BILLINGS PUBLIC SCHOOLS
MATHEMATICS
INTERMEDIATE ALGEBRA
Learner Objectives

MISSION STATEMENT

In a rapidly changing technological society, mathematics is a tool of great and growing importance. To achieve mathematical power one needs to become a problem solver, to value mathematics, to reason and communicate mathematically, and to be confident in applying mathematics to real world situations. The goal of mathematics education is to develop mathematically literate individuals who understand how mathematics, technology, and society influence one another.

PHILOSOPHY

We believe every student can understand the general nature and uses of mathematics necessary to solve problems, reason inductively and deductively and apply numerical concepts necessary to function in a technological society. We believe instructional strategies must include real world applications and the appropriate use of technology. We believe students must be able to use mathematics as a communications medium.

Therefore, as an educational system we believe we can teach all children and all children can learn. We believe accessing knowledge, reasoning, questioning, and problem solving are the foundations for learning in an ever-changing world. We believe education enables student to recognize and strive for higher standards. Consequently, we will commit out efforts to help students acquire knowledge and attitudes considered valuable in order to develop their potential and/or their career and lifetime aspirations.

LEARNER DOMAINS

I. **The learner will develop an understanding of number sense and mathematical properties.**

II. **The learner will develop an understanding of estimation, computation and mental math.**

III. **The learner will develop an understanding of measurement and geometric concepts.**

IV. **The learner will develop an understanding of patterns, algebraic reasoning and logic.**

V. **The learner will develop an understanding of statistics, probability, and data analysis.**

VI. **The learner will develop an understanding of technological tools.**

I. The learner will develop an understanding of number sense and mathematical properties.
(I, D, **E,** A)

   1. The learner will develop an understanding of number systems by relating, counting, grouping and place value concepts.

      a. Apply proportions and percents to real-world problems and develop an understanding of percent change. (A)

      b. Interpret integral and rational exponents and square roots. (E, A)

      c. Apply the laws of exponents to simplify and evaluate expressions. (D, **E**)

      d. Translate between standard and scientific notation with positive and negative exponents. (A)

      e. Order and compare real numbers. (D, **E**, A)

      f. Determine numbers belonging to various subsets of the real number system and recognize the relationships among the subsets, e.g., whole numbers, rational numbers, real numbers. (I, D, **E**, A)

II. The learner will develop an understanding of estimation, computation and mental math.
(I, D, **E**, A)

   2. The learner will compute fluently and make reasonable estimates.

      a. Approximate square roots and memorize the perfect squares up to and including 225. (E, A)

      b. Recognize and generate equivalent forms of real numbers. (D, **E,** A)

      c. Apply order of operations and laws of exponents. (D, **E,** A)

      d. Apply appropriate estimation strategies and recognizing when estimation, approximation, or exact answers are appropriate and recognize errors. (D, **E**, A)

      e. using mental math and number sense to compute with rational numbers.
(D, **E**, A)

      f. Add, subtract, multiply and divide with real numbers and demonstrate an understanding of how mathematical operations effect real numbers including operations involving exponents and roots. (D, **E**, A)

      g. Add, subtract, multiply, divide and simplify rational expressions.
(I, D)

   3. The learner will understand meanings of operations and how they relate to one another.

      a. **Identify and apply associative, commutative, distributive, identity and inverse properties.** (D, **E**)

III. The learner will develop an understanding of measurement and geometric concepts
(I, D, **E**, A)
    4. Apply appropriate techniques, tools and formulas to determine measurements.
        a. Solve problems involving the Pythagorean Theorem. (E, A)
        b. Memorize the relationships between the sides of 45-45-90 and 30-60-90
        triangles. (D, **E**, A)
        c. Solve problems involving rates and formulas. (I, D, **E**, A)

    5. Specify locations and describe spatial relationships using coordinate geometry and
    other representational systems.
        a. Determine lengths of segments using the distance formula, find midpoints,
        and determine whether lines are parallel or perpendicular using slopes.
        (D, **E**, A)

IV. The learner will develop an understanding of patterns, algebraic reasoning and logic.
(I, D, **E**, A)
    6. Understand patterns, relations and functions.
        a. Recognize functions represented by verbal descriptions, equations, tables, or
        graphs as linear, quadratic or neither. (I, D, **E**, A)
        b. Solve absolute value equations. (I, D)
        c. Draw conclusions and make predictions based on mathematical patterns
        and relationships. (I, D, **E**, A)
        d. Solve simple and compound interest problems (excluding continuous). (I, D)

    7. Represent and analyze mathematical situations and structures using algebraic
    symbols.
        a. Represent real life situations with algebraic expressions, equations, and
        inequalities. (D, **E**, A)
        b. Determine solutions to linear equations and systems of linear equations in
        two variables algebraically and graphically. (D, **E**, A)
        c. Determine solutions to linear inequalities and systems of linear inequalities
        in two variables graphically. (D, **E**)
        d. Determine the slope and intercepts of a linear equation represented by a
        graph or an equation and interpret the meaning of those values relative to the
        context of the problem. (D, **E**, A)
        e. **Graph linear equations and linear inequalities.** (D, **E**, A)
        f. Write equations to represent a given linear graph in slope-intercept form and
        standard form using two points and using a point and slope. (D, **E**, A)
        g. Recognize and write equivalent expressions. (D, **E**, A)
        h. Use function notation to evaluate functions using numerical and variable
        inputs. (I, D**, E**)

IV. The learner will develop an understanding of patterns, algebraic reasoning and logic. (I, D, **E**, A)

    7. Represent and analyze mathematical situations and structures using algebraic symbols. (cont.)
        i. Represent, analyze and generalize patterns relating to linear and quadratic functions through multiple representations (e. g. words, charts, algebraic expressions or equations and graphical representations). (I, D, **E**, A)
        j. Determine in a relationship (function) how a change in one variable affects the other variable. (D, **E**, A)
        k. **Add, subtract, multiply and factor polynomials.** (D, **E**, A)
        l. Determine solutions to quadratic functions through factoring, quadratic formula, square roots and graphically. (I, D,**E**, A)
        m. Determine the domain and range of a function. (D)

V. The learner will develop an understanding of technological tools. (I,D,**E**,A)
    8. The learner will understand and apply basic concepts of technological tools.
        a. Use technology to graph linear and quadratic functions with an appropriate window. (D,**E**)
        b. Use technology to solve systems graphically and with matrices. (I, D)
        c. Use technology to compute the value of an expression. (I, D, **E**, A)