

California Mathematics Content Standards Linked to the *Fantasy Sports and Mathematics*' Series

(Grades 5 and up)

* Denotes Standard on California High School Exit Exam

Note: The portion of any standard that is in italics is not covered.

Grade 5

Number Sense

- 1.0 Students compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relationship between decimals, fractions, and percents. They understand the relative magnitudes of numbers.
- 1.1 Estimate, round, and manipulate very large (e.g., millions) and very small (e.g., thousandths) numbers.
- 1.2 *Interpret percents as a part of a hundred*; find decimal and percent equivalents for common fractions *and explain why they represent the same value*; compute a given percent of a whole number.
- 1.3 Understand and compute positive integer powers of nonnegative integers; compute examples as repeated multiplication.
- 1.5 Identify and represent on a number line decimals, fractions, mixed numbers, and positive and negative integers.
- 2.0 Students perform calculations and solve problems involving addition, subtraction, and simple multiplication and division of fractions and decimals.
- 2.1 Add, subtract, multiply, and divide with decimals; add with negative integers; subtract positive integers from negative integers; *and verify the reasonableness of the results.*
- 1.1 Demonstrate proficiency with division, including division with positive decimals and long division with multidigit divisors.
- 2.3 Solve simple problems, including ones arising in concrete situations, involving the addition and subtraction of fractions and mixed numbers (like and unlike denominators of 20 or less), and express answers in the simplest form.
- 2.5 Compute and perform simple multiplication and division of fractions and apply these procedures to solving problems.

Algebra and Functions

- 1.0 Students use variables in simple expressions, compute the value of the expression for specific values of the variable, *and plot and interpret the results.*
- 1.1 Use information taken from a graph or equation to answer questions about a problem situation.

- 1.2 Use a letter to represent an unknown number; *write* and evaluate simple algebraic expressions in one variable by substitution.
- 1.3 Know and use the distributive property in equations and expressions with variables.

Measurement and Geometry

- 2.1 Measure, *identify*, and draw angles, *perpendicular and parallel lines, rectangles, and triangles* by using appropriate tools (e.g., straightedge, ruler, compass, protractor, *drawing software*).

Statistics, Data Analysis, and Probability

- 1.0 Students display, analyze, compare, and interpret different data sets, including data sets of different sizes.
- 1.1 Know the concepts of mean, median, and mode; compute and compare simple examples to show that they may differ.
- 1.2 Organize and display single-variable data in appropriate graphs and representations (e.g., histogram, circle graphs) and *explain which types of graphs are appropriate for various data sets*.

Mathematical Reasoning

- 2.3 Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
- 2.4 Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.

Grade 6

Number Sense

- 1.0 Students compare and order positive and negative fractions, decimals, and mixed numbers. Students solve problems involving fractions, ratios, proportions, and percentages.
- *1.1 Compare and order positive and negative fractions, decimals, and mixed numbers and place them on a number line.
- 1.2 Interpret and use ratios in different contexts (e.g., batting averages, miles per hour) to show the relative sizes of two quantities, using appropriate notations (a/b , a to b , $a:b$).
- 1.3 Use proportions to solve problems (e.g., determine the value of N if $4/7 = N/21$, find the length of a side of a polygon similar to a known polygon). Use cross-multiplication as a method for solving such problems, understanding it as the multiplication of both sides of an equation by a multiplicative inverse.
- 1.4 Calculate given percentages of quantities and solve problems involving discounts at sales, interest earned, and tips.
- 2.0 Students calculate and solve problems involving addition, subtraction, multiplication, and division.

- 2.1 Solve problems involving addition, subtraction, multiplication, and division of positive fractions and *explain why a particular operation was used for a given situation*.
- 2.2 Solve addition, subtraction, multiplication, and division problems, including those arising in concrete situations, that use positive and negative integers and combinations of these operations.
- 1.3 Solve addition, subtraction, multiplication, and division problems, including those arising in concrete situations, that use positive and negative integers and combinations of these operations.
- 2.4 Determine the least common multiple and the greatest common divisor of whole numbers; *use them to solve problems with fractions* (e.g., to find a common denominator to add two fractions or to find the reduced form for a fraction).

Algebra and Functions

- 1.0 *Students write verbal expressions and sentences as algebraic expressions and equations; they evaluate algebraic expressions, solve simple linear equations, and graph and interpret their results.*
- 1.2 Write and evaluate an algebraic expression for a given situation, using up to three variables.
- 2.1 Convert one unit of measurement to another (e.g., from feet to miles, from centimeters to inches).
- 2.3 Solve problems involving rates, average speed, distance, and time.
- 3.1 Use variables in expressions describing geometric quantities (e.g., $P = 2w + 2l$, $A = 1/2bh$, $C = pd$ - the formulas for the perimeter of a rectangle, the area of a triangle, and the circumference of a circle, respectively).

Statistics, Data Analysis, and Probability

- 1.1 Compute the range, mean, median, and mode of data sets.
- *3.3 Represent probabilities as *ratios, proportions*, decimals between 0 and 1, and percentages between 0 and 100 and verify that the probabilities computed are reasonable; know that if P is the probability of an event, $1 - P$ is the probability of an event not occurring.

Mathematical Reasoning

- 2.0 Students use strategies, skills, and concepts in finding solutions.
- 2.1 Use estimation to verify the reasonableness of calculated results.
- 2.4 Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, *and models*, to explain mathematical reasoning.
- 2.5 Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.

Grade 7

Number Sense

- *1.0 Students know the properties of, and compute with, rational numbers expressed in a variety of forms.
- *1.1 Read, write, and compare rational numbers in scientific notation (positive and negative powers of 10) with approximate numbers using scientific notation.
- *1.2 Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.
- *1.3 Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.
- *1.6 Calculate the percentage of increases and decreases of a quantity.
- *1.7 Solve problems that involve discounts, markups, commissions, and profit and compute simple and compound interest.

Algebra and Functions

- *1.0 Students express quantitative relationships by using algebraic terminology, expressions, equations, inequalities, and graphs.
- 1.2 Use the correct order of operations to evaluate algebraic expressions such as $3(2x + 5)^2$.
- *2.0 Students interpret and evaluate expressions involving integer powers and simple roots:
 - 2.1 *Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse.* Simplify and evaluate expressions that include exponents.
- *4.0 Students solve simple linear equations and inequalities over the rational numbers.
- *4.1 Solve two-step linear equations and inequalities in one variable over the rational numbers, *interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results.*
- 4.2 Solve multi-step problems involving rate, average speed, distance, and time or a direct variation.

Measurement and Geometry

- *1.1 Compare weights, *capacities, geometric measures, times, and temperatures* within and between measurement systems (e.g., miles per hour and feet per second, cubic inches to cubic centimeters).
- *2.1 Use formulas routinely for finding the perimeter and area of basic two-dimensional figures *and the surface area and volume of basic three-dimensional figures, including rectangles, parallelograms, trapezoids, squares, triangles, circles, prisms, and cylinders.*
- *2.4 Relate the changes in measurement with a change of scale to the units used (e.g., square inches, cubic feet) and to conversions between units (1 square foot = 144 square inches, 1 cubic inch is approximately 16.38 cubic centimeters).
- *3.0 Students know the Pythagorean theorem *and deepen their understanding of plane and solid geometric shapes by constructing figures that meet given conditions and by identifying attributes of figures.*
- *3.1 *Identify* and construct basic elements of geometric figures (e.g., altitudes, mid-

- points, diagonals, angle bisectors, perpendicular bisectors; central angles, radii, diameters, and chords* of circles) by using a compass and straightedge.
- *3.3 Know and understand the Pythagorean theorem and its converse and use it to find the length of the missing side of a right triangle and the lengths of other line segments and, *in some situations, empirically verify the Pythagorean theorem by direct measurement.*

Statistics, Data Analysis, and Probability

- *1.1 Know various forms of display for data sets, including a stem-and-leaf plot or box-and-whisker plot; use the forms to display a single set of data or to compare two sets of data.
- *1.2 Represent two numerical variables on a scatterplot and informally describe how the data points are distributed and any apparent relationship that exists between the two variables (e.g., between time spent on homework and grade level).
- *1.3 Understand the meaning of, and be able to compute the *minimum*, the lower quartile, the median, the upper quartile, and the *maximum* of a data set.

Mathematical Reasoning

- *2.1 Use estimation to verify the reasonableness of calculated results.
- *2.5 Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, *and models*, to explain mathematical reasoning.
- *2.6 Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.
- *3.1 Evaluate the reasonableness of the solution in the context of the original situation.

Grades 8 - 12

Geometry

- 15.0 Students use the Pythagorean theorem to determine distance and find missing lengths of sides of right triangles.

Algebra II

- 18.0 Students use fundamental counting principles to compute combinations and permutations.

Probability and Statistics

- 6.0 Students know the definitions of the mean, median, *and* mode of a distribution of data and can compute each in particular situations.
- 8.0 Students organize and describe distributions of data by using a number of different methods, including frequency tables, histograms, standard line and bar graphs, stem-and-leaf displays, scatter-plots, and box-and-whisker plots.