

Optimum Resource Inc.'s MiddleWare Software

California Standards - Seventh Grade Mathematics	Math Word Problems
<b>NUMBER SENSE</b>	
<b>1.0 Students know the properties of, &amp; compute with, rational numbers expressed in a variety of forms</b>	✓
Read, write, & compare rational numbers in science notation (positive & negative powers of 10)	
with approximate numbers using scientific notation	
Add, subtract, multiply, & divide rational numbers (integers, fractions, & terminating decimals)	✓
& take positive rational numbers to whole-number powers	✓
Convert fractions to decimals & percents & use these representations in estimations, computations, & applications	
Differentiate between rational & irrational numbers	
Know that every rational number is either a terminating or repeating decimal & be able to convert terminating	
decimals into reduced fractions	
Calculate the percentage of increases & decreases of a quantity	
Solve problems that involve discounts, markups, commissions, & profit & compute simple & compound interest	
<b>2.0 Students use exponents, powers and roots &amp; use exponents in working with fractions</b>	✓
Understand negative whole-number exponents. Multiply & divide expressions involving exponents with a common base	✓
Add & subtract fractions by using factoring to find common denominators	✓
Multiply, divide, and simplify rational numbers by using exponent rules	✓
Use the inverse relationship between raising to a power & extracting the root of a perfect square integer; for an integer	
that is not square, determine without a calculator the two integers between which its square root lies & explain why	
Understand the meaning of the absolute value of a number; interpret the absolute value as the distance of the number	

## Optimum Resource Inc.'s MiddleWare Software

from zero on a number line; & determine the absolute value of real numbers	
<b>ALGEBRA &amp; FUNCTIONS</b>	
<b>1.0 Students express quantitative relationships by using algebraic terminology, expressions, equations, inequalities, &amp; graphs</b>	✓
Use variables & appropriate operations to write an expression, an equation, and inequality, or a system of equations or inequalities that represents a verbal description	✓
Use the correct order of operations to evaluate algebraic expressions such as $3(2x + 25)$	
Simplify numerical expressions by applying properties of rational numbers (identity, inverse, distributive, associative, commutative) & justify the process used	
Use algebraic terminology (variable, equation, term, coefficient, inequality, expressions, constant) correctly	
Represent quantitative relationships graphically & interpret the meaning of a specific part of a graph in the situation represented by the graph	
<b>2.0 Students interpret &amp; evaluate expressions involving integer powers &amp; simple roots</b>	✓
Interpret positive whole-number powers as repeated multiplication & negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify & evaluate expressions that include exponents	
Multiply & divide monomials; extend the process of taking powers & extracting roots to monomials when the latter results in a monomial with an integer exponent	✓
<b>3.0 Students graph &amp; interpret linear &amp; some nonlinear functions</b>	
Graph functions of the form $y = nx^2$ and $Y = nx^3$ and use in solving problems	
Plot the value from the volume of three-dimensional shapes for various values of the edge lengths (cubes with varying edge lengths or a triangle prism with fixed height & an equilateral triangle base of varying lengths)	
Graph linear functions, noting that the vertical change (change in y-value) per unit of horizontal change (change in x-value) is always the same & know that the ratio (rise over run) is called the slope of a graph	
Plot the value of quantities whose ratios are always the same (cost to the number of an item, feet to inches, circumference	

## Optimum Resource Inc.'s MiddleWare Software

to diameter of a circle). Fit a line to the plot & understand that the slope of the line equals the quantities	
<b>4.0 Students solve simple linear equations &amp; inequalities over the rational numbers</b>	
Solve two-step linear equations & inequalities in one variable over the rational numbers, interpret the solution	
or solutions in the context from which they arose, & verify the reasonableness of the results	
Solve multi-step problems involving rate, average speed, distance, & time or a direct variation	
<b>MEASUREMENT &amp; GEOMETRY</b>	
<b>1.0 Students choose appropriate units of measure &amp; use ratios to convert</b>	
<b>within &amp; between measurement systems to solve problems</b>	
Compare weights, capacities, geometric measures, times, & temperatures within & between measurement systems	
(miles per hour & feet per second, cubic inches to cubic centimeters)	
Construct & read drawings & models made to scale	
Use measures expressed as rates (speed, density) & measures expressed as products (person-days) to solve problems;	
check the units of the solutions; & use dimensional analysis to check the reasonableness of the answer	
<b>2.0 Students compute the perimeter, area, &amp; volume of common geometric objects</b>	
<b>&amp; use the results to find measures of less common objects.</b>	
<b>They know how perimeter, area, &amp; volume are affected by changes of scale</b>	
Use formulas routinely for finding the perimeter & area of basic two-dimensional figures & the surface area & volume of basic	
three-dimensional figures, including rectangles, parallelograms, trapezoids, squares, triangles, circles, prisms, & cylinders	
Estimate & compute the area of more complex or irregular two- & three-dimensional figures by breaking	
the figures down into more basic geometric objects	
Compute the length of the perimeter, the surface area of the faces, & the volume of a three-dimensional object	
built from rectangular solids. Understand that when the lengths of all dimensions are multiplied by a scale factor,	
the surface area is multiplied by the square of the scale factor and the volume is multiplied by the cube of the scale factor	
Relate the changes in measurement with a change of scale to the units used ( square inches, cubic feet) & to conversions	

## Optimum Resource Inc.'s MiddleWare Software

between units (1 square foot = 144 square inches or (1 ft <sup>2</sup> = 144in <sup>2</sup> ) 1 cubic inch is approximately 16.38 cubic centimeters	
<b>3.0 Students know the Pythagorean theorem &amp; deepen their understanding</b>	
<b>of plane &amp; solid geometric shapes by constructing figures</b>	
<b>that meet given conditions &amp; by identifying attributes of figures</b>	
Identify & construct basic elements of geometric figures (altitudes, mid-points, diagonals, angle bisectors,	
& perpendicular bisectors; central angles, radii, diameters, & chords of circles) by using a compass and straightedge	
Understand & use coordinate graphs to plot simple figures, determine lengths & areas related to them,	
& determine their image under translations & reflections	
Know & understand the Pythagorean theorem & its converse & use it to find the length of the missing side	
of a right triangle & the lengths of other line segments &, in some situations, empirically verify the	
Pythagorean theorem by direct measurement	
Demonstrate an understanding of conditions that indicate two geometrical figures are congruent & what	
congruence means about the relationships between the sides & angles of the two figures	
Construct two-dimensional patterns for three-dimensional models, such as cylinders, prisms, & cones	
Identify elements of three-dimensional geometric objects (diagonals of rectangular solids) and describe	
how two or more objects are related in space (skew lines, the possible ways three planes might intersect)	
<b>STATISTICS, DATA ANALYSIS, &amp; PROBABILITY</b>	
<b>Students collect, organize, &amp; represent data sets that have one or more variables</b>	
<b>&amp; identify relationships among variables within a data set by hand &amp; through the</b>	
<b>use of an electronic spreadsheet software program</b>	
Know various forms of display for data sets, including a stem-&-leaf plot or box-&-whisker plot;	
use the forms to display a single set of data or to compare two sets of data	
Represent two numerical variables on a scatterplot & informally describe how the data points are distributed	
& an apparent relationship that exists between the two variables (between time spent on homework and grade level)	

## Optimum Resource Inc.'s MiddleWare Software

Understand the meaning of, & be able to compute the minimum, the lower quartile, the median, the upper quartile,	
and the maximum of a data set	
<b>MATHEMATICAL REASONING</b>	
<b>1.0 Students make decisions about how to approach problems</b>	
Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, sequencing	
& prioritizing information, & observing patterns	
Determine when and how to break a problem into simpler parts	
<b>2.0 Students use strategies, skills, &amp; concepts in finding solutions</b>	✓
Use estimation to verify the reasonableness of calculated results	
Apply strategies & results from simpler problems to more complex problems	✓
Estimate unknown quantities graphically & solve for them by using logical reasoning & arithmetic & algebraic techniques	
Use a variety of methods, such as words, numbers, symbols, charts, graphs tables, diagrams & models,	
to explain mathematical reasoning	
Express the solution clearly & logically by using the appropriate mathematical notation & terms & clear language,	
support solutions with evidence in both verbal symbolic work	
Indicate the relative advantages of exact & approximate solutions to problems & give answers to a specified	
degree of accuracy	
Make precise calculations & check the validity of the results from the context of the problem	
<b>3.0 Students move beyond a particular problem by generalizing to other situations</b>	✓
Evaluate the reasonableness of the solution in the context of the original situation	✓
Note the method of deriving the solution & demonstrate a conceptual understanding of the derivation	
by solving similar problems	
Develop generalizations of the results obtained & apply them in other	