

Subject	Topic	Subtopic	Explanation
Algebra	Set	Set builder notation	Reading and writing set builder notation
		Set operation	Forming the intersection, union, difference, and complement of sets
		Venn diagram	Making inference from Venn diagram
	Function and its graph	Mapping / arrow diagram	Reading and writing an arrow diagram for a function between finite sets
		Linear and quadratic function	Evaluating $f(x)$ when f is linear/quadratic, its graphs (intercept, intersection)
		Piecewise function	Different definition on different parts of the domain
		Inverse function	Finding the inverse of basic function (linear/ratio of linear functions)
	Equation	System of linear equations	Setting up and/or solving a system by elimination and substitution
		Quadratic equation	Solution by factoring, completing the square, or abc-formula
	Inequality	Solution set of inequalities	Finding the solution set to an inequality or a system of inequalities
		Extreme values	Finding maximum and/or minimum under certain condition
		Sign	Positive times positive is positive, etc. Square is never negative
		AM-GM inequality	Arithmetic mean is greater than or equal to geometric mean. Equality cases
	Sequence and series	Arithmetic and geometric sequence	Finding a particular term or the general term
		Recursive sequence	Finding the general term or using the recursion to infer a property
		Arithmetic and geometric series	Summing up a finite sequence
		Infinite series	Summing up an infinite sequence. Issue of convergence
	Polynomial	Degree and coefficient	Identifying deg and coefficient. Summing up the odd/even deg coefficient
		Root and factor	Factor theorem. Finding root by guessing and factoring
		Division with remainder	Remainder theorem. Divisibility of polynomials
Root and coefficient		Vieta formulas	
Trigonometric function	Unit circle	Defining cos and sin by the unit circle	
	Periodicity	Evaluating cos and sin on large angles by periodicity	
	Trigonometric identities	Various formulas	
Number Theory	Divisibility of integers	Special divisibility condition	Divisibility by 2, 3, 4, 5, 8, 9, 10, 11
		Parity	Odd or even
		Divisor	Finding the divisors, their number, and their sum
		Prime number	Using the properties of prime numbers
		Prime factorization	Using the existence and uniqueness property of prime factorization
	Division with remainders	GCD and LCM	Finding the gcd and lcm by factorization or other methods
		Quotient and remainder	Finding the quotient and remainder
	Digits	Modular arithmetic	Operation with mod. Periodicity. Fermat's little theorem
		Digit expansion	Expressing $ab=10a+b$, $abc=100a+10b+c$, and so on
		Digit sum	Finding the sum of digits
Combinatorics	Permutation	Permutation of different objects	Identifying which objects are permuted, and using the $n!$ formula
		Permutation with repetition	Permuting identical objects
		Permutation with grouping	Permuting groups and the objects within groups
		Circular permutation	Round table (rotational symmetry), necklace (rotation + reflection)
	Combination	Subset	Choosing members of a set to form one or several subsets
		Combination with repetition	Some members may be repeated a certain number of times
	Pigeonhole	Set pigeonhole	Choosing enough members of several sets
		Pigeonhole in number theory	Forcing certain remainder or digit
	Probability	Pigeonhole in geometry	Forcing certain length or area
		Coins	Repeated coin tossing. Unfair coin
		Dice	Repeated die tossing. Unfair die
	Statistics	Cards	Standard deck of 52 cards
Centrality measure		Mean / average, median, and mode	
Geometry	Triangle	Chart	Making inference from pie chart, bar diagram, etc
		Sum of angles in a triangle	Using the fact that the sum of angles in a triangle is 180 degrees
		Right triangle	Pythagorean theorem
		Similarity and congruency	AA, SAS, and SSS condition. Ratio of corresponding sides
		Area	Base times height over two. Heron formula
		Trigonometry on a triangle	Sine law, cosine law
	Quadrilateral	Circumcircle	Finding the radius. The formula $[ABC]=abc/4R$
		Incircle	Finding the radius. The formula $[ABC]=rs$
		Square and rectangle	Basic properties of square and rectangle. The use of Pythagorean theorem
		Parallelogram	Opposite angles equal. Opposite sides equal
	Circle	Trapezoid	Superimposing a parallelogram or square on a trapezoid
		Area	Base times height
		Angles on a circle	Central angle and arc measure
Circle	Area and circumference	Formulas for a circle	
	Chord and cut of a circle	Finding the length of chord, the area of sector, etc	