High School Core Concepts (Maths 1-3)

1) Number
   - (1) Extend the properties of exponents.
   - (2) Extended the properties of exponents to rational exponents. Use properties of rational and irrational numbers. Defining complex numbers.
   - (3) Use complex numbers in polynomial identities and equations.

   Ex.) Simplify the following: $(4x^2)*(x^3)$
   a) $4x^6$ b) $4x^5$ c) $5x^6$ d) $5x^5$

2) Algebra
   - (1) Interpret the structure of expressions. Write expressions in equivalent forms to solve problems. Perform arithmetic operations on polynomials. Understand the relationship between zeros and factors of polynomials. Create equations that describe numbers or relationships. Understand solving equations as a process of reasoning and explain the reasoning. Solve equations and inequalities in one variable. Solve systems of equations. Represent and solve equations and inequalities graphically.
   - (2) Interpret the structure of expressions. Perform arithmetic operations on polynomials. Create equations that describe numbers or relationships. Understand solving equations as a process of reasoning and explain the reasoning. Solve equations and inequalities in one variable. Solve systems of equations. Represent and solve equations and inequalities graphically.
   - (3) Interpret the structure of expressions. Write expressions in equivalent forms to solve problems. Understand the relationship between zeros and factors of polynomials. Rewrite rational expressions. Create equations that describe numbers or relationships. Understand solving equations as a process of reasoning and explain the reasoning. Represent and solve equations and inequalities graphically.

   Ex.) Consider the follow system of equations:

$$5x - 2y = -12$$
$$3x + 2y = -4$$

   What is the value of x?
   a) -2   b) 1   c) 2   d) -1

3) Functions
- (1) Understand the concept of a function and use function notation. Interpret functions that arise in applications in terms of a context. Analyze functions using different representations. Build a function that models a relationship between two quantities. Construct and compare linear and exponential models to solve problems. Interpret expressions for functions in terms of the situations they model.
- (2) Understand the concept of a function and use function notation. Interpret functions that arise in applications in terms of a context. Analyze functions using different representations. Build a function that models a relationship between two quantities. Build new functions from existing functions.
- (3) Understand the concept of a function and use function notation. Interpret functions that arise in applications in terms of the context. Analyze functions using different representations. Build a function that models a relationship between two quantities. Build new functions from existing functions. Construct and compare linear and exponential models and solve problems. Extend the domain of trigonometric functions using the unit circle. Model periodic phenomena with trigonometric functions.

Ex.) Create a linear function using the data table.

X	2	4	6	8	10
Y	6	12	18	24	30

4) Geometry
- (1) Use coordinates to prove simple geometric theorems algebraically.
- (2) Experiment with transformations in the plane. Understand congruence in terms of rigid motions. Prove geometric theorems. Understand similarity in terms of similarity transformations. Prove theorems involving similarity. Define trigonometric ratios and solve problems involving right triangles.
- (3) Prove geometric theorems. Understand and apply theorems about circles. Translate between the geometric description and the equation for a conic section. Explain volume formulas and use them to solve problems. Visualize relationships between two-dimensional and three-dimensional objects. Apply geometric concepts in modeling situations.

Ex.) Find the values of x and H using trigonometry.
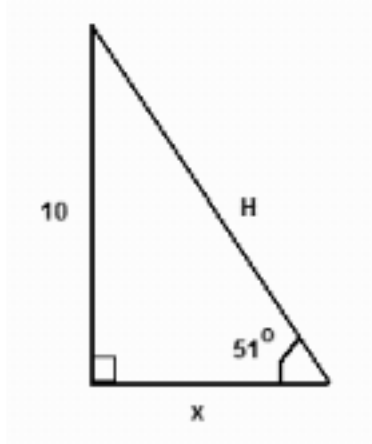
5) Statistics & Probability
  - (1) Summarize, represent, and interpret data on a single count or measurement variable. Summarize, represent, and interpret data on two categorical and quantitative variables. Interpret linear models.
  - (2) Understand and evaluate random processes underlying statistical experiments. Understand independence and conditional probability and use them to interpret data. Use the rules of probability to compute probabilities of compound events in a uniform probability model.
  - (3) Understand and evaluate random processes underlying statistical experiments. Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

Ex.) You have a 10-sided die. What is the probability of rolling either a 5 or an odd number?

a) 3/5   b) 1/2   c) 1/3   d) 1/6