

Math

Grade 8

Number Sense and Operations

Students will be able to:

- Demonstrate an understanding of the reason why it is impossible to divide by zero.
- Demonstrate an understanding of integers, their properties, and their relation to real numbers.
- Demonstrate an understanding of special numbers (palindromes, triangular, etc.)
- Demonstrate an understanding of the coordinate plane.
- Use estimation to validate solutions using fractions, decimals, percents, squares, etc.
- Solve problems using percentage.

Patterns, Relations and Algebra

Students will be able to:

- Extend, represent, analyze, and generalize a variety of patterns, including arithmetic and geometric progressions, with tables, graphs, words, and symbolic expressions, if possible.
- Using tables, graphs, and equations, solve problems that involve simple and compound interest.
- Demonstrate understanding of the identity $(-a)(-b) = ab$.
- Identify the slope of a line as a measurement of its steepness and as a constant rate of change from its table of values, equation, or graph. Apply the concept of slope to the solution of problems.
- Identify the roles of variables within an equation, ($y = mx + b$ expressing y as a function of x with parameters m and b).
- Set up and solve linear equations and inequalities, with one or two variables using algebraic symbols.
- Explain and analyze (both quantitatively and qualitatively, using pictures, graphs charts or equations) how a change in one variable results in the change in another variable in functional relationships ($C = \pi d$, $A = \pi r^2$ (A as a function of r)).
- Use tables and graphs to represent and compare linear growth patterns and, in particular, compare rates of change and intercepts.

Geometry

Students will be able to:

- Analyze, apply, and explain the relationships between the number of sides and the sums of interior and exterior angle measurements of polygons.
- Classify figures in terms of congruence and similarity, and use in the solution of problems.
- Relate the angles formed by intersecting lines, including parallel lines cut by a transversal.
- Demonstrate an understanding of the Pythagorean theorem and apply to solving problems.
- Use appropriate tools to formulate and test conjectures and to make geometric figures.
- Predict the results of transformations on unmarked or coordinate planes and draw the transformed figure (show how shapes transform under translations, reflections and rotations).
- Use spatial relationships, such as parallel faces, to identify three-dimensional figures (pyramids) by their physical appearance and distinguishing attributes.

Measurement

Students will be able to:

- Determine the surface area and volume of rectangular prisms, cylinders and spheres when provided with the formulas; use technology as appropriate.
- Use ratio and proportion (including scale factors) to solve problems that include similar plane figures and indirect measurement.

Data Analysis, Statistics, and Probability.

Students will be able to:

- Describe the characteristics and limitations of a data sample. Identify different ways of selecting a sample (convenience sampling, responses to a survey, or random sampling).
- Continue to use various tabular and graphical representations of data (circle graphs, Venn diagrams, scatterplots, stem-and-leaf plots, box plots, histograms, tables, and charts).
- Differentiate between continuous and discrete data and ways to represent them.
- Continue to utilize tree diagrams, tables, organized lists, and area models to compute probabilities for simple compound events (multiple coin tosses or rolls of dice).