

HiSET® – Test at a Glance (TAAG)

Information Brief

The purpose of the ETS High School Equivalency Test (*HiSET*®) is to certify a candidate's attainment of academic knowledge and skills equivalent to those of a high school graduate. HiSET scores will identify those candidates who have performed at a level consistent with high school equivalency. Information from the HiSET program also will help identify areas in which candidates are career and college ready, as well as areas in which additional preparation may be needed.

Candidates will be tested in five core areas: Language Arts – Reading, Language Arts – Writing, Mathematics, Science, and Social Studies. Descriptions of each of these five tests are contained in this document. The **HiSET® Practice Tests** allow candidates to view sample content and item types and provide them with general information about their level of preparation for taking the operational form.

Through ongoing validity research, the HiSET program has been connected to college-readiness indicators. Candidate performance relative to these indicators is part of the reporting system for the assessment.

The following TAAG sections give a quick overview of each HiSET test and include:

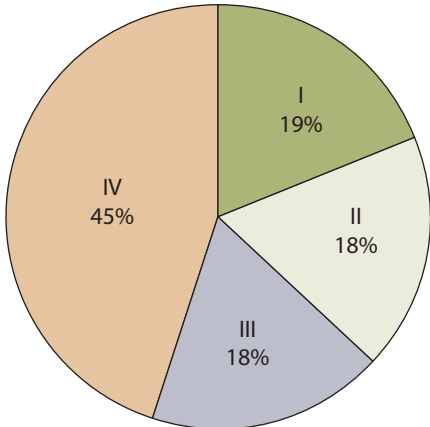
- Test name
- Length of test (Time)
- Number and types of questions (Format)
- Content Categories and approximate percentage of the test
- Process Categories
- Process Category Descriptors
- Depth of Knowledge Levels (DOK)*

The emphasis of each category is expressed as the average percentage of the number of questions per category. This percentage is the approximate average number of questions across the forms on the HiSET exam.

*Norman L. Webb, University of Wisconsin, 2002. *Depth-of Knowledge Levels for Four Content Areas*.

URL: <http://ossucurr.pbworks.com/w/file/fetch/49691156/Norm%20web%20dok%20by%20subject%20area.pdf>

Mathematics

Test at a Glance	
Test Name	Mathematics
Time	90 minutes
Number of Questions	55
Format	Multiple-choice questions
Calculator	Calculator neutral. Please refer to the state policies for the state in which you are testing.
	Content Categories (Approximate Percentage of Questions)
	I. Numbers and Operations on Numbers (19%) II. Measurement/Geometry (18%) III. Data Analysis/Probability/Statistics (18%) IV. Algebraic Concepts (45%)
	Process Categories A. Understand Mathematical Concepts and Procedures B. Analyze and Interpret Information C. Synthesize Data and Solve Problems

About This Test

The Mathematics test assesses mathematical knowledge and competencies. The test measures a candidate's ability to solve quantitative problems using fundamental concepts and reasoning skills. The questions present practical problems that require numerical operations, measurement, estimation, data interpretation, and logical thinking. Problems are based on realistic situations and may test abstract concepts such as algebraic patterns, precision in measurement, and probability. This test may contain some questions that will not count toward your score. The Mathematics test is calculator neutral. A calculator is not required, but if a test taker requests a calculator, the test center is required to provide access to one of the following: four-function or scientific calculator. Please refer to the state policies for the state in which you are testing. Some states have specified calculator type/model requirements. A test taker may not bring his or her own calculator to the testing center for use on the HiSET exam.

Some test questions require the use of formulas. The formulas needed to answer certain questions will be provided via a formula sheet. Test takers should know some formulas prior to testing. Some of these include: distance-rate-time, Pythagorean Theorem, and quadratic formula.

The formulas below will not be provided on the formula sheet:

- distance = (rate) (time) or $d = rt$; note d is distance, r is rate, and t is time
- Pythagorean Theorem: $a^2 + b^2 = c^2$. Note c is the longest side of the triangle; a and b are the other two sides of the triangle
- quadratic formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, where $ax^2 + bx + c = 0$ and $a \neq 0$

Depth of Knowledge Levels (DOK)

Each test question is assigned a Depth of Knowledge Level (DOK). The levels refer to the cognitive demand that the test questions require to answer correctly.

The DOK are listed below along with a brief explanation or some examples of the DOK performances.

- Level 1 – Recall: test takers apply a one-step calculation, simple algorithm, or a formula.
- Level 2 – Skill/Concept: test takers process/construct two or more step calculations.
- Level 3 – Strategic Thinking: test takers make inferences from calculations.
- Level 4 – Extended Thinking: test takers synthesize information and reveal higher-order thinking through complex reasoning.

The examples listed do not cover all the expected behaviors for the DOK levels.

The Test Framework

The Mathematics test framework is organized into broad areas of content, called **Content Categories**.

Each **Content Category** is further divided into **Content Category Descriptors**. The **Content Category Descriptors** describe in greater detail the skills and knowledge eligible for testing.

In addition to knowing and understanding the mathematics content explicitly described in the **Content Category Descriptors**, candidates also will answer questions that may involve one or more of the **Process Categories**. Each **Process Category** is further divided into **Process Category Descriptors**.

Content Categories

The **Content Category Descriptors** are numbered under each **Content Category** below. The **Process Category Descriptors** are numbered under the Mathematics **Process Categories** section starting on page 14.

I. Numbers and Operations on Numbers

1. Use properties of operations with real numbers, including rational and irrational numbers (e.g., identify rational and irrational numbers, locate these numbers between two points on a number line, find the product and sum of rational and irrational numbers, and determine if the product or sum is rational or irrational).
2. Rewrite expressions involving radicals and rational exponents using the properties of exponents (e.g., find an equivalent expression to the cube root of $27x^5y^6$).
3. Solve problems involving numbers written in scientific notation (e.g., add, subtract, multiply, and divide numbers in scientific notation form).
4. Reason quantitatively and use units to solve problems.
5. Choose a level of accuracy appropriate to limitations on measurement.
6. Solve multistep real-world and mathematical problems involving rational numbers and irrational numbers including proportional relationships (settings may include money, rate, percentage, average, estimation/rounding).

II. Measurement/Geometry

1. Understand transformations in the plane, including reflections, translations, rotations, and dilations. Describe a sequence of transformations to demonstrate that one two-dimensional figure is either congruent or similar to a second two-dimensional figure.
2. Use properties of two-dimensional figures, including formulas for area and perimeter and angle relationships. Develop a logical argument to show that such properties are valid.
3. Understand and apply the Pythagorean Theorem (e.g., find the distance between two points on a coordinate grid; find the third side of a right triangle given the lengths of two of the sides).
4. Demonstrate that two triangles are similar or congruent from criteria that is given. Use the fact that two triangles are congruent or similar to determine the values of unknown quantities. Solve real-world problems involving congruent and similar triangles.
5. Use volume formulas and problem-solving techniques to solve for the volume or surface area of 3-dimensional figures (e.g., cylinders, pyramids, cones, and spheres).
6. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).
7. Solve problems involving supplementary, complementary, vertical, and adjacent angles (e.g., given two supplementary angles with measures of $7x$ and $2x$, find the measure of one angle in degrees).
8. Know precise definitions of geometric terms (e.g., given three noncollinear points on a plane, determine which describes all the points between these points, including the points).

III. Data Analysis/Probability/Statistics

1. Use equations, graphs (dot plots, histograms, and box plots), and tables to understand, represent, and interpret data. For data displays, interpret shape, center, spread, and effects of outliers. Summarize data for two categories in two-way frequency tables to solve problems, including those of bivariate data, spread, and relative frequencies.
2. Identify line of best fit from a scatter plot. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
3. Use tables, lists, tree-diagrams and simulations to find the probabilities of compound events.
4. Approximate the probability of a chance event. Develop a probability model, and use it to find probabilities of events (e.g., using the results of an experiment, determine the probability of an event from those results).
5. Use measures of center (mean) to draw inferences about populations including summarizing numerical data sets and calculation of measures of center (e.g., compare the means of two data sets; determine the mean given a set of data).
6. Understand how to use statistics to gain information about a population, generalizing information about a population from a sample of the population (e.g., determine which method to use from a list of methods to select a random sample; using the outcome from a random sample, predict the outcome of the population).

IV. Algebraic Concepts

1. Interpret parts of an expression, such as terms, factors, and coefficients in terms of its context.
2. Perform arithmetic operations on polynomials and rational expressions.
3. Write expressions in equivalent forms to solve problems, including factoring a quadratic expression to reveal the zeros of the function it defines, completing the square to determine the minimum or maximum value of a function, or transforming exponential equations.

4. Solve mathematical and real-world problems involving linear equations and inequalities, including equations with coefficients represented by letters.
5. Solve quadratic equations in one variable that have real or complex roots by taking square roots, completing the square, or using the quadratic formula. Derive the quadratic formula by completing the square.
6. Solve simple rational and radical equations in one variable.
7. Solve systems of two linear equations algebraically and graphically. Know when a system has 0, 1, or an infinite number of solutions.
8. Graph linear, quadratic, square root, cube root, piecewise, absolute value, polynomial, rational, logarithmic, and exponential functions. Identify any intercepts, minima, maxima, asymptotes, and end behavior.
9. Create equations and inequalities in one or more variables to represent relationships and use them to solve problems mathematically and in the real world.
10. Rearrange formulas/equations to highlight a quantity of interest.
11. Understand the concept of a function and use function notation; interpret key features of graphs and tables in terms of quantities. Evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. Write a function that describes a relationship between two quantities (e.g., identify the graph of the function that shows y as a function of x). For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
12. Understand domain and range of a function (e.g., given a function in a real-world setting, determine which sets of numbers represent the domain of this function).
13. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
14. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate rate of change from a graph (e.g., estimate the rate of change from a graph of a function for a specified interval).

Mathematics Process Categories

Each **Process Category** is further divided into **Process Category Descriptors**. The **Process Category Descriptors** are numbered under each **Process Category** as follows.

A. Understand Mathematical Concepts and Procedures

1. Select appropriate procedures
2. Identify examples and counterexamples of concepts

B. Analyze and Interpret Information

1. Make inferences or predictions based on data or information
2. Interpret data from a variety of sources

C. Synthesize Data and Solve Problems

1. Reason quantitatively
2. Evaluate the reasonableness of solutions