FCAT Topics
Sunshine State Standards, Grades 3–5

Social Studies

History

- Historical Chronology
  - individuals and events
  - primary and secondary sources: maps and graphs, letters, and newspapers
  - measurement of time
- History from Its Beginning to the Renaissance
  - government
  - achievements up to the Renaissance
  - trade and exploration
  - Middle Ages (development)
  - scientific achievements
  - transportation and communication
  - social structures
- Civilization Since the Renaissance
  - individual contributions to society
  - humanities since the Renaissance
  - government and laws
  - Age of Discovery
- U.S. History to 1880
  - implications of American exploration
  - American Revolution
  - ideas and documents
  - growth and change 1801 to 1861
  - Civil War
- U.S. History from 1880 to Present Day
  - implications of World War I
  - Great Depression
  - implications of World War II
- Florida Immigration and Implications

Geography

- Geographic Tools
- Implications of Physical Environment

Government

- Functions of All Branches of American Government
- Implications of Citizenship in American Democracy

Economics

- Consumer Rights
- Earning and Spending

Science

- Nature of Matter
- Properties of Matter
  - tools of comparison
  - states, weights, combinations
  - organizations
- Energy
- Forms and Transformation of Energy
- Heat
- Energy and Uses
- Force and Motion
- Motion and Wave
- Forces of Gravity, Magnetism, Electricity
- Processes That Shape Earth
- Substances and Processes in the Lithosphere, Atmosphere, Hydrosphere, and Biosphere
- Recycling
- Interaction and Organization of the Solar System
- Patterns of Structure and Function of Living Things
- Process and Importance of Nature and Nurture
- Interaction of Living Things
- Nature of Living Things
- Nature of Science
- Scientific Process of Solving Problems

The Arts

Music

- Cultural and Historical Connections
- Music Types and Composers
- Relationship Between Music, the Other Arts, and Disciplines Outside the Arts
- Relationship Between Music and the World

FCAT Topics
Sunshine State Standards, Grades 3–5

Visual Arts
- Tools and Techniques of the Visual Arts
- Visual Arts in Relation to Culture and History
- Criteria to Evaluate Characteristics of Works of Art
- Influences of Artists

Theater
- Theater Environment
- Cultural Traditions of Dance in Various Cultures and Historical Periods

Health/Physical Education

Health Education
- Health Promotion and Disease Prevention
- Strategic Behaviors That Reduce Health Risks
- Factors That Influence Health
- Promotion of Healthy Living

Physical Education
- Specialized Techniques of Human Movement
- Benefits of Physical Activity

Foreign Language
- Cultural Practices
- Patterns of Communication

Literature
- Types of Mass Media
- Techniques Used in Media Messages
- Technologies for Communication
- Fables, Stories, Legends
- Drama, Poetry

FCAT Topics
Sunshine State Standards, Grades 6–8

Social Studies

History

- Historical Chronology
  - patterns and chronology of historical periods
  - primary and secondary sources: charts, tables, graphs
  - timelines
- History from Its Beginning to the Renaissance
  - influence of one culture on other cultures
  - major historical developments
  - important technological developments
  - impact of geographical factors
  - historical leaders
  - major events
  - significant achievements up to the time of the Renaissance
  - institutions that characterize civilizations
- Civilization Since the Renaissance
  - transmitted cultural characteristics
  - historical events shaping culture
  - physical and human geographic factors
  - significant historical leaders since the Renaissance
  - differences between Eastern and Western civilizations
- U.S. History to 1880
  - development of cities and industries
  - environmental influences on the colonies, the American Revolution, and the Civil War
  - U.S. values and traditions prior to 1880
  - U.S. influences on Native American peoples
- U.S. History from 1880 to Present Day
  - physical and cultural geography since 1880
  - individuals and events after 1880
  - causes and consequences of urbanization
- History of Florida and Its People
  - immigration and the history of Florida
  - geographic and demographic characteristics of Florida
  - environment of Florida modified by inhabitants
  - influence of societies and cultures on Florida's history
  - Florida's use of resources

Geography

- World in Spatial Terms
  - geographic representations, tools, and technologies
  - Earth's varied surface divisions
  - regional interconnections
  - communication and transportation systems
- Interaction of People and Environment
  - migration and diffusion
  - characteristics of different places
  - geographical factors that affect countries
  - environmental consequences of change
  - response to physical environment
  - resource distribution and utilization

Government

- American Constitutional Government
  - essential American constitutional government
  - importance of government
  - legislative, executive, and judicial branches
  - major parts of the federal system
  - organization of state and local governments
  - importance of the rule of law
- Rights, Liberties, and Obligations of American Democracy
  - limits on rights
  - personal, political, and economic rights
  - method to contact representatives
  - importance of participation
  - current issues

Economics

- Consumer Protection
- Credit
- Wise Consumer Decisions
- Different Economic Systems
  - production and distribution
  - market system
  - specialized institutions in market economies

FCAT Topics
Sunshine State Standards, Grades 6–8

Science

- Nature of Matter
- Properties of Matter
  - ways substances differ
  - weight and mass
  - temperature
  - movement of atoms
  - difference between physical and chemical change
  - volume and mass
- Basic Principles of Atomic Theory
  - particles and waves
  - general properties of the atom
- Forms of Energy
  - energy as a constant
  - forms of energy from the sun
  - energy conversions
  - thermal energy
  - the properties of waves
- Interaction of Matter, Energy, and Force
  - reduction in the amount of useful energy
  - fossil fuels
- Motion
  - description of motion of an object
  - vibrations in materials
- Forces and Effects
  - forces at a distance
  - ability of forces to reinforce or cancel each other, depending upon direction and magnitude
  - machines
  - nature of inertia
  - ways in which a net force can act upon an object
  - gravity
- Processes in the Lithosphere, Atmosphere, Hydrosphere, and Biosphere
  - erosion
  - life process of organisms
  - plants and animals reshape the landscape
  - concepts of time and size
- Protection of the Natural Systems
- Consequences of Human Action on Earth's Systems
- The Interaction and Organization of the Solar System
- Properties of Stars That Appear to Be Made of Similar Elements
- Vastness of the Universe and Earth's Role
  - comparison of other galaxies to our solar system
- Patterns of Structure and Function
  - structural basis of most organisms
  - properties of multi-cellular organisms
  - cells grow and divide
  - life functions of organisms
  - similar structures of cells with similar functions
  - behavioral responses to environment
- Process and Importance of Genetic Diversity
  - variation is due to genetic information
  - survival of organisms because of favorable characteristics
  - fossil records
- Nature of Living Things
  - viruses
  - classification as a tool for understanding biodiversity and interrelationships
  - interactions of organisms with each other and their environment
  - support of life by energy from the sun and the recycling of living organisms
- Consequences of Limited Resources
  - renewable resources
  - biotic and abiotic factors
  - effects of changes on organisms
  - humans as a part of an ecosystem
- Scientific Process of Solving Problems
  - modification of scientific knowledge
  - the inquiry process
  - differences among science disciplines
  - scientific method
- Patterns of Natural Events
- Interdependence of Science, Technology, and Society

The Arts

Music

- Cultural and Historical Connections
- Music in Relation to Culture and History
  - main characteristics
  - representative examples
  - important composers and musicians

FCAT Topics
Sunshine State Standards, Grades 6–8

The Arts (continued)

- Relationship Between Music, the Other Arts, and Disciplines Outside the Arts
- The Relationship Between Music and the World
  - influence of music experiences
  - music in various cultures
  - the uniqueness of music

Visual Arts

- Ways of Conveying Meanings
- Qualities and Characteristics of Art
- Multiple Purposes of Art
- Art's Interrelationships
- Visual Arts in Relation to Culture and History
  - historical and cultural themes
  - artist and his or her function
- Aesthetic and Critical Analysis
  - art standards
  - research and information to identify art
  - artists' intentions
- Connections Between Visual Arts and the Real World
  - artistic skills and development
  - roles of exhibitions

Theater

- Cultural and Historical Connections
- Context of Media Past and Present
  - social and universal concepts in theater
  - social impact of history and culture
  - representative artists
- Analysis, Criticism, and Construction of Meanings from Theater and Electronic Media
  - internal characterization, plot, conflict, and theme
  - evaluation of texts and performances
- Applications of the Theater and Electronic Media to Daily Life
  - media influence
  - audience reactions
  - pertinent skills
  - significant contributors

Dance

- Dance in Various Cultures and Historical Periods
  - historical role of dance
  - similarities and differences among social dances
- Aesthetic and Critical Analysis
- Connections Between Dance and Healthy Living
- Connections Between Dance and Other Disciplines
  - ideas expressed in dance

Health / Physical Education

Health Education

- Concepts of Health Promotion and Disease Prevention
  - body systems
  - health interrelationships
  - environment and health risks
  - eating disorders
- Access to Health Information, Products, and Services
  - information analysis
  - resources
  - health products
  - health services
- Responsible Health Behavior
- Factors on Health
  - information evaluation
- Promotion of Healthy Living
- Goals and Decisions That Affect Health
  - strategies and skills
  - needs assessments
- Personal, Family, and Community Health

Physical Education

- Concepts and Principles of Human Movement
  - generation of force by the body
  - sports skills
  - movement to music
  - development of game strategies

FCAT Topics
Sunshine State Standards, Grades 6–8

Physical Education (continued)

- Analyzes the Benefits of Physical Activity
  - fitness benefits
  - use of a journal
  - community resources
- Responsible Physical Activity Behaviors
- Methods to Achieve and Maintain a Healthy Level of Physical Fitness
  - aerobic activity
  - training principles
  - strength and endurance
  - caloric intake and energy expenditures
  - method to determine heart rate
  - formal and informal fitness assessments
  - participation in fitness program
  - explores new ways to maintain appropriate fitness
- Responsible Personal and Social Behavior in Physical Activity
  - appropriate responses to emergencies
- Diversity of Abilities and Cultures in Activities
  - modification for special needs
  - cultural contributions
- Method of Enjoyment and Communication Through Physical Activities
  - physical activity for personal enjoyment
  - commitment to wellness enhances life
  - benefits from physical activity

Foreign Language

- Cultural Practices
  - verbal communication
  - cultural activities
  - various forms of the culture
- Patterns of Interaction
  - cultural traditions
  - cultural similarities and differences

Literature

- Multiple Media Tools of Graphics
- Communication in Television, Film, Radio, and Advertising
- Audiovisual Aids
- Mass Media Can Manipulate Information

FCAT Topics
Sunshine State Standards, Grades 9–10

Social Studies

History

- Historical Chronology
  - roles of ideas, beliefs, and chance events in interpreting history
  - scientific, economic, and cultural themes
  - chronology, sequencing patterns
- History from Its Beginning to the Renaissance
  - human cultural development
  - early civilization and the spread of agriculture
  - emergence of civilization
  - economic, political, and social systems of ancient Greece
  - political, economic, and social systems of ancient Rome
  - European civilization during the Middle Ages
  - civilizations in Asia and Africa
  - civilizations in Mesoamerica and Andean South America
  - Mongol Empire
- Civilization Since the Renaissance
  - significant events during the Renaissance
  - significant issues from Renaissance through Reformation
  - general social interactions during the Age of Discovery
  - changes from Age of Reason through the Age of Enlightenment
  - 19th century European developments
  - Industrial Revolution
  - historical events 1900–1950
  - political, military, and economic events since the 1950s
- U.S. History to 1880
  - interactions between Native American tribes and European settlers
  - settlement patterns of the colonies
  - American Revolution
  - Constitutional period
  - Civil War and Reconstruction
- U.S. History from 1880 to Present Day
  - Industrial Revolution and its effects
  - immigration groups after 1880
  - involvement in World War I
  - Great Depression
  - World War II
  - foreign policy since World War II
  - voting rights since the 1950s
  - domestic policy in contemporary America

Geography

- World in Spatial Terms
  - maps
  - cultural and technological characteristics of regions
- Interaction of People and Environment
  - past and present trends in human migration
  - interactions between people in different regions
  - global impacts of human changes
  - sustainable development

Government

- American Constitutional Government
  - society in limited governments (constitutional democracies) and unlimited governments (totalitarian regimes)
  - limited government in the United States
  - overall design and specific features of the Constitution
  - development of public policy and the political process
- Citizens in American Democracy
  - political beliefs
  - issues
  - personal, political, and economic rights reinforce each other
  - citizens' influence on public policy

Economics

- Use of Available Resources
  - allocation of resources
  - credit
- Different Economic Systems
  - determination of wages and prices
  - price changes
  - taxes, policies, and programs
  - United States fiscal policies

FCAT Topics
Sunshine State Standards, Grades 9–10

Economics (continued)
- basic terms and indicators
- trade between nations

Science

- Nature of Matter
- Properties of Matter
  - electron configuration
  - diversity of materials due to molecular forces
  - energy change in phases of matter
  - atomic and molecular change
  - procedures involved in substance change
- Basic Principles of Atomic Theory
  - differences between an element, a molecule, and a compound
  - composition of elements
  - nuclear energy
  - different behaviors of different forms of matter
- Energy
- Forms of Energy
  - importance of knowledge of energy to all scientific disciplines
  - conservation of mass and energy
  - temperature
  - electrical charges
  - first law of thermodynamics
  - decrease of usable energy
- Current Theories of the Structure of the Universe
- Motion
  - relativity of motion
  - inertia
  - velocity
- Forces and Motion
- Forces and Effects
  - gravity
  - electrical force
  - magnetic and electrical force
  - nuclear power
  - forces between atoms and molecules
  - action and reaction
- Processes That Shape Earth
- Processes in the Lithosphere, Atmosphere, Hydrosphere, and Biosphere
  - climatic patterns
  - the structure of Earth's crust
  - Earth's change over time
- Protection of the Natural Systems
  - interconnectedness of Earth's systems
- Interaction and Organization of the Solar System
  - relationship between Earth and the solar system
  - characteristics of planets and satellites
- Vastness of the Universe and Earth's Role
  - stages in development of three categories of stars
  - bodies within and outside our galaxy
  - astronomical distance and time
  - stellar equilibrium
  - ways scientists collect and generate data about the universe
- Patterns of Structure and Function
  - body structures and functions
  - the function of membranes
  - biological systems
  - complex interactions
  - communication between the separate parts of the body
  - stimulus response
- Process and Importance of Genetic Diversity
  - mechanisms of change
- Nature of Living Things
  - diversity and interdependence of living things
  - chemical composition of molecules
- Consequences of Limited Resources
  - fossil fuels
  - equilibrium
  - world ecosystems
  - carrying capacity
- Nature of Science
- Scientific Process of Solving Problems
  - scientific investigation
  - development of new ideas in science
- Patterns of Natural Events
  - discovery of rules by careful, systematic study

FCAT Topics
Sunshine State Standards, Grades 9–10

Science (continued)

- Interdependence of Science, Technology, and Society
  - technological problems and the demand for new scientific knowledge
  - possible causes and effects of events
  - influence of funding on the area of discovery
  - social context of the value of a technology
  - uses of scientific knowledge

The Arts

Music
- Cultural and Historical Connections
- Music in Relation to Culture and History
  - characteristics of unfamiliar music
  - development of American music
  - influence of composers and performers
- Aesthetic and Critical Analysis
- Relationship Between Music, the Other Arts, and Disciplines Outside the Arts
  - connections with other subjects
  - artistic tradition and cultural context
- Relationship Between Music and the World

Visual Arts
- Subjects, Symbols, and Ideas of Visual Arts
- Media, Techniques, and Processes of Visual Arts
- Implications of Art
- Visual Arts in Relation to Culture and History
  - influences on art
- Aesthetic and Critical Analysis of the Characteristics of Works of Art
  - differences between artist's intent and public interpretation
  - critical and aesthetic statements
- Connections Between Visual Arts and the Real World
  - creative skills and elaboration within the arts and across life
  - aesthetic questions

Theater
- Cultural and Historical Connections
- Context of Media from Past and Present
  - cultural and historical influences
- Applications of the Theater and Electronic Media to Daily Life
  - arts media communication
  - audience reactions
  - theatrical production responsibilities

Dance
- Cultural and Historical Connections
- Dance in Various Cultures and Historical Periods
  - significant historical events
  - impact of society and history
  - changing role in culture
- Aesthetic and Critical Analysis
- Connections Between Dance and Healthy Living
- Connections Between Dance and Other Disciplines
  - use of technology to study expression of ideas through dance
  - comparison of historical and cultural images with contemporary media

Health / Physical Education

Health Education
- Concepts of Health Promotion and Disease Prevention
  - health interrelationships
  - environmental health
  - influence of health research on solution of health problems
  - nutrition
- Access to Health Information, Products and Services
- Responsible Health Behavior
- Health Factors
- Goals and Decisions That Affect Health
  - various strategies
- Personal, Family, and Community Health
  - healthier communities

FCAT Topics
Sunshine State Standards, Grades 9–10

Health / Physical Education
(continued)

Physical Education

- Benefits of Physical Activity
  - reduction of health risks by physical activity
  - stress relief through physical activity
  - effects of personal factors upon physical activity
  - preferences and exercise habits
  - role of physical activity in health
  - community resources
  - importance of physical activity as part of one's lifestyle
  - nutrition as related to physical activity
- Responsible Physical Activity Behaviors
- Methods to Achieve and Maintain a Healthy Level of Physical Fitness
  - appropriate fitness
  - fitness assessments
  - technology in fitness
  - beneficial physical activity
  - lifestyle changes
- Responsible Personal and Social Behavior in Physical Activity
- Diversity of Abilities and Cultures in Activities
  - all influences upon physical activity preferences
  - modification for special needs
- Enjoyment and Communication Through Physical Activities

Foreign Language

- Cultural Practices
  - patterns of behavior
  - aspects of the culture
  - target-language writers and their influence
- Information and Perspective Through the Foreign Language
  - research information
  - communication of information in other classes
  - acquisition of information about a topic of community or world interest
- Different Patterns of Communication
  - elements that signify time
  - language in varied contexts
  - different worldviews
  - cultural similarities and differences
  - contributions of parallel cultures
- Benefits of Being Multilingual

Literature

- Integration of Multimedia and Technology
- Drama
- Literature of Different Cultures and Historical Periods
- Various Dialects of English

Mathematics Content Assessed by the FCAT and Item Formats by Benchmark

A: Number Sense, Concepts, and Operations		
1. The student understands the different ways numbers are represented and used in the real world.		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.A.1.2.1 names whole numbers combining three-digit numeration (hundreds, tens, ones) and the use of number periods, such as ones, thousands, and millions and associates verbal names, written word names, and standard numerals with whole numbers, commonly used fractions, decimals, and percents. (Assessed with A.1.2.4)	MA.A.1.3.1 associates verbal names, written word names, and standard numerals with integers, fractions, decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios. (Assessed with A.1.3.4)	MA.A.1.4.1 associates verbal names, written word names, and standard numerals with integers, rational numbers, irrational numbers, real numbers, and complex numbers. (Assessed with A.1.4.4)
MA.A.1.2.2 understands the relative size of whole numbers, commonly used fractions, decimals, and percents. Grades 3–4 MC Grade 5 MC, GR	MA.A.1.3.2 understands the relative size of integers, fractions, and decimals; numbers expressed as percents; numbers with exponents; numbers in scientific notation; radicals; absolute value; and ratios. MC	MA.A.1.4.2 understands the relative size of integers, rational numbers, irrational numbers, and real numbers. MC
MA.A.1.2.3 understands concrete and symbolic representations of whole numbers, fractions, decimals, and percents in real-world situations. (Assessed with A.1.2.4)	MA.A.1.3.3 understands concrete and symbolic representations of rational numbers and irrational numbers in real-world situations. (Assessed with A.1.3.4 and D.2.3.1)	MA.A.1.4.3 understands concrete and symbolic representations of real and complex numbers in real-world situations. (Assessed with A.1.4.4)
MA.A.1.2.4 understands that numbers can be represented in a variety of equivalent forms using whole numbers, decimals, fractions, and percents. (Also assesses A.1.2.1 and A.1.2.3) Grades 3–4 MC Grade 5 MC, GR	MA.A.1.3.4 understands that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, scientific notation, exponents, radicals, and absolute value. (Also assesses A.1.3.1 and A.1.3.3) MC, GR	MA.A.1.4.4 understands that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, scientific notation, exponents, radicals, absolute value, and logarithms. (Also assesses A.1.4.1 and A.1.4.3) MC, GR

MC = multiple-choice, GR = gridded-response, SR = short-response, ER = extended-response
Unless otherwise noted, the item format or formats listed for an individual benchmark apply to all grades covered by that benchmark.

Mathematics Content Assessed by the FCAT and Item Formats by Benchmark

A: Number Sense, Concepts, and Operations		
2. The student understands number systems.		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.A.2.2.1 uses place-value concepts of grouping based upon powers of ten (thousandths, hundredths, tenths, ones, tens, hundreds, thousands) within the decimal number system. Grades 3–4 MC Grade 5 MC, GR	MA.A.2.3.1 understands and uses exponential and scientific notation. MC, GR	MAA.2.4.1 understands and uses the basic concepts of limits and infinity. (Not assessed)
MA.A.2.2.2 recognizes and compares the decimal number system to the structure of other number systems such as the Roman numeral system or bases other than ten. (Not assessed)	MA.A.2.3.2 understands the structure of number systems other than the decimal number system. (Not assessed)	MA.A.2.4.2 understands and uses the real number system. (Assessed with A.3.4.1, A.3.4.2, and A.3.4.3)
		MA.A.2.4.3 understands the structure of the complex number system. (Not assessed)
3. The student understands the effects of operations on numbers and the relationships among these operations, selects appropriate operations, and computes for problem solving.		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.A.3.2.1 understands and explains the effects of addition, subtraction, and multiplication on whole numbers, decimals, and fractions, including mixed numbers, and the effects of division on whole numbers, including the inverse relationship of multiplication and division. MC	MA.A.3.3.1 understands and explains the effects of addition, subtraction, multiplication, and division on whole numbers, fractions, including mixed numbers, and decimals, including the inverse relationships of positive and negative numbers. MC	MA.A.3.4.1 understands and explains the effects of addition, subtraction, multiplication, and division on real numbers, including square roots, exponents, and appropriate inverse relationships. (Also assesses A.2.4.2) MC

MC = multiple-choice, GR = gridded-response, SR = short-response, ER = extended-response
Unless otherwise noted, the item format or formats listed for an individual benchmark apply to all grades covered by that benchmark.

MATHEMATICS CONTENT ASSESSED BY THE FCAT AND ITEM FORMATS BY BENCHMARK

A: Number Sense, Concepts, and Operations		
3. The student understands the effects of operations on numbers and the relationships among these operations, selects appropriate operations, and computes for problem solving. (continued)		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.A.3.2.2 selects the appropriate operation to solve specific problems involving addition, subtraction, and multiplication of whole numbers, decimals, and fractions, and division of whole numbers. MC	MA.A.3.3.2 selects the appropriate operation to solve problems involving addition, subtraction, multiplication, and division of rational numbers, ratios, proportions, and percents, including the appropriate application of the algebraic order of operations. MC, GR	MA.A.3.4.2 selects and justifies alternative strategies, such as using properties of numbers, including inverse, identity, distributive, associative, transitive, that allow operational shortcuts for computational procedures in real-world or mathematical problems. (Also assesses A.2.4.2. and A.3.3.2) MC
MA.A.3.2.3 adds, subtracts, and multiplies whole numbers, decimals, and fractions, including mixed numbers, and divides whole numbers to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator. Grades 3–4 MC Grade 5 MC, GR	MA.A.3.3.3 adds, subtracts, multiplies, and divides whole numbers, decimals, and fractions, including mixed numbers, to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator. MC, GR	MA.A.3.4.3 adds, subtracts, multiplies, and divides real numbers, including square roots and exponents, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator. (Also assesses A.2.4.2) MC, GR

MC = multiple-choice, GR = gridded-response, SR = short-response, ER = extended-response
Unless otherwise noted, the item format or formats listed for an individual benchmark apply to all grades covered by that benchmark.

Mathematics Content Assessed by the FCAT and Item Formats by Benchmark

A: Number Sense, Concepts, and Operations		
4. The student uses estimation in problem solving and computation.		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.A.4.2.1 uses and justifies different estimation strategies in a real-world problem situation and determines the reasonableness of results of calculations in a given problem situation. (Also assesses B.3.2.1) Grades 3–4 MC Grade 5 SR	MA.A.4.3.1 uses estimation strategies to predict results and to check the reasonableness of results. (Also assesses A.4.2.1, B.2.3.1, and B.3.3.1) MC	MA.A.4.4.1 uses estimation strategies in complex situations to predict results and to check the reasonableness of results. (Also assesses A.4.2.1 and B.3.4.1) MC
5. The student understands and applies theories related to numbers.		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.A.5.2.1 understands and applies basic number theory concepts, including primes, composites, factors, and multiples. MC	MA.A.5.3.1 uses concepts about numbers, including primes, factors, and multiples, to build number sequences. (Assessed with D.1.3.1 and D.1.3.2)	MA.A.5.4.1 applies special number relationships such as sequences and series to real-world problems. (Not assessed)

MC = multiple-choice, GR = gridded-response, SR = short-response, ER = extended-response
Unless otherwise noted, the item format or formats listed for an individual benchmark apply to all grades covered by that benchmark.

MATHEMATICS CONTENT ASSESSED BY THE FCAT AND ITEM FORMATS BY BENCHMARK

B: Measurement

1. The student measures quantities in the real world and uses the measures to solve problems.

Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.B.1.2.1 uses concrete and graphic models to develop procedures for solving problems related to measurement including length, weight/mass, time, temperature, perimeter, area, volume/capacity, and angle. Grades 3–4 (Not assessed) Grade 5 (Assessed with C.2.2.1)	MA.B.1.3.1 uses concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference, and volume of two- and three-dimensional shapes, including rectangular solids and cylinders. (Also assesses B.1.2.2 and B.2.3.1) Grades 6–7 MC, GR Grade 8 GR, SR	MA.B.1.4.1 uses concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference, and volume of two- and three-dimensional shapes, including rectangular solids, cylinders, cones, and pyramids. (Also assesses B.1.2.2 and B.1.4.2) Grade 9 MC, GR Grade 10 MC, GR, SR
MA.B.1.2.2 solves real-world problems involving length, weight, perimeter, area, capacity, volume, time, temperature, and angles. Grades 3–4 MC Grade 5 MC, GR	MA.B.1.3.2 uses concrete and graphic models to derive formulas for finding rates, distance, time, and angle measures. (Also assesses B.1.2.2 and B.2.3.1) Grade 6 (Assessed with C.1.3.1) Grades 7–8 MC, GR	MA.B.1.4.2 uses concrete and graphic models to derive formulas for finding rate, distance, time, angle measures, and arc lengths. (Also assesses B.1.2.2) MC, GR
	MA.B.1.3.3 understands and describes how the change of a figure in such dimensions as length, width, height, or radius affects its other measurements such as perimeter, area, surface area, and volume. (Also assesses C.2.3.1) MC, GR	MA.B.1.4.3 relates the concepts of measurement to similarity and proportionality in real-world situations. Grade 9 MC, GR Grade 10 (Assessed with C.2.4.1)
	MA.B.1.3.4 constructs, interprets, and uses scale drawings such as those based on number lines and maps to solve real-world problems. (Also assesses B.2.3.1) MC, GR	

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MATHEMATICS CONTENT ASSESSED BY THE FCAT AND ITEM FORMATS BY BENCHMARK

B: Measurement		
2. The student compares, contrasts, and converts within systems of measurement (both standard/nonstandard and metric/customary).		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.B.2.2.1 uses direct (measured) and indirect (not measured) measures to calculate and compare measurable characteristics. Grades 3–4 MC Grade 5 MC, GR	MA.B.2.3.1 uses direct (measured) and indirect (not measured) measures to compare a given characteristic in either metric or customary units. (Assessed with A.4.3.1, B.1.3.1, B.1.3.2, and B.1.3.4)	MA.B.2.4.1 selects and uses direct (measured) or indirect (not measured) methods of measurement as appropriate. Grade 9 MC, GR Grade 10 MC
MA.B.2.2.2 selects and uses appropriate standard and nonstandard units of measurement, according to type and size. (Also assesses B.4.2.1) MC	MA.B.2.3.2 solves problems involving units of measure and converts answers to a larger or smaller unit within either the metric or customary system. MC, GR	MA.B.2.4.2 solves real-world problems involving rated measures (miles per hour, feet per second). (Also assesses B.2.3.2) MC, GR
3. The student estimates measurements in real-world problem situations.		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.B.3.2.1 solves real-world problems involving estimates of measurements, including length, time, weight, temperature, money, perimeter, area, and volume. (Assessed with A.4.2.1)	MA.B.3.3.1 solves real-world and mathematical problems involving estimates of measurements including length, time, weight/mass, temperature, money, perimeter, area, and volume, in either customary or metric units. (Assessed with A.4.3.1)	MA.B.3.4.1 solves real-world and mathematical problems involving estimates of measurements, including length, time, weight/mass, temperature, money, perimeter, area, and volume, and estimates the effects of measurement errors on calculations. (Assessed with A.4.4.1)

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Mathematics Content Assessed by the FCAT and Item Formats by Benchmark

B: Measurement		
4. The student selects and uses appropriate units and instruments for measurement to achieve the degree of precision and accuracy required in real-world situations.		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.B.4.2.1 determines which units of measurement, such as seconds, square inches, dollars per tankful, to use with answers to real-world problems. (Assessed with B.2.2.2)	MA.B.4.3.1 selects appropriate units of measurement and determines and applies significant digits in a real-world context. (Significant digits should relate to both instrument precision and to the least precise unit of measurement.) (Not assessed)	MA.B.4.4.1 determines the level of accuracy and precision, including absolute and relative errors of tolerance, required in real-world measurement situations. (Not assessed)
MA.B.4.2.2 selects and uses appropriate instruments and technology, including scales, rulers, thermometers, measuring cups, protractors, and gauges, to measure in real-world situations. Grades 3–4 MC Grade 5 (Not assessed)	MA.B.4.3.2 selects and uses appropriate instruments, technology, and techniques to measure quantities in order to achieve specified degrees of accuracy in a problem situation. (Not assessed)	MA.B.4.4.2 selects and uses appropriate instruments, technology, and techniques to measure quantities in order to achieve specified degrees of accuracy in a problem situation. (Not assessed)

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Mathematics Content Assessed by the FCAT and Item Formats by Benchmark

C: Geometry and Spatial Sense		
1. The student describes, draws, identifies, and analyzes two- and three-dimensional shapes.		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.C.1.2.1 given a verbal description, draws and/or models two- and three-dimensional shapes and uses appropriate geometric vocabulary to write a description of a figure or a picture composed of geometric figures. MC	MA.C.1.3.1 understands the basic properties of, and relationships pertaining to, regular and irregular geometric shapes in two and three dimensions. (Also assesses C.1.2.1) MC	MA.C.1.4.1 uses properties and relationships of geometric shapes to construct formal and informal proofs. (Also assesses C.1.2.1 and C.1.3.1) MC, GR
2. The student visualizes and illustrates ways in which shapes can be combined, subdivided, and changed.		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.C.2.2.1 understands the concepts of spatial relationships, symmetry, reflections, congruency, and similarity. (Also assesses B.1.2.1, B.1.2.2, C.1.2.1, and C.3.2.1) Grades 3–4 MC Grade 5 MC, ER	MA.C.2.3.1 understands the geometric concepts of symmetry, reflections, congruency, similarity, perpendicularity, parallelism, and transformations, including flips (reflections), slides (translations), turns (rotations), and enlargements. (Also assesses B.1.3.3, C.1.2.1, C.1.3.1, and C.3.3.1) Grades 6–7 MC Grade 8 MC, ER	MA.C.2.4.1 understands geometric concepts such as perpendicularity, parallelism, tangency, congruency, similarity, reflections, symmetry, and transformations including flips (reflections), slides (translations), turns (rotations), enlargements, rotations, and fractals. (Also assesses B.1.4.3, C.1.4.1, and C.3.4.1) Grade 9 MC, GR Grade 10 MC, GR, ER
MA.C.2.2.2 predicts, illustrates, and verifies which figures could result from a flip (reflection), slide (translation), or turn (rotation) of a given figure. MC	MA.C.2.3.2 predicts and verifies patterns involving tessellations (a covering of a plane with congruent copies of the same pattern with no holes and no overlaps, like floor tiles). (Assessed with C.3.3.1)	MA.C.2.4.2 analyzes and applies geometric relationships involving planar cross-sections (the intersection of a plane and a three-dimensional figure). Grade 9 (Not assessed) Grade 10 MC

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MATHEMATICS CONTENT ASSESSED BY THE FCAT AND ITEM FORMATS BY BENCHMARK

C: Geometry and Spatial Sense		
3. The student uses coordinate geometry to locate objects in both two and three dimensions and to describe objects algebraically.		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.C.3.2.1 represents and applies a variety of strategies and geometric properties and formulas for two- and three-dimensional shapes to solve real-world and mathematical problems. (Also assesses C.2.2.1 and C.3.2.2) Grades 3–4 MC Grade 5 MC, SR	MA.C.3.3.1 represents and applies geometric properties and relationships to solve real-world and mathematical problems. (Also assesses C.2.3.1, C.2.3.2, and C.3.2.2) Grades 6 MC Grades 7 MC, GR Grade 8 MC, SR	MA.C.3.4.1 represents and applies geometric properties and relationships to solve real-world and mathematical problems including ratio, proportion, and properties of right triangle trigonometry. (Also assesses C.2.4.1) MC, GR
MA.C.3.2.2 identifies and plots positive ordered pairs (whole numbers) in a rectangular coordinate system (graph). MC	MA.C.3.3.2 identifies and plots ordered pairs in all four quadrants of a rectangular coordinate system (graph) and applies simple properties of lines. MC	MA.C.3.4.2 using a rectangular coordinate system (graph), applies and algebraically verifies properties of two- and three-dimensional figures, including distance, midpoint, slope, parallelism, and perpendicularity. (Also assesses C.3.3.2 and D.2.4.1) Grade 9 MC, GR Grade 10 MC, GR, SR

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Mathematics Content Assessed by the FCAT and Item Formats by Benchmark

D: Algebraic Thinking

1. The student describes, analyzes, and generalizes a wide variety of patterns, relations, and functions.

Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.D.1.2.1 describes a wide variety of patterns and relationships through models, such as manipulatives, tables, graphs, rules using algebraic symbols. (Also assesses D.1.2.2) Grades 3–4 MC Grade 5 MC, GR	MA.D.1.3.1 describes a wide variety of patterns, relationships, and functions through models, such as manipulatives, tables, graphs, expressions, equations, and inequalities. (Also assesses A.5.3.1) MC, GR	MA.D.1.4.1 describes, analyzes, and generalizes relationships, patterns, and functions using words, symbols, variables, tables, and graphs. MC, GR
MA.D.1.2.2 generalizes a pattern, relation, or function to explain how a change in one quantity results in a change in another. (Also assesses D.1.2.1) Grades 3–4 (Not assessed) Grade 5 SR	MA.D.1.3.2 creates and interprets tables, graphs, equations, and verbal descriptions to explain cause-and-effect relationships. (Also assesses A.5.3.1) Grades 6–7 MC, GR Grade 8 MC, GR, SR	MA.D.1.4.2 determines the impact when changing parameters of given functions. Grade 9 MC, GR Grade 10 MC, GR, SR

2. The student uses expressions, equations, inequalities, graphs, and formulas to represent and interpret situations.

Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.D.2.2.1 represents a given simple problem situation using diagrams, models, and symbolic expressions translated from verbal phrases, or verbal phrases translated from symbolic expressions, etc. (Also assesses D.2.2.2) MC	MA.D.2.3.1 represents and solves real-world problems graphically, with algebraic expressions, equations, and inequalities. (Also assesses A.1.3.3) Grades 6–7 MC Grade 8 MC, SR	MA.D.2.4.1 represents real-world problem situations using finite graphs, matrices, sequences, series, and recursive relations. (Assessed with C.3.4.2 and D.2.4.2)
MA.D.2.2.2 uses informal methods, such as physical models and graphs, to solve real-world problems involving equations and inequalities. (Also assesses D.2.2.1) Grades 3–4 MC Grade 5 MC, GR	MA.D.2.3.2 uses algebraic problem-solving strategies to solve real-world problems involving linear equations and inequalities. MC, GR	MA.D.2.4.2 uses systems of equations and inequalities to solve real-world problems graphically, algebraically, and with matrices. (Also assesses D.2.3.1, D.2.3.2, and D.2.4.1) Grade 9 MC, GR Grade 10 MC, GR, SR

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MATHEMATICS CONTENT ASSESSED BY THE FCAT AND ITEM FORMATS BY BENCHMARK

E: Data Analysis and Probability		
1. The student understands and uses the tools of data analysis for managing information.		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.E.1.2.1 solves problems by generating, collecting, organizing, displaying, and analyzing data using histograms, bar graphs, circle graphs, line graphs, pictographs, and charts. (Also assesses E.1.2.3) Grades 3–4 MC Grade 5 MC, GR, ER	MA.E.1.3.1 collects, organizes, and displays data in a variety of forms, including tables, line graphs, charts, bar graphs, to determine how different ways of presenting data can lead to different interpretations. (Also assesses E.1.3.3) Grades 6–7 MC, GR Grade 8 MC, GR, ER	MA.E.1.4.1 interprets data that has been collected, organized, and displayed in charts, tables, and plots. (Also assesses E.1.3.1 and E.1.4.3) Grade 9 MC, GR Grade 10 MC, GR, ER
MA.E.1.2.2 determines range, mean, median, and mode from sets of data. (Also assesses E.1.2.3) Grades 3–4 MC Grade 5 MC, GR	MA.E.1.3.2 understands and applies the concepts of range and central tendency (mean, median, and mode). (Also assesses E.1.3.3) MC, GR	MA.E.1.4.2 calculates measures of central tendency (mean, median, and mode) and dispersion (range, standard deviation, and variance) for complex sets of data and determines the most meaningful measure to describe the data. (Also assesses E.1.4.3) MC, GR
MA.E.1.2.3 analyzes real-world data to recognize patterns and relationships of the measures of central tendency using tables, charts, histograms, bar graphs, line graphs, pictographs, and circle graphs generated by appropriate technology, including calculators and computers. (Assessed with E.1.2.1 and E.1.2.2)	MA.E.1.3.3 analyzes real-world data by applying appropriate formulas for measures of central tendency and organizing data in a quality display, using appropriate technology, including calculators and computers. (Assessed with E.1.3.1 and E.1.3.2)	MA.E.1.4.3 analyzes real-world data and makes predictions of larger populations by applying formulas to calculate measures of central tendency and dispersion using the sample population data, and using appropriate technology, including calculators and computers. (Assessed with E.1.4.1 and E.1.4.2)

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Mathematics Content Assessed by the FCAT and Item Formats by Benchmark

E: Data Analysis and Probability		
2. The student identifies patterns and makes predictions from an orderly display of data using concepts of probability and statistics.		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.E.2.2.1 uses models, such as tree diagrams, to display possible outcomes and to predict events. Grades 3–4 MC Grade 5 SR	MA.E.2.3.1 compares experimental results with mathematical expectations of probabilities. MC	MA.E.2.4.1 determines probabilities using counting procedures, tables, tree diagrams, and formulas for permutations and combinations. (Also assesses E.2.4.2) MC, GR
MA.E.2.2.2 predicts the likelihood of simple events occurring. MC	MA.E.2.3.2 determines odds for and odds against a given situation. (Also assesses E.2.2.2) MC	MA.E.2.4.2 determines the probability for simple and compound events as well as independent and dependent events. (Assessed with E.2.4.1)
3. The student uses statistical methods to make inferences and valid arguments about real-world situations.		
Grades 3–5 Benchmark	Grades 6–8 Benchmark	Grades 9–10 Benchmark
MA.E.3.2.1 designs experiments to answer class or personal questions, collects information, and interprets the results using statistics (range, mean, median, and mode) and pictographs, charts, bar graphs, circle graphs, and line graphs. (Also assesses E.3.2.2) Grades 3–4 (Not assessed) Grade 5 MC	MA.E.3.3.1 formulates hypotheses, designs experiments, collects and interprets data, and evaluates hypotheses by making inferences and drawing conclusions based on statistics (range, mean, median, and mode) and tables, graphs, and charts. (Also assesses E.3.3.2) MC	MA.E.3.4.1 designs and performs real-world statistical experiments that involve more than one variable, then analyzes results and reports findings. (Also assesses E.3.3.1 and E.3.4.2) MC
MA.E.3.2.2 uses statistical data about life situations to make predictions and justifies reasoning. Grades 3–4 (Not assessed) Grade 5 (Assessed with E.3.2.1)	MA.E.3.3.2 identifies the common uses and misuses of probability and statistical analysis in the everyday world. (Assessed with E.3.3.1)	MA.E.3.4.2 explains the limitations of using statistical techniques and data in making inferences and valid arguments. (Assessed with E.3.4.1)

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FCAT Mathematics Glossary
Grades 9–10

The terms defined in this glossary pertain to the *Sunshine State Standards* in mathematics for Grades 9 and 10 and the content assessed on the FCAT in mathematics. Included are the glossary terms from Grades 3 through 8. Italicized words or phrases within a definition are defined separately in this glossary.

Absolute value — a number's distance from zero (0) on a number line. Distance is expressed as a positive value (e.g., $|3| = 3$ and $|^-3| = 3$).

Acute angle — an *angle* that measures less than 90° and greater than 0°.

Addend — any number being added.

Additive identity — the number zero (0). When zero (0) is added to another number the sum is the number itself (e.g., $5 + 0 = 5$).

Additive inverse property — a number and its additive inverse have a sum of zero (0) (e.g., in the equation $3 + ^-3 = 0$, 3 and $^-3$ are additive inverses of each other).

Algebraic equation (inequality) — a mathematical sentence containing *variables* in which two *expressions* are connected by an equality (inequality) symbol. See also *equation* and *inequality.*

Algebraic expression — an expression containing numbers and *variables* (e.g., $7x$), and operations that involve numbers and *variables* (e.g., $2x + y$ or $3a^2 - 4b + 2$). Algebraic expressions do not contain equality or *inequality* symbols.

Algebraic order of operations — the order of performing computations is parentheses first, then *exponents,* followed by multiplication and/or division (as read from left to right), then addition and/or subtraction (as read from left to right). For example:
$= 5 + (12 - 2) \div 2 - 3 \times 2$
$= 5 + 10 \div 2 - 3 \times 2$
$= 5 + 5 - 6$
$= 10 - 6$
$= 4$

Algebraic rule — a mathematical *expression* that contains *variables* and describes a pattern or relationship.

Altitude — the *perpendicular* distance from a *vertex* in a *polygon* to its opposite *side.*

Angle — two *rays* extending from a common end *point* called the *vertex.* Angles are measured in degrees.

Area the measure, in square units, of the inside region of a closed two-dimensional figure (e.g., a rectangle with sides of 4 units by 6 units has an area of 24 square units).

Associative property the way in which three or more numbers are grouped for addition or multiplication does not change their *sum* or *product,* respectively [e.g., $(5 + 6) + 9 = 5 + (6 + 9)$ or $(2 \times 3) \times 8 = 2 \times (3 \times 8)$].

Axes (of a graph) the horizontal and vertical *number lines* used in a *coordinate plane* system.

Axis the singular form of *axes.*

Bar graph a graph that uses either vertical or horizontal bars to display data.

Base (algebraic) the number used as a factor in *exponential form.* For example 2^3 is the exponential form of $2 \times 2 \times 2$. The numeral two (2) is called the base, and the numeral three (3) is called the *exponent.*

Base (geometric) the line or plane of a geometric figure, from which an *altitude* can be constructed, upon which a figure is thought to rest.

Box-and-whisker plot a basic graphing tool that displays centering, spread, and distribution of a data set.

Break a zigzag on the *x*- or *y*-axis in a line or bar graph indicating that the data being displayed do not include all of the values that exist on the *number line* used. Also called a *squiggle.*

Capacity the amount of space that can be filled in a container. Both capacity and *volume* are used to measure three-dimensional spaces; however, capacity usually refers to fluid measures, whereas *volume* is described by cubic units.

Central angle an angle that has its *vertex* at the center of a circle, with *radii* as its sides.

Chart a *data display* that presents information in columns and rows.

Circle graph a *data display* that divides a circle into regions representing a portion of the total set of data. The circle represents the whole set of data.

Circumference the distance around a circle.

Closed figure a two-dimensional figure that divides the *plane* in which the figure lies into two parts—the part inside the figure and the part outside the figure (e.g., circles, squares, rectangles).

Commutative property	the order in which two numbers are added or multiplied does not change their *sum* or *product,* respectively (e.g., $2 + 3 = 3 + 2$ or $4 \times 7 = 7 \times 4$).
Complementary angles	two *angles* with measures that sum to be exactly 90°.
Composite number	a whole number that has more than two *factors.*
Congruent	figures or objects that are the same shape and size.
Coordinate grid or plane	a two-dimensional network of horizontal and vertical lines that are *parallel* and evenly-spaced; especially designed for locating points, displaying data, or drawing maps.
Coordinates	numbers that correspond to points on a *coordinate plane* in the form (x, y), or a number that corresponds to a point on a *number line.*
Counting principle	if a first event has n outcomes and a second event has m outcomes, then the first event followed by the second event has $n \times m$ outcomes.
Customary units	the units of measure developed and used in the United States. Customary units for *length* are inches, feet, yards, and miles. Customary units for *weight* are ounces, pounds, and tons. Customary units for *volume* are cubic inches, cubic feet, and cubic yards. Customary units for *capacity* are fluid ounces, cups, pints, quarts, and gallons.
Cylinder	a three-dimensional figure with two *parallel* bases that are *congruent* circles.
Data displays/graphs	different ways of displaying data in *charts, tables,* or graphs, including *pictographs, circle graphs,* single-, double-, or triple-*bar* and *line graphs,* histograms, *stem-and-leaf plots, box-and-whisker plots,* and *scatter plots.*
Decimal number	any number written with a decimal point in the number. A decimal number falls between two *whole numbers* (e.g., 1.5 falls between 1 and 2). Decimal numbers smaller than 1 are sometimes called decimal fractions (e.g., five-tenths is written 0.5).
Diameter	a *line segment* from any point on the circle passing through the center to another point on the circle.
Difference	a number that is the result of subtraction.

Dilation	a proportional increase or decrease in size in all dimensions.
Direct measure	obtaining the measure of an object by using measuring devices, either standard devices of the *customary* or *metric systems,* or nonstandard devices such as a paper clip or pencil.
Distributive property	the *product* of a number and the *sum* or *difference* of two numbers is equal to the *sum* or *difference* of the two *products* (e.g., $x(a + b) = ax + bx$).
Divisible	a number capable of being divided by another number without a remainder.
Divisor	the number by which another number is divided.
Empirical probability	the likelihood of an event happening that is based on experience and observation rather than on theory.
Enlargement	See *dilation.*
Equation	a mathematical sentence in which two *expressions* are connected by an equality symbol. See also *algebraic equation (inequality)*.
Equilateral triangle	a triangle with three *congruent* sides.
Equivalent expressions	*expressions* that have the same value but are presented in a different format using the properties of numbers.
Equivalent forms of a number	the same number expressed in different forms (e.g., $\frac{3}{4}$, 0.75, 75%).
Estimation	the use of rounding and/or other strategies to determine a reasonably accurate approximation, without calculating an exact answer (e.g., clustering, front-end estimating, grouping, etc.).
Evaluate an algebraic expression	substitute numbers for the *variables* and follow the *algebraic order of operations* to find the numerical value of the *expression.*
Exponent (exponential form)	the number of times the *base* occurs as a *factor* (e.g., 2^3 is the exponential form of $2 \times 2 \times 2$). The numeral two (2) is called the *base,* and the numeral three (3) is called the exponent.
Expression	a collection of numbers, symbols, and/or operation signs that stands for a number.
Extraneous information	information that is not necessary to solving the problem.

Extrapolate to *estimate* or infer a value or quantity beyond the known range of data.

Face one of the *plane* surfaces bounding a three-dimensional figure; a side.

Factor a number or *expression* that divides evenly into another number [e.g., 1, 2, 4, 5, 10, and 20 are factors of 20 and $(x + 1)$ is one of the factors of $(x^2 - 1)$].

Flip See *reflection.*

Fraction any part of a whole is called a fraction (e.g., one-half written in fractional form is $\frac{1}{2}$).

Function (of *x*) a relation in which each value of x is paired with a unique value of y.

Function table a table of x- and y-values (*ordered pairs*) that represents the *function, pattern,* relationship, or *sequence* between the two *variables.*

Grid See *coordinate grid.*

Height a *line segment* extending from the *vertex* or apex of a figure to its *base* and forming a *right angle* with the *base* or *plane* that contains the *base.*

Hypotenuse the longest *side* of a right triangle; the *side* opposite the *right angle.*

Hypothesis a proposition or supposition developed to provide a basis for further investigation or research.

Indirect measure the measurement of an object through the known measure of another object.

Inequality a sentence that states one *expression* is greater than, greater than or equal to, less than, less than or equal to, or not equal to, another *expression* (e.g., $a \neq 5$ or $x < 7$ or $2y + 3 \geq 11$). See also *algebraic inequality.*

Integers the numbers in the set $\{\ldots -4, -3, -2, -1, 0, 1, 2, 3, 4 \ldots\}$.

Intercept the value of a *variable* when all other *variables* in the *equation* equal zero (0). On a graph, the values where a *function* crosses the *axes.*

Intersection the *point* at which *lines* or *curves* meet; the *line* where *planes* meet.

Inverse operation an action that undoes a previously applied action (e.g., subtraction is the inverse operation of addition).

Irrational number — a *real number* that cannot be expressed as a *ratio* of two integers (e.g., $\sqrt{2}$).

Isosceles triangle — a triangle with two *congruent sides* and two *congruent angles.*

Labels (for a graph) — the titles given to a graph, the *axes* of a graph, or to the *scales* on the *axes* of a graph.

Length — a one-dimensional measure that is the measurable property of *line segments.*

Likelihood — the chance that something is likely to happen. See *probability.*

Line — a collection of an infinite number of *points* in a straight pathway with unlimited *length* and having no width.

Line graph — a graph that displays data using connected *line segments.*

Line segment — a portion of a *line* that consists of two defined endpoints and all the points in between.

Linear equation — an *algebraic equation* in which the *variable* quantity or quantities are raised to the zero or the graph is a straight *line* [e.g., $20 = 2(w + 4) + 2w$ and $y = 3x + 4$].

Linear inequality — an *algebraic inequality* in which the *variable* quantity or quantities are raised to the zero or first power and the graph is a region whose boundary is the straight *line* formed by the inequality.

Mass — the amount of matter in an object.

Mean — the arithmetic average of a set of numbers. It is also a measure of central tendency.

Median — the middle *point* of a set of rank-ordered numbers where half of the numbers are above the median and half are below it. It is also a measure of central tendency.

Metric units — the units of measure developed in Europe and used in most of the world.
Like the decimal system, the metric system uses the *base* 10.
Metric units for *length* are millimeters, centimeters, meters, and kilometers.
Metric units for *mass* are milligrams, grams, and kilograms.
Metric units for *volume* are cubic millimeters, cubic centimeters, and cubic meters.
Metric units for *capacity* are milliliters, centiliters, liters, and kiloliters.

Midpoint of a line segment	the *point* on a *line segment* equidistant from the endpoints.
Mode	the score or data point found most often in a set of numbers. There may be no mode, one mode, or more than one mode in a set of numbers. It is also a measure of central tendency.
Multiples	the numbers that result from multiplying a given *whole number* by the set of *whole numbers* (e.g., the multiples of 15 are 0, 15, 30, 45, 60, 75, etc.).
Multiplicative identity	the number one (1). The product of a number and the multiplicative identity is the number itself (e.g., $5 \times 1 = 5$).
Multiplicative inverse (reciprocal)	any two numbers with a *product* of 1 (e.g., 4 and $\frac{1}{4}$). Zero (0) has no multiplicative inverse.
Natural numbers (counting numbers)	the numbers in the set {1, 2, 3, 4, 5 . . .}.
Negative exponent	used to designate the *reciprocal* of a number to the *absolute value* of the *exponent.* Also used in scientific notation to designate a number smaller than one (1). For example, 3.45×10^{-2} equals 0.0345.
Nonstandard units of measure	objects such as blocks, paper clips, crayons, or pencils that can be used to obtain a measure.
Number line	a *line* on which ordered numbers can be written or visualized.
Obtuse angle	an *angle* with a measure of more than 90° but less than 180°.
Odds	the *ratio* of one event occurring (favorable outcome) to it not occurring (unfavorable outcome) if all outcomes are equally likely.
Operation	any mathematical process, such as addition, subtraction, multiplication, division, raising to a power, or finding the *square root*.
Operational shortcut	a method having fewer arithmetic calculations.
Ordered pair	the location of a single *point* on a *rectangular coordinate system* where the first and second values represent the position relative to the *x-axis* and *y-axis,* respectively [e.g., (x, y) or (3, -4)].
Organized data	data arranged in a display that is meaningful and that assists in the interpretation of the data. See *data displays.*

Origin	the *point* of *intersection* of the *x*- and *y-axes* in a *rectangular coordinate system,* where the *x-coordinate* and *y-coordinate* are both zero (0).
Parallel lines	two *lines* in the same *plane* that are a constant distance apart. Parallel lines have equal *slopes.*
Pattern (relationship)	a predictable or prescribed *sequence* of numbers, objects, etc. Patterns and relationships may be described or presented using manipulatives, *tables,* graphics (pictures or drawings), or *algebraic rules (functions)*.
Percent	a special-case *ratio* which compares numbers to 100 (the second term). For example, 25% means the *ratio* of 25 to 100.
Perimeter	the distance around a *polygon.*
Perpendicular	two *lines,* two *line segments,* or two *planes* that intersect to form a *right angle.*
Pi (π)	the symbol designating the *ratio* of the *circumference* of a circle to its *diameter.* It is an *irrational number* with common approximations of either 3.14 or $\frac{22}{7}$.
Pictograph	a *data display* constructed with pictures or symbols to visualize any *ratios* between two measures or counts.
Place value	the position of a single digit in a number.
Planar cross-section	the intersection of a *plane* and a three-dimensional figure.
Plane	an infinite, two-dimensional geometric surface defined by three non-linear *points* or two distinct *parallel* or *intersecting lines*.
Plane figure	a two-dimensional figure that lies entirely within a single *plane.*
Point	a specific location in space that has no discernible *length* or width.
Polygon	a closed-*plane* figure, having at least three sides that are *line segments* and are connected at their end-points.
Prime number	any *whole number* with only two *whole number factors,* 1 and itself (e.g., 2, 3, 5, 7, 11, etc.).

Probability — a measure of the *likelihood* that a given event will occur; expressed as a *ratio* of one event occurring (favorable outcomes) to the number of equally likely possible outcomes. See also *empirical probability* and *theoretical/expected probability.*

Product — the result of multiplying numbers together.

Proof — a logical argument that demonstrates the truth of a given statement. In a formal proof, each step can be justified with a reason; such as a given, a definition, an axiom, or a previously proven property or theorem.

Proportion — a mathematical sentence stating that two *ratios* are equal.

Proportional — having the same or a constant *ratio.* Two quantities that have the same *ratio* are considered directly proportional (e.g., If $y = kx$, then y is said to be directly proportional to x and the constant of proportionality is k).
Two quantities whose *products* are always the same are considered inversely proportional (e.g., If $xy = k$, then y is said to be inversely proportional to x).

Pyramid — a three-dimensional figure whose *base* is a *polygon* and whose *faces* are triangles with a common *vertex.*

Pythagorean theorem — the square of the *hypotenuse* (c) of a *right triangle* is equal to the sum of the square of the legs (a and b), as shown in the *equation* $c^2 = a^2 + b^2$.

Quadrant — any of the four regions formed by the *axes* in a *rectangular coordinate system.*

Quotient — the result of dividing two numbers.

Radical — an expression that has a root (*square root,* cube root, etc.) For example, $\sqrt{25}$ is a radical. Any root can be specified by an index number, b, in the form $\sqrt[b]{a}$ (e.g., $\sqrt[3]{8}$). A radical without an index number is understood to be a *square root.*

Radical sign — the symbol ($\sqrt{\ }$) used before a number to show that the number is a *radicand.* See also *radical.*

Radicand — the number that appears within a *radical sign* (e.g., in $\sqrt{25}$, 25 is the radicand).

Radius — a *line segment* extending from the center of a circle or *sphere* to a *point* on the circle or *sphere.* Plural: radii.

Randomly (chosen)	an equal chance of being chosen.
Range	the lowest value (L) in a set of numbers through the highest value (H) in the set. When the width of the range is expressed as a single number, the range is calculated as the difference between the highest and lowest values (H − L). Other presentations show the range calculated as (H − L + 1). Depending on the context, the result of either calculation would be considered correct.
Rate	a *ratio* that compares two quantities of different units (e.g., feet per second).
Ratio	the comparison of two quantities (e.g., the ratio of *a* and *b* is *a:b* or *a/b*, where $b \neq 0$).
Rational number	a *real number* that can be expressed as a *ratio* of two *integers.*
Ray	a portion of a *line* that begins at an endpoint and goes on indefinitely in one direction.
Real numbers	the set of all *rational* and *irrational numbers.*
Reciprocal	See *multiplicative inverse.*
Rectangular coordinate system	See *coordinate grid or plane.*
Reduction	See *dilation.*
Reflection	a *transformation* that produces the mirror image of a geometric figure over a *line* of reflection. Also called a *flip.*
Reflexive property of equality	a number or *expression* is equal to itself (e.g., $7 = 7$ or $ab = ab$).
Regular polygon	a *polygon* that is both equilateral (all *sides congruent*) and equiangular (all *angles congruent*).
Relation	a set of *ordered pairs* (x, y).
Relative size	the size of one number in comparison to the size of another number or numbers.
Right angle	an *angle* whose measure is exactly 90°.
Right circular cylinder	a *cylinder* in which the *bases* are *parallel* circles *perpendicular* to the *side* of the *cylinder.*

Right prism or rectangular solid	a three-dimensional figure (polyhedron) with *congruent,* polygonal *bases* and lateral *faces* that are all parallelograms.
Right triangle geometry	finding the measures of missing *sides* or *angles* of a right triangle when given the measures of other *sides* or *angles.*
Rise	the vertical change on the graph between two *points.*
Rotation	a *transformation* of a figure by turning it about a center *point* or *axis.* The amount of rotation is usually expressed in the number of degrees (e.g., a 90° rotation). Also called a *turn.*
Rule	a mathematical *expression* that describes a *pattern* or relationship, or a written description of the *pattern* or *relationship.*
Run	the horizontal change on a graph between two *points.*
Scale	the numeric values, set at fixed intervals, assigned to the *axes* of a graph.
Scale factor	the constant that is multiplied by the *length* of each *side* of a figure that produces an image that is the same shape as the original figure.
Scale model	a model or drawing based on a *ratio* of the dimensions for the model and the actual object it represents.
Scalene triangle	a triangle having no *congruent sides*.
Scatter plot	a graph of data *points,* usually from an experiment, that is used to observe the relationship between two *variables*.
Scientific notation	a shorthand method of writing very large or very small numbers using *exponents* in which a number is expressed as the *product* of a power of 10 and a number that is greater than or equal to one (1) and less than 10 (e.g., $7.59 \times 10^5 = 759{,}000$).
Sequence	an ordered list of numbers with either a constant *difference* (arithmetic) or a constant *ratio* (geometric).
Side	the edge of a *polygon* (e.g., a triangle has three *sides*), the face of a polyhedron, or one of the *rays* that make up an *angle.*
Similar figures	figures that are the same shape, have corresponding, *congruent angles,* and have corresponding *sides* that are *proportional* in *length*.

Similarity — a term describing figures that are the same shape but are not necessarily the same size or in the same position.

Slide — See *translation.*

Slope — The *ratio* of change in the vertical *axis* (*y-axis*) to each unit change in the horizontal *axis* (*x-axis*) in the form $\frac{\text{rise}}{\text{run}}$ or $\frac{\Delta y}{\Delta x}$. Also, the constant, *m*, in the linear *equation* for the slope-intercept form $y = mx + b$.

Solid figures — three-dimensional figures that completely enclose a portion of space (e.g., a rectangular prism, cube, *sphere, right circular cylinder,* right circular cone, and *square pyramid*).

Sphere — a three-dimensional figure in which all *points* on the figure are equidistant from a center *point.*

Square root — a positive *real number* that can be multiplied by itself to produce a given number (e.g., the square root of 144 is 12 or $\sqrt{144} = 12$).

Squiggle — See *break.*

Standard units of measure — accepted measuring devices and units of the *customary* or *metric system.*

Stem-and-leaf plot — a graph that organizes data by place value to compare data frequencies.

Straight angle — an *angle* that measures exactly 180°.

Sum — the result of adding numbers together.

Supplementary angles — two *angles,* with measures the *sum* of which is exactly 180°.

Surface area of a geometric solid — the *sum* of the areas of the *faces* and any curved surfaces of the figure that create the geometric solid.

Symbolic representations of numbers — *expressions* represented by symbols (e.g., circles shaded to represent $\frac{1}{4}$ or *variables* used to represent quantities).

Symmetry — a term describing the result of a *line* drawn through the center of a figure such that the two halves of the figure are *reflections* of each other across the *line.*

System of equations — a group of two or more *equations* that are related to the same situation and share *variables.* The solution to a system of equations is an ordered number set that makes all of the *equations* true.

Table	a *data display* that organizes information about a topic into categories. See also *chart.*
Tessellation	a covering of a *plane* with *congruent* copies of the same *pattern* with no holes and no overlaps.
Theoretical/expected probability	the *likelihood* of an event happening based on theory rather than on experience and observation.
Transformation	an *operation* on a geometric figure by which another image is created. Common transformations include *reflections* (*flips*), *translations* (*slides*), *rotations* (*turns*), and *dilations*.
Transitive property	when the first element has a particular relationship to a second element that in turn has the same relationship to a third element, the first has this same relationship to the third element (e.g., if $a = b$ and $b = c$, then $a = c$).
Translation	a *transformation* in which every *point* in a figure is moved in the same direction and by the same distance. See also *slide.*
Transversal	a *line* that *intersects* two or more *lines* at different *points.*
Tree diagram	a diagram in which all the possible outcomes of a given event are displayed.
Trend line	a *line* on a graph indicating a statistical trend.
Turn	See *rotation.*
Unorganized data	data that are presented in a *random* manner.
Variable	any symbol, usually a letter, which could represent a number.
Vertex	the *point* common to the two *rays* that form an *angle*; the *point* common to any two sides of a *polygon*; the *point* common to three or more edges of a polyhedron.
Vertical angles	the opposite or non-adjacent *angles* formed when two *lines intersect.*
Volume	the amount of space occupied in three dimensions and expressed in cubic units. Both *capacity* and *volume* are used to measure empty spaces; however, *capacity* usually refers to fluid measures, whereas *volume* is described by cubic units.
Weight	measures that represent the force of gravity on an object.

Whole numbers	the numbers in the set {0, 1, 2, 3, 4 . . .}.
***x*-axis**	the horizontal *number line* on a *rectangular coordinate system.*
***x*-intercept**	the value of *x* at the *point* where a *line* or *graph intersects* the *x-axis*. The value of *y* is zero (0) at this *point.*
***y*-axis**	the vertical *number line* on a *rectangular coordinate system.*
***y*-intercept**	the value of *y* at the *point* where a *line* or *graph intersects* the *y-axis.* The value of *x* is zero (0) at this *point.*

FCAT Mathematics Scoring Rubrics
Grades 9–10

Short-Response (SR) Tasks

2 points A score of two indicates that the student has demonstrated a thorough understanding of the mathematics concepts and/or procedures embodied in the task. The student has completed the task correctly, in a mathematically sound manner. When required, student explanations and/or interpretations are clear and complete. The response may contain minor flaws that do not detract from the demonstration of a thorough understanding.

1 point A score of one indicates that the student has provided a response that is only partially correct. For example, the student may provide a correct solution, but may demonstrate some misunderstanding of the underlying mathematical concepts or procedures. Conversely, a student may provide a computationally incorrect solution but could have applied appropriate and mathematically sound procedures, or the student's explanation could indicate an understanding of the task, despite the error.

0 points A score of zero indicates the student has provided either no response at all, or a completely incorrect or uninterpretable response, or demonstrated insufficient understanding of the mathematics concepts and/or procedures embodied in the task. For example, a student may provide some work that is mathematically correct, but the work does not demonstrate even a rudimentary understanding of the primary focus of the task.

Extended-Response (ER) Tasks

4 points A score of four is a response in which the student demonstrates a thorough understanding of the mathematics concepts and/or procedures embodied in the task. The student has responded correctly to the task, used mathematically sound procedures, and provided clear and complete explanations and interpretations. The response may contain minor flaws that do not detract from the demonstration of a thorough understanding.

3 points A score of three is a response in which the student demonstrates an understanding of the mathematics concepts and/or procedures embodied in the task. The student's response to the task is essentially correct with the mathematical procedures used and the explanations and interpretations provided demonstrating an essential but less than thorough understanding. The response may contain minor flaws that reflect inattentive execution of mathematical procedures or indications of some misunderstanding of the underlying mathematics concepts and/or procedures.

2 points A score of two indicates that the student has demonstrated only a partial understanding of the mathematics concepts and/or procedures embodied in the task. Although the student may have used the correct approach to obtaining a solution or may have provided a correct solution, the student's work lacks an essential understanding of the underlying mathematical concepts. The response contains errors related to misunderstanding important aspects of the task, misuse of mathematical procedures, or faulty interpretations of results.

1 point A score of one indicates that the student has demonstrated a very limited understanding of the mathematics concepts and/or procedures embodied in the task. The student's response is incomplete and exhibits many flaws. Although the student's response has addressed some of the conditions of the task, the student reached an inadequate conclusion and/or provided reasoning that was faulty or incomplete. The response exhibits many flaws or may be incomplete.

0 points A score of zero indicates the student has provided either no response at all, or a completely incorrect or uninterpretable response, or demonstrated insufficient understanding of the mathematics concepts and/or procedures embodied in the task. For example, a student may provide some work that is mathematically correct, but the work does not demonstrate even a rudimentary understanding of the primary focus of the task.

Instructions for Item Review

Directions: A series of questions numbered 1–9 is presented below. These questions are designed to assist with your evaluation of the quality of FCAT test items you will be reviewing. The attached chart is an example of the one you will use to record your rating of each item. You will review the items independently before discussing each item with other committee members. If you identify any problem area in the item during the independent review, you should put a crossmark (x) in the appropriate column. Crossmarks (x) will indicate problem areas and blank spaces or checks (✓) will indicate no problems.

1. Does the test item measure the benchmark?
2. Does the content measured by the item meet the content limits of the *FCAT Test Item Specifications?*
3. In your professional judgment, what is the cognitive complexity of the item for students who have attained the benchmark at the grade level being assessed? In other words, is the item best categorized as low complexity (L), moderate complexity (M), or high complexity (H)? Use the cognitive complexity handouts in making this judgment.
4. In your professional judgment, what is the level of difficulty of the item for students who have attained the benchmark at the grade level being assessed?
   Use: E = easy (more than 70% of the students should get the item correct)
   A = average (from 40% to 70% of the students should get this item correct)
   C = challenging (less than 40% of the students should get this item correct)
5. Is the *Sunshine State Standards* topic appropriate for the item?
6. Is the wording/context of the item (stem and stimulus) appropriate for the grade level?
7. Is the assigned content focus appropriate for the item? Is there a better content focus available for the assigned benchmark (using DOE's content focus spreadsheet)?
8. Is the keyed response the **correct, best, and only** answer? For gridded-response items: Does the problem result in an answer that will fit in the grid? Do other acceptable answers need to be identified in the answer key?
9. Are the multiple-choice options appropriate, parallel (both grammatically and conceptually) to the keyed response, and plausible?

Overall Quality

Rate the overall quality of each test item using the following rating definitions and codes.

A (Accept)	Please provide a brief explanation of ratings of AR, RR, and D in the comment section.
AR (Accept as Revised)	
RR (Revise and Re-present, including art)	
D (Delete)	

After the group discussion and possible revision of an item, you may wish to change your overall rating. If so, place a slash (/) through your original rating and give the item a new rating.

Item Review Rating Sheet

Name_____
Grade_____

Florida Comprehensive Assessment Test (FCAT)
Rating of Items - Mathematics Content Review Meeting

Page # of Item	Item ID Number	Measures Benchmark	Content Limit	Cognitive Complexity	Item Difficulty	SSS Topic	Grade Appr.	Content Focus	One Correct Answer	MC Options	Overall Rating A/AR/RR/D	Additional Comments
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
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16												
17												
18												
19												
20												
21												
22												

Students in my (classroom, school, district) [circle one] are given the opportunity to learn the material that these items test, except as noted in my comments.

Signature_____Date_____

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Assessment and School Performance
Florida Department of Education
Tallahassee, Florida

1 2 3 4 5 6 7 8 9 10 11 12 A B C D E

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