GUGC ONLINE APTITUDE TEST

Test preparation guideline

Topics & Textbook recommendation

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MATHMATICS TOPICS

A. Calculus

- Basic properties (such as increasing/decreasing, positive/negative, zeros) and graphs of polynomial functions, rational functions, irrational (root) functions
- Absolute value function
- One-to-one functions and their inverses
- Basic properties (such as increasing/decreasing, positive/negative, zeros) and graphs of exponential and logarithmic functions
- Limits and continuity
- Vertical, horizontal and oblique asymptotes
- Definition of a derivative, intuitive definition of a derivative derivatives of basic functions, chain rule
- Applications of derivatives: extreme values, concave upward/downward, l'Hospital rule
- Equation of the tangent line to the curve of a graph at a certain point
- Definition of an antiderivative, antiderivatives of basic functions
- Connection between derivatives and antiderivatives
- Definite integrals
- Techniques of integration: substitution rule, integration by parts, partial fractions

B. Algebra

- Division of polynomials
- Binomium of Newton
- Solving of equations and inequalities involving polynomial, rational, irrational, exponential, logarithmic functions
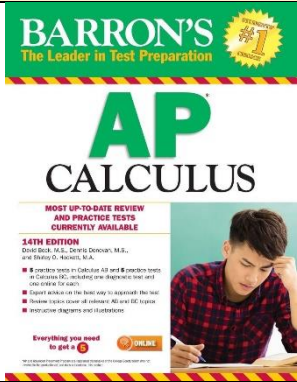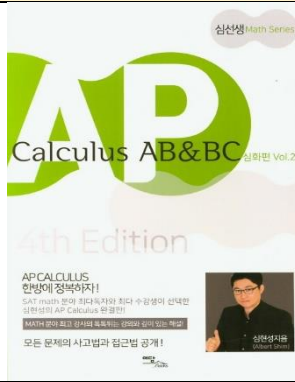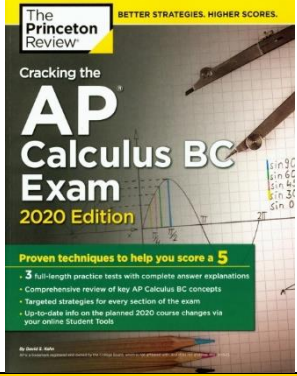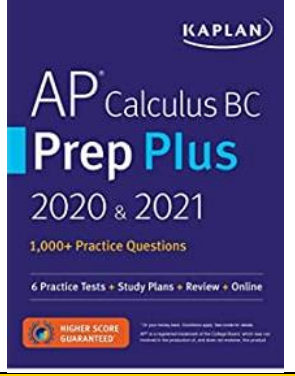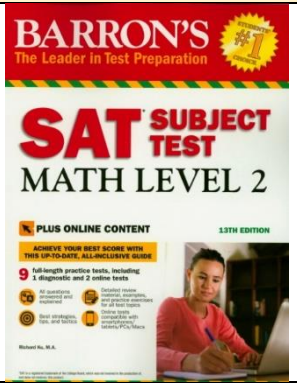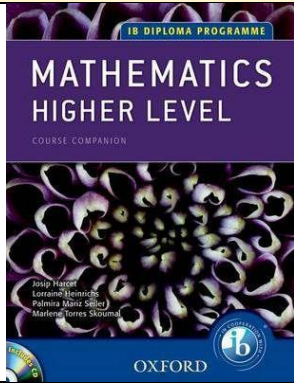- Solving of systems of equations

C. Trigonometry

- Degrees and radians
- Trigonometric functions sine, cosine, tangent, cotangent and their graphs
- Fundamental identity, addition and subtraction formulas, double-angle formulas, half-angle formulas, product-to-sum formulas, sum-to-product formulas
- Proving of trigonometric identities
- Trigonometric equations
- Trigonometry of right triangles

D. Geometry

- Points, coordinates and equations
- Equation of a circle
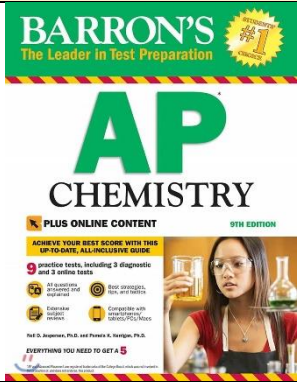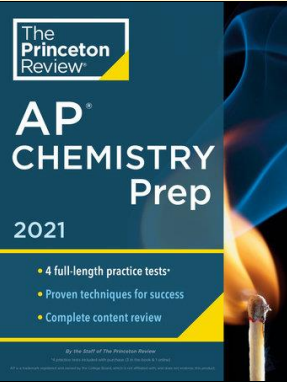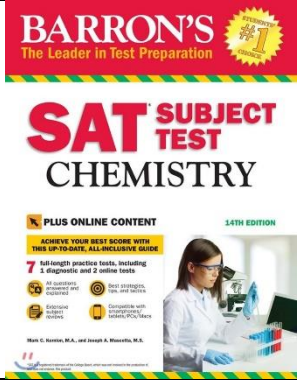- Equation of a line
- Parallel and perpendicular lines

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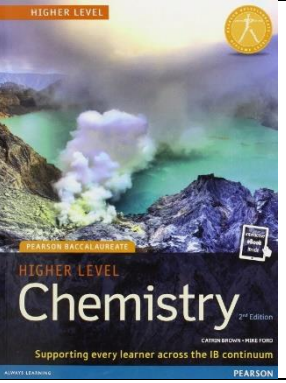
TEST PRACTICE BOOL RECOMMENDATION – MATHEMATICS

AP Calculus			
Book Cover	**Title**	**Book Cover**	**Title**
	Barron's AP Calculus Difficulty: Advanced		AP Calculus AB & BC 심화편(국내도서) Difficulty: Basic
	Princeton Review AP Calculus BC Difficulty: Basic		KAPLAN AP Calculus BC Difficulty: Intermediate

SAT		IB	
Book Cover	**Title**	**Book Cover**	**Title**
	BARRON's SAT MATH Level 2 Subject Test Difficulty: Basic		IB Math HL Textbook – OXFORD Difficulty: Basic

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CHEMISTRY TOPICS

- Elements, mixtures
- Lavoisier Law
- Symbolic representation of atoms and molecules, atomic mass, unit of atomic mass, electrons and nucleons (protons and neutrons)
- Oxidation number, ion and ion charge
- Reactions between bases and acids
- Reaction equations: ion exchange reactions, precipitation reactions, combustion reactions, synthesis reactions
- pH calculations, titration and titration reactions
- Bohr atom model, Bohr-Sommerfeld model, electron spin, Pauli rule
- Energy levels: s, p, d, f and orbital (basic knowledge)
- Electro negativity, electron pairs
- Covalent and ionic bonds, metal bonds
- Lewis notation from binary compounds and polyatomic compounds
- Polar and apolar compounds
- Intermolecular forces
- Nomenclature inorganic and organic compounds and ions (basic level)
- Stoichiometry: molar mass, molar volume, Avogadro constant, ideal gas law, mass density
- Concentration and concentration units, calculation of masses, volumes, concentrations, excess and limiting reagentia
- Reaction rate: factors influencing reaction rate, explanation via collision theory model
- Chemical equilibrium: equilibrium constant, factors influencing chemical equilibrium, calculations with equilibrium data
- Redox reactions: completion of redox reactions and interpretation of oxidators and redactors Sigma and pi bonds
- Solubility of ionic compounds

TEST PRACTICE BOOK RECOMMENDATION – CHEMISTRY

AP Chemistry			
Book Cover	Title	Book Cover	Title
	Barron's AP Chemistry Difficulty: Advanced		Princeton Review AP Chemistry Difficulty: Basic

SAT		IB	
Book Cover	Title	Book Cover	Title
	Barron's SAT Subject Test Chemistry Difficulty: Advanced		IB Chemistry HL – Pearson Difficulty: Basic

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