

# Mathematics 8

## General Curriculum Outcomes

- A. Students will demonstrate number sense and apply number-theory concepts.
- B. Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations.
- C. Students will explore, recognize, represent, and apply patterns and relationships, both informally and informally.
- D. Students will demonstrate an understanding of and apply concepts and skills associated with measurement.
- E. Students will demonstrate spatial sense and apply geometric concepts, properties, and relationships.
- F. Students will solve problems involving the collection, display, and analysis of data.
- G. Students will represent and solve problems involving uncertainty.

## Specific Curriculum Outcomes

Students will be expected to

- A1 model and link various representations of square root of a number
- A2 recognize perfect squares between 1 and 144 and apply patterns related to them
- A3 distinguish between an exact square root of a number and its decimal approximation
- A4 find the square root of any number, using an appropriate method
- A5 demonstrate and explain the meaning of negative exponents for base ten
- A6 represent any number written in scientific notation in standard form, and vice versa
- A7 compare and order integers and positive and negative rational numbers (in decimal and fractional forms)
- A8 represent and apply fractional per cents, and per cents greater than 100, in fraction or decimal form, and vice versa
- A9 solve proportion problems that involve equivalent ratios and rates
  
- B1 demonstrate an understanding of the properties of operations with integers and positive and negative rational numbers (in decimal and fractional forms)
- B2 solve problems involving proportions, using a variety of methods
- B3 create and solve problems which involve finding a, b, or c in the relationship  $a\%$  of  $b = c$ , using estimation and calculation
- B4 apply percentage increase and decrease in problem situations
- B5 add and subtract fractions concretely, pictorially, and symbolically
- B6 add and subtract fractions mentally, when appropriate
- B7 multiply fractions concretely, pictorially, and symbolically
- B8 divide fractions concretely, pictorially, and symbolically
- B9 estimate and mentally compute products and quotients involving fractions
- B10 apply the order of operations to fraction computations, using both pencil and paper and the calculator
- B11 model, solve, and create problems involving fractions in meaningful contexts

- B12 add, subtract, multiply, and divide positive and negative decimal numbers with and without the calculator
- B13 solve and create problems involving addition, subtraction, multiplication, and division of positive and negative decimal numbers
- B14 add and subtract algebraic terms concretely, pictorially, and symbolically to solve simple algebraic problems
- B15 explore addition and subtraction of polynomial expressions, concretely and pictorially
- B16 demonstrate an understanding of multiplication of a polynomial by a scalar, concretely, pictorially, and symbolically
- C1 represent patterns and relationships in a variety of formats and use these representations to predict unknown values
- C2 interpret graphs that represent linear and non-linear data
- C3 construct and analyze tables and graphs to describe how change in one quantity affects a related quantity
- C4 link visual characteristics of slope with its numerical value by comparing vertical change with horizontal change
- C5 solve problems involving the intersection of two lines on a graph
- C6 solve and verify simple linear equations algebraically
- C7 create and solve problems, using linear equations
- D1 solve indirect measurement problems, using proportions
- D2 solve measurement problems, using appropriate SI units
- D3 estimate areas of circles
- D4 develop and use the formula for the area of a circle
- D5 describe patterns and generalize the relationships between areas and perimeters of quadrilaterals, and areas and circumferences of circles
- D6 calculate the areas of composite figures
- D7 estimate and calculate volumes and surface areas of right prisms and cylinders
- D8 measure and calculate volumes and surface areas of composite 3-D shapes
- D9 demonstrate an understanding of the Pythagorean relationship, using models
- D10 apply the Pythagorean relationship in problem situations
- E1 make and apply informal deductions about the minimum and sufficient conditions to guarantee the uniqueness of a triangle and the congruency of two triangles
- E2 make and apply generalizations about the properties of rotations and dilatations, and use dilatations in perspective drawings of various 2-D shapes
- E3 make and apply generalizations about the properties of similar 2-D shapes
- E4 perform various 2-D constructions and apply the properties of transformations to these constructions
- E5 make and apply generalizations about the properties of regular polygons
- E6 recognize, name, describe and make and apply generalizations about the properties of prisms, pyramids, cylinders, and cones
- E7 draw isometric and orthographic views of 3-D shapes and construct 3-D models from these views
- F1 demonstrate an understanding of the variability of repeated samples of the same population
- F2 develop and apply the concept of randomness
- F3 construct and interpret circle graphs
- F4 construct and interpret scatter plots and determine a line of best fit by inspection

- F5 construct and interpret box-and-whisker plots
- F6 extrapolate and interpolate information from graphs
- F7 determine the effect of variations in data on the mean, median, and mode
- F8 develop and conduct statistics projects to solve problems
- F9 evaluate data interpretations that are based on graphs and tables
  
- G1 conduct experiments and simulations to find probabilities of single and complementary events
- G2 determine theoretical probabilities of single and complementary events
- G3 compare experimental and theoretical probabilities
- G4 demonstrate an understanding of how data are used to establish broad probability patterns