

High School Grades (9-12)

SSS - Essential Work Skills Crosswalk - Math

Math Standard	MA.A	Math SSS/Benchmark	1.4.1	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Associates verbal names, written word names, and standard numerals with integers, rational numbers, irrational numbers, real numbers, and complex numbers.*

Essential Skill **Essential Skill Description**

- m19 Understand the definitions and properties of rational and irrational numbers.
- m60 Understand the concept of the imaginary unit, i , and know how to simplify square roots involving a negative radicand.
- m61 Understand the concepts recurrence relations and how they are applicable to such things as compound interest and annuity.

Math Standard	MA.A	Math SSS/Benchmark	1.4.2	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Understands the relative size of integers, rational numbers, irrational numbers, and real numbers.*

Essential Skill **Essential Skill Description**

- m19 Understand the definitions and properties of rational and irrational numbers.

Math Standard	MA.A	Math SSS/Benchmark	1.4.3	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Understands concrete and symbolic representations of real and complex numbers in real-world situations.*

Essential Skill **Essential Skill Description**

- m19 Understand the definitions and properties of rational and irrational numbers.
- m60 Understand the concept of the imaginary unit, i , and know how to simplify square roots involving a negative radicand.
- m65 Know the standard form of a complex number is expressed as $a + bi$ where a and b are real numbers, and represent graphically on the complex plane where the horizontal axis is the real axis and the vertical axis is the imaginary axis.

Math Standard	<i>MA.A</i>	Math SSS/Benchmark	<i>1.4.4</i>	FCAT Concept	H
Description	<i>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.</i>				
Essential Skill	Essential Skill Description				
m19	Understand the definitions and properties of rational and irrational numbers.				

Math Standard	<i>MA.A</i>	Math SSS/Benchmark	<i>2.4.1</i>	FCAT Concept	L
Description	<i>Understands and uses the basic concepts of limits and infinity.</i>				
Essential Skill	Essential Skill Description				
m48	Understand the concepts and apply the uses of functions and limits (i.e., conduct limiting processes using functions to investigate infinite series and sequences).				

Math Standard	<i>MA.A</i>	Math SSS/Benchmark	<i>2.4.2</i>	FCAT Concept	H
Description	<i>Understands and uses the real number system.</i>				
Essential Skill	Essential Skill Description				
m19	Understand the definitions and properties of rational and irrational numbers.				

Math Standard	<i>MA.A</i>	Math SSS/Benchmark	<i>2.4.3</i>	FCAT Concept	L
Description	<i>Understands the structure of the complex number system.</i>				
Essential Skill	Essential Skill Description				
m60	Understand the concept of the imaginary unit, i , and know how to simplify square roots involving a negative radicand.				
m65	Know the standard form of a complex number is expressed as $a + bi$ where a and b are real numbers, and represent graphically on the complex plane where the horizontal axis is the real axis and the vertical axis is the imaginary axis.				

Math Standard	MA.A	Math SSS/Benchmark	3.4.1	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Understands and explains the effects of addition, subtraction, multiplication, and division on real numbers, including square roots, exponents, and appropriate inverse relationships.*

Essential Skill **Essential Skill Description**

- m01 Perform operations with signed (positive and negative) numbers, including decimals, ratios, percents, and fractions.
- m24 Understand the basic properties and laws of exponents and scientific notation.
- m44 Perform operations with radicals such as addition, subtraction, multiplication, and division of two or more irrational numbers and express as the square root of a positive integer or as the product of a rational number and the square root of a positive integer.
- m62 Understand the characteristics of algorithms and how they are used for finding the greatest common denominator of two numbers and the solutions of quadratic equations.
- m68 Apply arithmetic methods for obtaining a rational approximation of an irrational number (e.g., radical).

Math Standard	MA.A	Math SSS/Benchmark	3.4.2	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Selects and justifies alternative strategies, such as using properties of numbers, including inverse, identify, distributive, associative, transitive, that allow operational shortcuts for computational procedures in real-world or mathematical problems.*

Essential Skill **Essential Skill Description**

- m03 Understand basic algebraic properties (i.e., commutative: $ab = ba$; associative: $ab(c) = a(bc)$; and distributive: $a(b+c) = (ab)+(ac)$).
- m08 Understand the correct order of operations for performing algebraic computations.
- m11 Use addition and multiplication to simplify an algebraic expression by identifying the order of operations and techniques necessary to carry out the operations (e.g., $5-3(x-2) = 5-3x+6 = 11-3x$).

Math Standard	MA.A	Math SSS/Benchmark	3.4.3	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *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.*

Essential Skill **Essential Skill Description**

- m01 Perform operations with signed (positive and negative) numbers, including decimals, ratios, percents, and fractions.
- m44 Perform operations with radicals such as addition, subtraction, multiplication, and division of two or more irrational numbers and express as the square root of a positive integer or as the product of a rational number and the square root of a positive integer.
- m62 Understand the characteristics of algorithms and how they are used for finding the greatest common denominator of two numbers and the solutions of quadratic equations.

Math Standard	<i>MA.A</i>	Math SSS/Benchmark	<i>4.4.1</i>	FCAT Concept	H
Description	<i>Uses estimation strategies in complex situations to predict results and to check the reasonableness of results.</i>				
Essential Skill	Essential Skill Description				
	No Essential Work Skill				

Math Standard	<i>MA.A</i>	Math SSS/Benchmark	<i>5.4.1</i>	FCAT Concept	M
Description	<i>Applies special number relationships such as sequences and series to real-world problems.</i>				
Essential Skill	Essential Skill Description				
m48	Understand the concepts and apply the uses of functions and limits (i.e., conduct limiting processes using functions to investigate infinite series and sequences).				

Math Standard	<i>MA.B</i>	Math SSS/Benchmark	<i>1.4.1</i>	FCAT Concept	H
Description	<i>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.</i>				
Essential Skill	Essential Skill Description				
m13	Compute the perimeter and area of two-dimensional figures.				
m17	Compute the volume of three-dimensional figures (solids).				

Math Standard	<i>MA.B</i>	Math SSS/Benchmark	<i>1.4.2</i>	FCAT Concept	H
Description	<i>Uses concrete and graphic models to derive formulas for finding rate, distance, time, angle measures and arc lengths.</i>				
Essential Skill	Essential Skill Description				
m14	Understand the angle relationships in triangles (i.e., acute, obtuse, right, interior, and exterior).				
m30	Know how to measure circle quantities (e.g., area, angle formed by two secants, circumference, length of segments, etc.)				

Math Standard	<i>MA.B</i>	Math SSS/Benchmark	<i>1.4.3</i>	FCAT Concept	H
Description	<i>Relates the concepts of measurement to similarity and proportionality in real-world situations.</i>				
Essential Skill	Essential Skill Description				
m52	Find the solution of proportions with monomial and binomial terms (e.g., $x/(x-2) = 6/5$, therefore, $x = 12$).				

Math Standard	<i>MA.B</i>	Math SSS/Benchmark	<i>2.4.1</i>	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Selects and uses direct (measured) or indirect (not measured) methods of measurement as appropriate.*

Essential Skill **Essential Skill Description**

- m33 Use the technique of dimensional analysis to convert units of measure (e.g., convert km/hr to m/min) including drawing to scale and applying ratios. Understand and use various techniques for estimating, making and converting measure; and using these to perform dimensional analysis.
- m50 Use the process of integration (i.e., anti-derivatives) to determine areas, volumes, and distances.
- m57 Understand the concepts of right triangle trigonometry and solve right triangles using basic trigonometric ratios (sine, cosine, tangent).

Math Standard	<i>MA.B</i>	Math SSS/Benchmark	<i>2.4.2</i>	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Solves real-world problems involving rated measures (miles per hour, feet per second).*

Essential Skill **Essential Skill Description**

- m33 Use the technique of dimensional analysis to convert units of measure (e.g., convert km/hr to m/min) including drawing to scale and applying ratios. Understand and use various techniques for estimating, making and converting measure; and using these to perform dimensional analysis.

Math Standard	<i>MA.B</i>	Math SSS/Benchmark	<i>3.4.1</i>	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *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.*

Essential Skill **Essential Skill Description**

- m33 Use the technique of dimensional analysis to convert units of measure (e.g., convert km/hr to m/min) including drawing to scale and applying ratios. Understand and use various techniques for estimating, making and converting measure; and using these to perform dimensional analysis.

Math Standard	<i>MA.B</i>	Math SSS/Benchmark	<i>4.4.1</i>	FCAT Concept	L
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Determines the level of accuracy and precision, including absolute and relative errors or tolerance, required in real-world measurement situations.*

Essential Skill **Essential Skill Description**

No Essential Work Skill

Math Standard	<i>MA.B</i>	Math SSS/Benchmark	<i>4.4.2</i>	FCAT Concept	<i>L</i>
Description	<i>Selects and uses appropriate instruments, technology, and techniques to measure quantities in order to achieve specified degrees of accuracy in a problem situation.</i>				
Essential Skill	Essential Skill Description No Essential Work Skill				

Math Standard	<i>MA.C</i>	Math SSS/Benchmark	<i>1.4.1</i>	FCAT Concept	<i>H</i>
Description	<i>Uses properties and relationships of geometric shapes to construct formal and informal proofs.</i>				
Essential Skill	Essential Skill Description				
m14	Understand the angle relationships in triangles (i.e., acute, obtuse, right, interior, and exterior).				
m16	Understand the properties and classification of triangles by sides (i.e., scalene, isosceles, and equilateral).				
m26	Understand the properties and classification of polygons (e.g., triangle, quadrilaterals, pentagon, hexagon, etc.) as well as knowledge of geometric shapes.				
m27	Understand the properties and classification of quadrilaterals by orientation (e.g., parallelogram, rectangle, rhombus, square, and trapezoid).				
m29	Know the classification and properties of solid figures such as prisms, rectangular solids, pyramids, right circular cylinders, cones, and spheres.				
m32	Use direct proof and indirect proof sequencing techniques to reach a conclusion. Direct proof uses the Laws of Reasoning to create an orderly arrangement of steps leading to a conclusion. Indirect proof uses an initial assumption that the conclusion is false, and through a series of logically sound reasoning steps the statement may be proved otherwise.				

Math Standard	<i>MA.C</i>	Math SSS/Benchmark	<i>2.4.1</i>	FCAT Concept	<i>H</i>
Description	<i>Understands geometric concepts such as perpendicularity, parallelism, tangency, congruency, similarity, reflections, symmetry, and transformations including flips, slides, turns, enlargements, rotations, and fractals.</i>				
Essential Skill	Essential Skill Description				
m02	Understand the characteristics of parallel, perpendicular, and intersecting lines.				
m49	Apply transformation concepts to understand and create congruent and similar figures.				
m55	Understand the concepts of symmetry and transformations and graphically apply line reflections, rotation, translations, and dilation.				

Math Standard	<i>MA.C</i>	Math SSS/Benchmark	<i>2.4.2</i>	FCAT Concept	<i>H</i>
Description	<i>Analyzes and applies geometric relationships involving planar cross-sections (the intersection of a plane and a three-dimensional figure).</i>				
Essential Skill	Essential Skill Description				
m86	Know how to graphically sketch basic conic sections (e.g., circles and parabolas) using their equations, and graphically solve systems of equations.				

Math Standard	MA.C	Math SSS/Benchmark	3.4.1	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Represents and applies geometric properties and relationships to solve real-world and mathematical problems including ratio, proportion, and properties of right triangle trigonometry.*

Essential Skill **Essential Skill Description**

- m34 Know the equation for the slope of a line and compute slope given the coordinates of two points.
- m52 Find the solution of proportions with monomial and binomial terms (e.g., $x/(x-2) = 6/5$, therefore, $x = 12$).
- m57 Understand the concepts of right triangle trigonometry and solve right triangles using basic trigonometric ratios (sine, cosine, tangent).

Math Standard	MA.C	Math SSS/Benchmark	3.4.2	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Using a rectangle coordinate system (graph), applies and algebraically verifies properties of two- and three- dimensional figures, including distance, midpoint, slope, parallelism, and perpendicularity.*

Essential Skill **Essential Skill Description**

- m02 Understand the characteristics of parallel, perpendicular, and intersecting lines.
- m09 Know how to compute the distance between two points (i.e., length of a line segment) on a coordinate plane.
- m23 Know the components and properties of the rectangular coordinate system, (i.e., x - y axis, origin, quadrants, abscissa (x-coordinate) and ordinate (y-coordinate), and the general representation of a point (x,y)).
- m34 Know the equation for the slope of a line and compute slope given the coordinates of two points.
- m38 Know how to compute the midpoint of a line segment between two points on a coordinate plane.

Math Standard	MA.D	Math SSS/Benchmark	1.4.1	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Describes, analyzes, and generalizes relationships, patterns, and functions using words, symbols, variables, tables, and graphs.*

Essential Skill **Essential Skill Description**

- m40 Understand appropriate terminology used to define relations and functions and their properties (e.g., domain, range, function composition, inverses, etc.).
- m45 Know the equation of a line and interpret graphically using the slope-intercept form (i.e., $y = mx+b$), and the point-slope form (i.e., $y-b=m(x-a)$).
- m47 Know how to represent the solution set of an open sentence (e.g., $x < -1$) on a number line.
- m64 Know how to express a linear function (e.g., $y = 1/3x+5$) using the functional notation $f(x) = 1/3x+5$, and determine the ordered pairs.
- m73 Understand inverse functions as the set of ordered pairs obtained by interchanging the first and second elements of each pair belonging to a one-on-one function. Use one-on-one functions to create symmetric figures consisting of the graphs of a function and its inverse function.

Math Standard	<i>MA.D</i>	Math SSS/Benchmark	<i>1.4.2</i>	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Determines the impact when changing parameters of given functions.*

Essential Skill **Essential Skill Description**

m48 Understand the concepts and apply the uses of functions and limits (i.e., conduct limiting processes using functions to investigate infinite series and sequences).

Math Standard	<i>MA.D</i>	Math SSS/Benchmark	<i>2.4.1</i>	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Represents real-world problem situations using finite graphs, matrices, sequences, series, and recursive relations.*

Essential Skill **Essential Skill Description**

m48 Understand the concepts and apply the uses of functions and limits (i.e., conduct limiting processes using functions to investigate infinite series and sequences).

m51 Understand the concepts and uses of matrices in modeling (i.e., finite graphs (structures) can be represented geometrically and interpreted algebraically in the form of a matrix).

m61 Understand the concepts recurrence relations and how they are applicable to such things as compound interest and annuity.

m72 Understand the characteristics and uses of finite sequence and series (e.g., it allows a systematic and useful means of quantifying things).

Math Standard	<i>MA.D</i>	Math SSS/Benchmark	<i>2.4.2</i>	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Uses systems of equations and inequalities to solve real-world problems graphically, algebraically, and with matrices.*

Essential Skill **Essential Skill Description**

m71 Know how to find the graphic solution of systems of linear equations (e.g., find the point(s) common to a quadratic-linear pair).

m81 Solve and graphically sketch problems involving two variables that exhibit direct and indirect variation.

m82 Know how to find the graphic solution of systems of linear inequalities (e.g., graph the solution set or region of the coordinate plane common to both inequalities).

Math Standard	<i>MA.E</i>	Math SSS/Benchmark	<i>1.4.1</i>	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Interprets data that has been collected, organized, and displayed in charts, tables, and plots.*

Essential Skill **Essential Skill Description**

m05 Understand the best procedures for statistical data collection, organization, and display including making estimates and predictions and drawing inferences.

m36 Understand the characteristics of measures of dispersion (i.e., range, mean deviation, variance, and standard deviation).

m42 Understand the concepts and applications of quartiles (i.e., distributing groups into four equal frequencies) and percentiles (i.e., distributing individuals into one hundred groups of equal frequency).

Math Standard	MA.E	Math SSS/Benchmark	1.4.2	FCAT Concept	H
Description	<i>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.</i>				
Essential Skill	Essential Skill Description				
m36	Understand the characteristics of measures of dispersion (i.e., range, mean deviation, variance, and standard deviation).				
m42	Understand the concepts and applications of quartiles (i.e., distributing groups into four equal frequencies) and percentiles (i. e., distributing individuals into one hundred groups of equal frequency).				

Math Standard	MA.E	Math SSS/Benchmark	1.4.3	FCAT Concept	H
Description	<i>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.</i>				
Essential Skill	Essential Skill Description				
m36	Understand the characteristics of measures of dispersion (i.e., range, mean deviation, variance, and standard deviation).				
m42	Understand the concepts and applications of quartiles (i.e., distributing groups into four equal frequencies) and percentiles (i. e., distributing individuals into one hundred groups of equal frequency).				

Math Standard	MA.E	Math SSS/Benchmark	2.4.1	FCAT Concept	H
Description	<i>Determines probabilities using counting procedures, tables, tree diagrams, and formulas for permutations and combinations.</i>				
Essential Skill	Essential Skill Description				
m25	Determine the probability of single and compound events using the basic premise that the probability of an event is equal to the number of ways it can occur divided by the total number of outcomes.				
m43	Know how to determine combinations (i.e., the various grouping a set may be arranged in without regard to order).				
m56	Use the Counting Principle to determine the probability of events occurring jointly (e.g., if one activity can occur in any of m ways and another in any one of n ways, then the total number of ways both activities can occur is mn).				
m66a	Know how to determine permutation (i.e., arrangements of a set where order matters).				

Math Standard	<i>MA.E</i>	Math SSS/Benchmark	<i>2.4.2</i>	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Determines the probability for simple and compound events as well as independent and dependent events.*

Essential Skill **Essential Skill Description**

m25 Determine the probability of single and compound events using the basic premise that the probability of an event is equal to the number of ways it can occur divided by the total number of outcomes.

Math Standard	<i>MA.E</i>	Math SSS/Benchmark	<i>3.4.1</i>	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Designs and performs real-world statistical experiments that involve more than one variable, then analyzes results and reports findings.*

Essential Skill **Essential Skill Description**

m05 Understand the best procedures for statistical data collection, organization, and display including making estimates and predictions and drawing inferences.

Math Standard	<i>MA.E</i>	Math SSS/Benchmark	<i>3.4.2</i>	FCAT Concept	H
----------------------	-------------	---------------------------	--------------	---------------------	----------

Description *Explains the limitations of using statistical techniques and data in making inferences and valid arguments.*

Essential Skill **Essential Skill Description**

m36 Understand the characteristics of measures of dispersion (i.e., range, mean deviation, variance, and standard deviation).
m42 Understand the concepts and applications of quartiles (i.e., distributing groups into four equal frequencies) and percentiles (i. e., distributing individuals into one hundred groups of equal frequency).