales)

Goal 4.9: Analyze characteristics and properties of angles.

No objectives at this grade level.

Standard 5: Data Analysis, Probability, and Statistics

Goal 5.1: Represent data with a variety of formats.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.5.1.1 Analyze and interpret tables, charts and graphs. (eg interpret a body mass index (BMI) chart)

Goal 5.2: Collect, organize, and display data.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.5.2.1 Collect, organize, and display data in tables, charts and graphs. (eg chart change in stock values over 4 weeks)

Goal 5.3: Apply simple statistical measurements.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.5.3.1 Interpret and use basic statistical concepts including mean, median, mode, range, and distribution of data. (eg wages – state compared to national)
- TM.5.3.2 Make predictions and draw conclusions based on statistical measures. (eg predict the number of new jobs based on growth in population; predict the number of sunny days in a given area for a given time frame)

Goal 5.4: Understand basic concepts of probability.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.5.4.1 Find probabilities based on independent events. (eg determine probability of specific outcomes when a coin is flipped three times)

Goal 5.5: Make predictions or decisions based on data.

Objective(s): By the end of Technical Math, the student will be able to:

- TM.5.5.1 Make predictions based on randomness, chance, equally likely events, and probability. (eg predict the likelihood of having an accident using past accident data)
- TM.5.5.2 Use data to predict the chance of an event. (eg calculate the odds of a hit based on the batting average)

THIS PAGE INTENTIONALLY LEFT BLANK

Secondary Mathematics
AP Statistics

Prerequisite: Mastery of Algebra II and/or appropriate Compass Score

Course Description

A course in AP Statistics consists of a full academic year of work in statistics and related topics comparable to courses in colleges and universities. The *Advanced Placement Course Description for Statistics* for the current school year should be consulted to provide the teacher with a guide to the topics and concepts that should be included in the high school statistics course. This publication is updated by the College Board and provides a descriptive outline of the course, detailing its content and the kinds of skills students are expected to demonstrate in the corresponding introductory college-level course (see the abbreviated outline below). It also provides a description of the Advanced Placement examination, sample multiple-choice questions with an answer key, and sample free-response questions. The *Advanced Placement Course Description for Statistics* should be the guide, and the teacher is responsible for expanding the course to include applications and enrichment. The *Advanced Placement Teacher's Guide in Statistics* is another publication containing syllabi developed by high school teachers currently teaching the AP course and by college faculty who teach the equivalent course at their institutions. It also contains lesson plans, innovative teaching tips, and lists of recommended teaching resources.

Copies of the *Advanced Placement Course Description for Statistics* and the *Advanced Placement Teacher's Guide in Statistics* for the current year may be obtained by writing to:

College Board Publications
Dept. CMC0400 A B C D
Two College Way
Forrester Center, WV 25438

Materials may be purchased online at www.collegeboard.com in the College Board Online Store. Additional information regarding the course and ancillary materials may be reviewed at <http://apcentral.collegeboard.com>.

Below is an abbreviated version of the course outline from the College Board AP Statistics website.

I. Exploring Data: Describing patterns and departures from patterns.

- A. Constructing and interpreting graphical displays of distributions of univariate data (dotplot, stemplot, histogram, cumulative frequency plot)
- B. Summarizing distributions of univariate data
- C. Comparing distributions of univariate data (dotplots, back-to-back stemplots, parallel boxplots)
- D. Exploring bivariate data
- E. Exploring categorical data

II. Sampling and Experimentation: Planning and conducting a study.

- A. Overview of methods of data collection
- B. Planning and conducting surveys
- C. Planning and conducting experiments
- D. Generalizability of results and types of conclusions that can be drawn from observational studies, experiments, and surveys

III. Anticipating Patterns: Exploring random phenomena using probability and simulation.

- A. Probability
- B. Combining independent random variables
- C. The normal distribution
- D. Sampling distributions

IV. Statistical Inference: Estimating population parameters and testing hypotheses.

- A. Estimation (point estimators and confidence intervals)
- B. Tests of significance

Secondary Mathematics
AP Calculus

Prerequisite: Pre-Calculus Course or Teacher Recommendation

Course Description:

An Idaho Course in AP Calculus consists of a full year of academic work in calculus and related topics. This should be equivalent to a one semester entry-level calculus course in most colleges or universities. The topics and concepts that should be included in any calculus course, whether AB or BC, can be found in the *Advanced Placement Course Description for Calculus*. Updated annually, this publication provides a descriptive outline for the course while detailing the content and skills students need to demonstrate. This publication also provides a description of the Advanced Placement examination, sample multiple-choice questions with an answer key, and sample free-response questions. Using the *Advanced Placement Course Description for Calculus* as a guide, the teacher is responsible for expanding the course to include enrichment, applications and special projects. The *Advanced Placement Teacher's Guide in Calculus* is a publication that teachers may find very helpful. It contains syllabi developed by high school teachers currently teaching AP Calculus, lesson plans, current teaching techniques, and lists of recommended teaching resources.

Copies of the *Advanced Placement Course Description for Calculus* and the *Advanced Placement Teacher's Guide in Calculus* for the current year may be obtained by writing to:

College Board Publications
Dept. CMC0400 A B C D
Two College Way
Forrester Center, WV 25438

Materials may be purchased online at www.collegeboard.com in the College Board Online Store. Additional information about the course, previous AP Tests and review problems, and any supplemental materials may be reviewed at <http://apcentral.collegeboard.com>.

Below is an abbreviated version of the course outline from the College Board AP Calculus website.

I. Functions, Graphs, and Limits

- Analysis of graphs
- Limits of functions (including one-sided limits)
- Asymptotic and unbounded behavior
- Continuity as a property of functions
- * Parametric, polar, and vector functions

II. Derivatives

- Concept of the derivative
- Derivative at a point
- Derivative as a function
- Second derivatives
- Applications of derivatives
- Computation of Derivatives

III. Integrals

- Interpretations and properties of definite integrals
- Applications of integrals
- Fundamental Theorem of Calculus
- Techniques of antidifferentiation
- Applications of antidifferentiation
- Numerical approximations to definite integrals

***IV. Polynomial**

- * Concept of series
- * Series of constants
- * Taylor series

Note: The topic outline for Calculus BC includes all of the topics for Calculus AB. Additional topics are indicated with an asterisk (*).

**IDAHO CONTENT STANDARDS
PRE-CALCULUS/TRIGONOMETRY
MATHEMATICS**

This set of standards combined with “Pre-Calculus/Algebra” forms the content standard for Pre-Calculus. This set alone forms the content for Trigonometry.

Students are expected to know content and apply skills from previous grades.

Mathematical reasoning and problem solving processes should be incorporated throughout all mathematics standards. Students should use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models to communicate mathematical information and to explain mathematical reasoning and concepts.

Standard 1: Number and Operation

Goal 1.1: Understand and Use Numbers

No objectives at this grade level.

Goal 1.2: Understand and perform computations accurately

Objectives: By the end of Trigonometry, the student will be able to:

- PC.T.1.2.1 Convert rectangular coordinates to polar coordinates and back.
- PC.T.1.2.2 Perform vector operations.
- PC.T.1.2.3 Use appropriate technology to complete applied problems.
- PC.T.1.2.4 Use appropriate vocabulary to communicate solutions.

Goal 1.3: Estimate and judge reasonableness of results

Objective(s): By the end of Trigonometry, the student will be able to:

- PC.T.1.3.1 Estimate in which quadrant an angle lies given its radian or degree measurement.

Mathematical Language and Symbols Students Should Use

Polar coordinates, radian measure, amplitude, magnitude, Cartesian plane, vector, trigonometric ratios, Pythagorean Theorem

Standard 2: Concepts and Principles of Measurement

Goal 2.1: Understand and use U.S. customary and metric measurements.

No objectives at this grade level.

Goal 2.2: Apply the concepts of rates, ratios, and proportions.

No objectives at this grade level.

Goal 2.3: Apply dimensional analysis.

Objective(s): By the end of Pre-Calculus, the student will be able to:

- PC.T.2.3.1 Draw an angle in standard position given degree or radian measure.
- PC.T.2.3.2 Compute its co-terminal angles and reference angle given an angle in standard position.
- PC.T.2.3.3 Use appropriate vocabulary to communicate solutions.

Goal 2.4: Apply appropriate techniques, tools, and formulas to determine measurements.

Objective(s): By the end of Pre-Calculus, the student will be able to:

- PC.T.2.4.1 Convert radians to degrees and degrees to radians.
- PC.T.2.4.2 Find measure of the arc length and area of the sector.
- PC.T.2.4.3 Use appropriate vocabulary to communicate solutions.

Mathematical Language and Symbols Students Should Use

Initial side, terminal side, radians, reference angle, terminal angle, standard position, sector, arc, Greek variables

Standard 3: Concepts and Language of Algebra and Functions

Goal 3.1: Use algebraic symbolism as a tool to represent mathematical relationships.

Objective(s): By the end of Trigonometry, the student will be able to:

- PC.T.3.1.1 Manipulate, simplify, and verify trigonometric identities.

Goal 3.2: Evaluate algebraic expressions.

No objectives at this grade level.

Goal 3.3: Solve algebraic equations and inequalities.

Objective(s): By the end of Trigonometry, the student will be able to:

- PC.T.3.3.1 Solve trigonometric equations.
- PC.T.3.3.2 Use appropriate vocabulary to communicate solutions.

Goal 3.4: Solve simple linear systems of equations.

No objectives at this grade level.

Goal 3.5: Understand the concept of functions.

Objective(s): By the end of Trigonometry, the student will be able to:

- PC.T.3.5.1 Identify domain and range given a trigonometric function.
- PC.T.3.5.2 Use appropriate vocabulary to communicate solutions.

Goal 3.6: Apply functions to a variety of problems.

Objective(s): By the end of Trigonometry, the student will be able to:

- PC.T.3.6.1 Use the Law of Sines and Law of Cosines appropriately to solve triangles.
- PC.T.3.6.2 Model and solve real world phenomena using trigonometric functions and vectors.
- PC.T.3.6.3 Use appropriate vocabulary to communicate solutions.

Mathematical Language and Symbols Students Should Use

Fundamental identities, sum and difference identities, half-angle and double angle identities, law of Sines, law of Cosines, sine, cosine, tangent, domain, range, bearing

Standard 4: Concepts and Principles of Geometry

Goal 4.1: Apply concepts of size, shape, and spatial relationships.

Objective(s): By the end of Trigonometry, the student will be able to:

- PC.T.4.1.1 Find the period, amplitude, phase shift of trigonometric functions.

Goal 4.2: Apply the geometry of right triangles.

Objective(s): By the end of Trigonometry, the student will be able to:

- PC.T.4.2.1 Solve right triangles using the Pythagorean Theorem and trigonometric ratios.
- PC.T.4.2.2 Classify and solve special 30 – 60 – 90 and 45 – 45 – 90 triangles.
- PC.T.4.2.3 Use appropriate vocabulary to communicate solutions.

Goal 4.3: Apply graphing in two dimensions.

Objective(s): By the end of Trigonometry, the student will be able to:

- PC.T.4.3.1 Graph trigonometric functions of the form $d + A \sin^*(Bx + C)$ and inverse trigonometric functions. $\sin^*$ implies any trig function.
- PC.T.4.3.2 Place vectors appropriately on a graph.
- PC.T.4.3.3 Use appropriate vocabulary to communicate solutions.

Goal 4.4: Represent and graph linear relationships.

No objectives at this grade level.

Goal 4.5: Understand the basic concepts of polygons.

No objectives at this grade level.

Goal 4.6: Understand basic concepts of a circle.

Objective(s): By the end of Trigonometry, the student will be able to:

- PC.T.4.6.1 Apply Unit Circle Trigonometry.
- PC.T.4.6.2 Use appropriate vocabulary to communicate solutions.

Mathematical Language and Symbols Students Should Use

Period, phase shift, amplitude, Cartesian plane, Pythagorean Theorem, vectors, unit circle, special triangles

Standard 5: Data Analysis, Probability, and Statistics

Goal 5.1: Represent data with a variety of formats.

No objectives at this grade level.

Goal 5.2: Collect, organize, and display data.

No objectives at this grade level.

Goal 5.3: Apply simple statistical measurements.

No objectives at this grade level.

Goal 5.4: Understand basic concepts of probability.

No objectives at this grade level.

Goal 5.5: Make predictions or decisions based on data.

No objectives at this grade level.

**IDAHO CONTENT STANDARDS
PRECALCULUS/ALGEBRA
MATHEMATICS**

This set of standards, combined with “Pre-Calculus/Trigonometry” forms the content standards for Pre-Calculus. This set alone forms the content for Algebra III.

Students are expected to know content and apply skills from previous grades.

Mathematical reasoning and problem solving processes should be incorporated throughout all mathematics standards. Students should use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models to communicate mathematical information and to explain mathematical reasoning and concepts.

Standard 1: Number and Operation

Goal 1.1: Understand and use numbers.

Objective(s): By the end of Pre-Calculus, the student will be able to:

- PC.A.1.1.1 Apply matrices to systems and use them to organize and store data.
- PC.A.1.1.2 Apply properties of exponents and logarithms.

Goal 1.2: Perform computations accurately.

Objective(s): By the end of Pre-Calculus, the student will be able to:

- PC.A.1.2.1 Perform operations on real and complex numbers.
- PC.A.1.2.2 Perform operations on matrices.

Goal 1.3: Estimate and judge reasonableness of results.

Objective(s): By the end of Pre-Calculus, the student will be able to:

- PC.A.1.3.1 Apply number sense to mathematical models and judge the reasonableness of results.
- PC.A.1.3.2 Use the appropriate technology (computers, graphing calculators, calculators, paper-pencil, mental estimates) to model and solve complex problems.

Standard 2: Concepts and Principles of Measurement

Goal 2.1: Understand and use U.S. customary and metric measurements.

No objectives at this grade level.

Goal 2.2: Apply the concepts of rates, ratios and proportions.

No objectives at this grade level.

Goal 2.3: Apply dimensional analysis.

No objectives at this grade level.

Goal 2.4: Apply appropriate techniques, tools, and formulas to determine measurements.

No objectives at this grade level.

Standard 3: Concepts and Language of Algebra and Functions

Goal 3.1: Use algebraic symbolism as a tool to represent mathematical relationships.

Objective(s): By the end of Pre-Calculus, the student will be able to:

- PC.A.3.1.1 Select and use various representations for relations and functions.
- PC.A.3.1.2 Perform transformations such as arithmetically combining, finding the inverse, and the composition of functions.
- PC.A.3.1.3 When appropriate, use technology to perform algebraic transformations on more complicated symbolic expressions.
- PC.A.3.1.4 Use the standard and general forms of the equations of circles, parabolas, ellipses and hyperbolas.

Goal 3.2: Evaluate algebraic expressions.

Objective(s): By the end of Pre-Calculus, the student will be able to:

- PC.A.3.2.1 Judge the meaning, usefulness, and reasonableness of the results of symbol manipulation, including those carried out by technology.

Goal 3.3: Solve algebraic equations and inequalities.

Objective(s): By the end of Pre-Calculus, the student will be able to:

- PC.A.3.3.1 Solve exponential, logarithmic, rational, and polynomial equations.
- PC.A.3.3.2 Solve systems of equations using algebra, graphing and/or matrices.
- PC.A.3.3.3 Solve systems of inequalities.

Goal 3.4: Solve simple linear systems of equations.

No objectives at this grade level.

Goal 3.5: Understand the concept of functions.

Objective(s): By the end of Pre-Calculus, the student will be able to:

- PC.A.3.5.1 Define, identify, and apply relations and functions.
- PC.A.3.5.2 Use and compare the properties of classes of functions, including polynomial, rational, exponential, logarithmic and multi-variable functions.

Goal 3.6: Apply functions to a variety of problems.

Objective(s): By the end of Pre-Calculus, the student will be able to:

- PC.A.3.6.1 Identify essential quantitative relationships in a situation and determine the class or classes of functions that might model the relationships.

- PC.A.3.6.2 Communicate reasonable conclusions about a situation being modeled by a function.

Goal 3.7: Analyze the behavior of series and sequences.

Objective(s): By the end of Pre-Calculus, the student will be able to:

- PC.A.3.7.1 Use arithmetic, geometric, and infinite notation including sigma notation.
PC.A.3.7.2 Identify and find n th terms of arithmetic, geometric and infinite sequences.
PC.A.3.7.3 Find sums of arithmetic, geometric and infinite series.

Standard 4: Concepts and Principles of Geometry

Goal 4.1 Apply concepts of size, shape, and spatial relationships.

Objective(s): By the end of Pre-Calculus, the student will be able to:

- PC.A.4.1.1 Transform and analyze families of graphs from a parent graph.

Goal 4.2 Apply the geometry of right triangles.

No objectives at this grade level.

Goal 4.3: Apply graphing in two dimensions.

Objective(s): By the end of Pre-Calculus, the student will be able to:

- PC.A.4.3.1 Graph rational, exponential, logarithmic, and polynomial functions.
PC.A.4.3.2 Graph circles, parabolas, ellipses and hyperbolas given their equations.

Goal 4.4: Represent and graph linear relationships.

Objective(s): By the end of Precalculus, the student will be able to:

- PC.A.4.4.1 Develop and analyze mathematical models.

Standard 5: Data Analysis, Probability, and Statistics

Goal 5.1: Represent data with a variety of formats.

No objectives at this grade level.

Goal 5.2: Collect, organize, and display data.

No objectives at this grade level.

Goal 5.3: Apply simple statistical measurements.

No objectives at this grade level.

Goal 5.4: Understand basic concepts of probability.

No objectives at this grade level.

Goal 5.5: Make predictions or decisions based on data.

No objectives at this grade level.

DRAFT

**STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007**

REFERENCE: APPLICABLE STATUTE, RULE, OR POLICY

**TITLE 33
EDUCATION
CHAPTER 1
STATE BOARD OF EDUCATION**

33-105. RULES -- EXECUTIVE DEPARTMENT. (1) The state board shall have power to make rules for its own government and the government of its executive departments and offices; and, upon recommendations of its executive officers, to appoint to said departments and offices such specialists, clerks and other employees as the execution of duties may require, to fix their salaries and assign their duties.

(2) Statements of the state board of education and board of regents of the university of Idaho which relate to the curriculum of public educational institutions, to students attending or applicants to such institutions, or to the use and maintenance of land, equipment and buildings controlled by the respective institutions, are not rules and are not statements of general applicability for the purposes of chapter 52, title 67, Idaho Code.

(3) Notwithstanding any other provision of chapter 52, title 67, Idaho Code, the state board of education and board of regents of the university of Idaho shall be deemed to be in full compliance with the notice requirements of section 67-5221, Idaho Code, if:

(a) Notice is given by including the intended action in the official written agenda for a regularly scheduled meeting of the board, and the agenda is available for public inspection at the central office of the board not less than five (5) days prior to the meeting; and

(b) Notice of the intended action, accompanied by the full text of the rule under consideration prepared so as to indicate words added or deleted from the presently effective text, if any, is transmitted to the director of the legislative services office at the same time that notice is given under paragraph (a) of this subsection. The director of the legislative services office shall refer the material under consideration to the germane joint subcommittee created in section 67-454, Idaho Code, to afford the subcommittee opportunity to submit data, views or arguments in writing to the board prior to the time for receiving comment as provided in paragraph (d) of this subsection; and

(c) The intended action is discussed but not acted upon during the regularly scheduled meeting for which the agenda was prepared, but instead is held for final action at the next regularly scheduled or later meeting of the board; and

(d) At least fifteen (15) days prior to the scheduled date for final action, the board shall mail to all persons who have made timely request in writing to the board and shall publish in an issue of the Idaho administrative bulletin a brief description of the intended action, or a concise summary of any statement of economic impact required pursuant to section 67-5223(2), Idaho Code, and shall note the time when, the place where, and the manner in which interested persons may present their views thereon; and

(e) Upon adoption of a rule, the board, if requested in writing to do so by an interested person either prior to adoption or within twenty-eight (28) days thereafter, shall issue a concise statement of the principal reasons for and against its adoption,

**STATE DEPARTMENT OF EDUCATION
AUGUST 23, 2007**

incorporating therein its reasons for overruling the considerations urged against its adoption.

**TITLE 33
EDUCATION
CHAPTER 1
STATE BOARD OF EDUCATION**

33-107. GENERAL POWERS AND DUTIES OF THE STATE BOARD. The state board shall have power to:

- (1) Perform all duties prescribed for it by the school laws of the state;
- (2) Acquire, hold and dispose of title, rights and interests in real and personal property;
- (3) Have general supervision, through its executive departments and offices, of all entities of public education supported in whole or in part by state funds;
- (4) Delegate to its executive secretary, to its executive officer, or to such other administrators as the board may appoint, such powers as said officers require to carry out the policies, orders and directives of the board;
- (5) Through its executive departments and offices:
 - (a) Enforce the school laws of the state,
 - (b) Study the educational conditions and needs of the state and recommend to the legislature needed changes in existing laws or additional legislation;
- (6) In addition to the powers conferred by chapter 24, title 33, Idaho Code:
 - (a) Maintain a register of postsecondary educational institutions approved to provide programs and courses that lead to a degree or which provide, offer and sell degrees in accordance with the procedures established in chapter 24, title 33, Idaho Code,
 - (b) Determine whether to accept academic credit at public postsecondary educational institutions in Idaho. Academic credit shall not be transferred into any Idaho public postsecondary institution from a postsecondary educational institution or other entity that is not accredited by an organization recognized by the board,
 - (c) Maintain a register of proprietary schools approved to conduct, provide, offer or sell a course or courses of study in accordance with the procedures established in chapter 24, title 33, Idaho Code;
- (7) Prescribe the courses and programs of study to be offered at the public institutions of higher education, after consultation with the presidents of the affected institutions;
- (8) Approve new courses and programs of study to be offered at community colleges organized pursuant to chapter 21, title 33, Idaho Code, when the courses or programs of study are academic in nature and the credits derived there from are intended to be transferable to other state institutions of higher education for credit toward a baccalaureate degree, and when the courses or programs of study have been authorized by the board of trustees of the community college.