

Bethlehem Lutheran School Math Grade 8 (Algebra)

In recognizing the need for understanding and mastering mathematical computations and concepts, the philosophy of the mathematics program is to involve each student in a learning program that blends mathematical skills with practical applications to their daily Christian lives.

State Standard 1

Students develop number sense and use of numbers and number relationships in problem-solving situation and communicate the reasoning used in solving these problems.

Classroom objectives

The student will:

- 1.1 Demonstrate meanings for integers, rational numbers, percents, exponents, square roots, and pi (π); use physical materials and technology in problem-solving situations.
- 1.2 Read, write, and order integers, rational numbers, and common irrational numbers such as $\sqrt{2}$, $\sqrt{5}$, and π .
- 1.3 Apply number-theory concepts (for example, primes, factors, and multiples) to represent numbers in various ways.
- 1.4 Use the relationships among fractions, decimals, and percents, including the concepts of ratio and proportion, in problem-solving situations.
- 1.5 Develop, test, and explain conjectures about properties of integers and rational numbers.
- 1.6 Use number sense to estimate and justify the reasonableness of solutions to problems involving integers, rational numbers, and common irrational numbers such as $\sqrt{2}$, $\sqrt{5}$, and π .
- 1.7 Demonstrate meanings for real numbers, absolute value, and scientific notation using physical materials and technology in problem-solving situations.
- 1.8 Calculate elapsed time.

State Standard 2

Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems.

Classroom objectives

The student will:

- 2.1 Represent, describe, and analyze patterns and relationships using tables, graphs, verbal rules, and standard algebraic notation.
- 2.2 Describe patterns using variables, expressions, equations, and inequalities in problem-solving situations.
- 2.3 Analyze functional relationships to explain how a change in one quantity results in a change in another (for example, how the area of a circle changes as the radius increases, or how a person's height changes over time).
- 2.4 Distinguish between linear and nonlinear functions through informal investigations.
- 2.5 Solve simple linear equations in problem-solving situations using a variety of methods (informal, formal, and graphical) and a variety of tools (physical materials and calculators).
- 2.6 Model real-world phenomena (for example, distance versus-time relationships, compound interest, amortization tables, and mortality rates) using functions, equations, inequalities, and matrices.

State Standard 3

Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.

Classroom objectives

The student will:

- 3.1 Read and construct displays of data using appropriate techniques (for example: line graphs, circle graphs, scatter plots, box plots, and stem-and-leaf plots) and appropriate technology.
- 3.2 Display and use measures of central tendency, such as mean, median, and mode, and measures of variability, such as range and quartiles.

- 3.3 Evaluate arguments that are based on statistical claims.
- 3.4 Formulate hypotheses, draw conclusions, and make convincing arguments based on data analysis (science curriculum).
- 3.5 Determine probabilities through experiments or simulations.
- 3.6 Make predictions and compare results using both experimental and theoretical probability drawn from real-world problems.
- 3.7 Use counting strategies to determine all the possible outcomes from an experiment (for example, the number of ways students can line up to have their picture taken).

State Standard 4

Students use geometric concepts, properties, and relationships in problem-solving situations and communicate the reasoning used in solving these problems.

Classroom objectives

The student will:

- 4.1 Construct two- and three-dimensional models using a variety of materials and tools.
- 4.2 Describe, analyze, and reason informally about the properties (for example, parallelism, perpendicularity, and congruence) of two- and three-dimensional figures.
- 4.3 Apply the concepts of ratio, proportion, and similarity in problem-solving situations.
- 4.4 Solve problems using coordinate geometry.
- 4.5 Solve problems involving perimeter and area in two dimensions and involving surface area and volume in three dimensions.
- 4.6 Use methods to measure perimeter, area, and volume of regular geometric figures.

State Standard 5

Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.

Classroom objectives

The students will

- 5.1 Estimate, use, and describe measures of distance, perimeter, area, volume, capacity, weight, mass, and angle comparison.

- 5.2 Develop and use formulas and procedures to solve problems involving measurement.

Standard 6

Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers in problem solving situations and communicate the reasoning used in solving these problems.

Classroom objectives

The student will:

- 6.1 Use models to explain how ratios, proportions, and percents can be used to solve real-world problems.
- 6.2 Construct, use, and explain procedures to compute and estimate with whole numbers, fractions, decimals, and integers.
- 6.3 Develop, apply, and explain a variety of different estimation strategies in problem-solving situations and explain why an estimate may be acceptable in place of an exact answer.
- 6.4 Select and use appropriate algorithms for computing with commonly used fractions and decimals, percents, and integers in problem-solving and determine whether the results are reasonable.
- 6.5 Use ratios, proportions, and percents in problem-solving situations.