

PURPOSEFUL DESIGN PUBLICATIONS

Intermediate
Mathematics Series
Scope and Sequence

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	Course A	Course B
I. NUMBER THEORY		
A. Classification of Numbers		
Counting numbers	•	•
Whole numbers	•	•
Integers	•	•
Rational numbers	•	•
Irrational numbers	•	•
Real numbers	•	•
B. Whole Numbers		
Place value	•	
Primes and composites	•	•
Divisibility rules	•	•
Factorization	•	•
Greatest common factor	•	•
Multiples	•	•
Least common multiple	•	•
Fundamental Theorem of Arithmetic		•
C. Exponents, Powers, and Roots		
Positive exponents	•	•
Square roots	•	•
Scientific notation	•	•
Negative exponents		•
Zero exponents		•
Product of powers		•
Quotient of powers		•
Power of a power		•
Square Root of a Product Property		•
Square Root of a Quotient Property		•
D. Operations		
Order of operations	•	•
Inverse operations	•	•
Commutative Property of Addition	•	•
Commutative Property of Multiplication	•	•
Associative Property of Addition	•	•
Associative Property of Multiplication	•	•
Distributive Property	•	•
Identity Property of Addition		•
Identity Property of Multiplication		•

	Course A	Course B
Inverse Property of Addition		•
Inverse Property of Multiplication		•
Equality Properties		•
II. FRACTIONS AND DECIMALS		
A. Concepts		
Naming equivalent fractions	•	•
Determining least common denominator	•	•
Naming equivalent decimals	•	•
Terminating and repeating decimals	•	•
Modeling fractions and decimals	•	•
Converting fractions to decimals	•	•
Converting decimals to fractions	•	•
Comparing and ordering	•	•
Using inequality and equality signs	•	•
Using reciprocals	•	•
Rounding and estimating	•	•
B. Operations with Rational Numbers		
Add and subtract fractions and mixed numbers	•	•
Add and subtract decimals	•	•
Multiply and divide fractions and mixed numbers	•	•
Multiply and divide decimals	•	•
III. RATIO, PROPORTION, AND PERCENT		
A. Ratio and Rate		
Writing ratios in simplest form	•	•
Comparing ratios	•	•
Equivalent ratios	•	•
Ratio tables		•
Determining rate, unit rate, and unit price	•	•
Using conversion factors	•	•
Sine, cosine, and tangent ratios		•
B. Proportion		
Defining and recognizing proportions	•	•
Solving proportions using cross products	•	•
Property of Cross Products		•
Related to maps and scale drawings	•	•
Related to similar figures	•	•
Using the constant of proportionality		•

	Course A	Course B
C. Percent		
Relating fractions and decimals to percent	•	•
Relating ratio to percent	•	•
Converting fractions to percents and percents to fractions	•	•
Converting decimals to percents and percents to decimals	•	•
Estimating percents	•	•
Finding a percent of a number	•	•
Finding what percent one number is of another	•	•
Finding a number when a percent is known	•	•
Writing and solving equations involving percent	•	•
Percent increase and decrease	•	•
Taxes and discounts	•	•
Interest		•
IV. ALGEBRA		
A. Integers		
Properties of integers	•	•
Opposites	•	•
Absolute value	•	•
Comparing and ordering integers	•	•
Graphing on a number line	•	•
Adding and subtracting integers	•	•
Multiplying and dividing integers	•	•
Simplifying and evaluating expressions	•	•
Solving equations	•	•
B. Properties		
Commutative Property of Addition	•	•
Commutative Property of Multiplication	•	•
Associative Property of Addition	•	•
Associative Property of Multiplication	•	•
Distributive Property	•	•
Identity Property of Addition		•
Identity Property of Multiplication		•
Inverse Property of Addition		•
Inverse Property of Multiplication		•
Equalities Properties		•
Property of Cross Products		•
Square Root of a Product Property		•
Square Root of a Quotient Property		•

	Course A	Course B
Properties of Exponents		•
C. Expressions, Equations, Inequalities		
Constants and variables	•	•
Identifying terms		•
Translating numerical and algebraic expressions	•	•
Simplifying and evaluating expressions	•	•
Writing and solving addition and subtraction equations	•	•
Writing and solving multiplication and division equations	•	•
Writing and solving two-step equations	•	•
Solving absolute value equalities	•	•
Writing and solving equations using square roots		•
Solving equations with variables on both sides		•
Writing and solving inequalities	•	•
Graphing inequalities	•	•
Writing and solving compound inequalities	•	•
Solving absolute value inequalities	•	•
Graphing absolute value inequalities		•
D. Functions and Relationships		
Identifying numerical patterns	•	•
Function tables	•	•
Writing functions	•	•
Domain, range, and ordered pairs		•
Graphing functions		•
Rate of change and slope		•
Slope intercept form of a linear equation		•
Writing and graphing linear equations		•
Identifying slopes of parallel lines		•
Writing and graphing linear inequalities		•
Solving a system of linear equations by graphing		•
Solving a system of linear equations by substitution		•
E. Polynomials		
Identifying and classifying polynomials		•
Modeling polynomials		•
Simplifying polynomials		•
Adding and subtracting polynomials		•
Multiplying and dividing by a monomial		•
Multiplying binomials		•
Factoring polynomials		•

	Course A	Course B
Expressing geometric measurements		•
V. MEASUREMENT		
A. Linear Measurement		
Customary units of length	•	
Metric units of length	•	
Comparing customary and metric units	•	
B. Capacity		
Customary units of capacity	•	
Metric units of capacity	•	
Comparing customary and metric units	•	
C. Weight and Mass		
Customary units of weight	•	
Metric units of mass	•	
Comparing customary and metric units	•	
D. Temperature		
Customary units of temperature	•	
Metric units of temperature	•	
Using formulas to convert temperature	•	
E. Conversion Factors		
Converting rates	•	•
Converting units	•	•
VI. GEOMETRY		
A. Plane Geometry		
Identifying points, lines, and angles	•	•
Identifying polygons	•	•
Circles and parts of circles	•	•
Finding perimeter of polygons	•	•
Finding perimeter of irregular figures	•	•
Finding area of polygons	•	•
Finding area of irregular figures	•	•
Finding circumference of a circle	•	•
Finding area of a circle	•	•
Sum of the angles in a polygon	•	•
Sum of the exterior angles of a polygon		•
Constructing a congruent line segment	•	•
Constructing a perpendicular bisector	•	•
Constructing a congruent angle	•	•
Constructing triangles	•	•

	Course A	Course B
Constructing an angle bisector		•
Constructing a perpendicular line through a point		•
Constructing parallel lines		•
Constructing trefoil designs		•
B. Solid Geometry		
Identifying polyhedrons	•	•
Identifying cylinders, cones, and spheres	•	•
Finding surface area of polyhedrons	•	•
Finding volume of polyhedrons	•	•
Finding surface area of cylinders	•	•
Finding volume of cylinders and cones	•	•
Finding surface area of cones and spheres		•
Finding volume of spheres		•
Conic sections		•
Spatial visualization		•
C. Formulas		
Area and perimeter of a rectangle	•	•
Area and perimeter of a square	•	•
Area and perimeter of a parallelogram	•	•
Area and perimeter of a triangle	•	•
Area of a trapezoid	•	•
Area and circumference of a circle	•	•
Euler's formula	•	
Volume and surface area of a rectangular prism	•	•
Volume and surface area of a cube	•	•
Volume of a triangular prism	•	•
Surface area of a triangular prism		•
Volume of a pyramid	•	•
Surface area of a pyramid		•
Volume and surface area of a cylinder	•	•
Volume of a cone	•	•
Surface area of a cone		•
Volume and surface area of a sphere		•
Pythagorean Theorem	•	•
Distance Formula		•
Midpoint Formula		•
Sine, cosine, and tangent ratios		•

	Course A	Course B
D. Relationships		
Parallel, perpendicular, and intersecting lines	•	•
Angle relationships	•	•
Congruent triangles	•	•
Similar figures	•	•
Tessellations		•
Pythagorean Theorem	•	•
Irrational spiral		•
Sine, cosine, and tangent ratios		•
VII. COORDINATE SYSTEM		
A. Coordinate Grid		
Using a four-quadrant grid	•	•
Graphing ordered pairs	•	•
Graphing linear equations	•	•
Graphing horizontal and vertical lines	•	•
Identifying slope of a line		•
Determining rate of change		•
Writing the equation of a line		•
Graphing linear inequalities		•
Graphing systems of linear equations		•
Distance Formula		•
Midpoint Formula		•
B. Transformations		
Translations	•	•
Reflections	•	•
Dilations	•	•
Rotations	•	•
Reflections over parallel lines		•
Reflections over intersecting lines		•
VIII. PROBLEM SOLVING		
A. Problem-solving Guide		
Read and analyze word problem	•	•
Select a strategy	•	•
Apply the selected strategy using the appropriate operations	•	•
Check for reasonableness	•	•
B. Problem-solving Strategies		
Choose an operation	•	•
Draw a diagram/picture	•	•

	Course A	Course B
Find a pattern	•	•
Identify sub-goals	•	•
Make a table or graph	•	•
Make an organized list	•	•
Solve a simpler problem	•	•
Try and check	•	•
Use a formula	•	•
Use a graph	•	•
Use a coordinate grid	•	•
Use estimation or mental math	•	•
Use logical reasoning	•	•
Work backward	•	•
Write an expression, equation, or inequality	•	•
C. Applications		
Greatest common factor and least common multiple	•	•
Integers	•	•
Positive exponents and powers	•	•
Negative exponents and powers		•
Square roots		•
Fractions and mixed numbers	•	•
Decimals	•	•
Ratios, rates, unit rates, and unit prices	•	•
Proportions	•	•
Percents	•	•
Taxes and discounts	•	•
Interest		•
Measurements	•	•
Measurement conversions	•	•
Map skills	•	•
Perimeter and area	•	•
Surface area and volume	•	•
Geometric relationships	•	•
Sine, cosine, and tangent ratios		•
Permutations and combinations	•	•
Probability of events	•	•
Measures of central tendency	•	•
Tables, charts, and graphs	•	•
Transformations	•	•

	Course A	Course B
Slope and rate of change		•
Linear equations		•
Polynomials		•
IX. PROBABILITY		
A. Counting Methods		
Fundamental Counting Principle	•	•
Sample spaces and tree diagrams	•	•
Permutations	•	•
Combinations	•	•
B. Determining Probabilities		
Relating favorable outcomes to the number of possible outcomes	•	•
Making predictions	•	•
Theoretical and experimental probabilities	•	•
Expressing probability as a fraction	•	•
Expressing probability as a percent or decimal		•
Mutually exclusive events	•	•
Independent events and dependent events	•	•
Simulations	•	
Geometric probability		•
Determining odds		•
Fair and unfair games		•
X. STATISTICS		
A. Graphs		
Bar graph	•	•
Histogram	•	•
Circle graph	•	•
Line graph	•	•
Line plot	•	•
Stem plot (stem-and-leaf plot)	•	•
Box plot (box-and-whisker plot)	•	•
Scatterplot	•	•
Double-line graph		•
Double-bar graph		•
Pictograph		•
Pictorial model		•
Interpreting graphs	•	•
Selecting an appropriate graph	•	•
Identifying visually misleading graphs		•

	Course A	Course B
B. Collecting and Analyzing Data		
Sampling	•	•
Surveys		•
Tally charts	•	•
Frequency tables	•	•
Spreadsheets	•	
Trend lines	•	•
Correlation		•
Interpreting statistics	•	•
Making predictions	•	•
C. Statistical Measurements		
Frequency	•	•
Mean	•	•
Median	•	•
Mode	•	•
Range	•	•
Quartiles	•	•

