



ADVANCED Mathematical Concepts

Precalculus
with Applications

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STANDARDS

PAGE REFERENCES

Big Idea: Number Properties and Operations

High school students should enter high school with a strong background in rational numbers and numerical operations and expand this to real numbers. Solving quadratic equations produces a working knowledge of complex numbers. This becomes the foundation for algebra and working with algebraic symbols. They understand large and small numbers and their representations, powers and roots. They compare and contrast properties of numbers and number systems and develop strategies to estimate the results of operations on real numbers. Students will use and understand the limitations of, graphing calculators and computer spreadsheets appropriately as learning tools.

Academic Expectations

- 2.7** Students understand number concepts and use numbers appropriately and accurately.
- 2.8** Students understand various mathematical procedures and use them appropriately and accurately.
- 2.12** Students understand mathematical structure concepts including the properties and logic of various mathematical systems.

Program of Studies: Understandings

MA-HS-NPO-U-1

Students will understand that numbers, ways of representing numbers, relationships among numbers and number systems are means of representing real-world quantities.

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Program of Studies: Skills and Concepts**MA-HS-NPO-S-NS4**

Students will explore vectors and matrices as systems that have some of the properties of the real number system.

MA-HS-NPO-S-NS5

Students will compare and contrast number systems, including complex numbers as solutions to quadratic equations that do not have real solutions.

MA-HS-NPO-S-NO5

Students will determine a specific term of a sequence given an explicit formula.

MA-HS-NPO-S-NO6

Students will describe and extend arithmetic and geometric sequences.

MA-HS-NPO-S-NO7

Students will determine an explicit rule for the n th term of an arithmetic sequence.

MA-HS-NPO-S-PNO3

Students will compare and contrast the number systems according to their properties.

Related Core Content for Assessment

<p><i>MA-HS-1.1.2</i> Students will demonstrate the relationships between different subsets of the real number system.</p>	<p>Student Edition: 206, 209 #3, 861-862</p>
<p><i>MA-HS-1.1.3</i> Students will use scientific notation to express very large or very small quantities.</p>	<p>Student Edition: 273 #6, 282 #6, 695 ex 1, 700 #19, 701 #68, 727 ex 2, 749 #4</p> <p>Teacher Wraparound Edition: ICE 696</p>
<p>MA-HS-1.3.2 Students will:</p> <ul style="list-style-type: none"> • describe and extend arithmetic and geometric sequences; • determine a specific term of a sequence given an explicit formula; • determine an explicit rule for the nth term of an arithmetic sequence and • apply sequences to solve real-world problems. DOK 3 	<p>Student Edition: 759-765, 766-773, 774-783, 793 #6, 806-814</p> <p>Teacher Wraparound Edition: AIN 761, 779; EC 764; F 766; ICE 760, 761, 766-773, 774-783, 793 #6, 806-814</p>

STANDARDS	PAGE REFERENCES
<p>MA-HS-1.3.3 <i>Students will write an explicit rule for the nth term of a geometric sequence.</i></p>	<p>Student Edition: 759-765, 766-773, 774-783, 793 #6, 806-814 Teacher Wraparound Edition: AIN 761, 779; EC 764; F 766; ICE 760, 761, 766-773, 774-783, 793 #6, 806-814</p>
<p>MA-HS-1.3.4 <i>Students will recognize and solve problems that can be modeled using a finite geometric series, such as home mortgage problems and other compound interest problems.</i></p>	<p>Student Edition: 768 ex 3, 770 ex 6, 771 #15, 772 #41, 773 #47, 793 #10, 833 #55 Teacher Wraparound Edition: A 773; ICE 768, 770</p>
<p>MA-HS-4.1.3 <i>Students will represent real-world data using matrices and will use matrix addition, subtraction, multiplication (with matrices no larger than 2×2) and scalar multiplication to solve real-world problems.</i></p>	<p>Student Edition: 78-85, 88-96, 104 #54, 120 #20-#27, 136 #44, 250 #54 Teacher Wraparound Edition: F 88; ICE 80, 81, 82, 89</p>
<p>MA-HS-NPO-U-2 <i>Students will understand that meanings of and relationships among operations provide tools necessary to solve realistic problems encountered in everyday life and problems encountered in mathematical situations.</i></p> <p>MA-HS-NPO-S-NO7 <i>Students will determine an explicit rule for the nth term of an arithmetic sequence.</i></p> <p>MA-HS-NPO-S-NO8 <i>Students will apply sequences and arithmetic and geometric series to solve realistic problems.</i></p> <p>MA-HS-NPO-S-PNO1 <i>Students will identify and apply real number properties.</i></p> <p>MA-HS-NPO-S-PNO2 <i>Students will use equivalence relations of real numbers to solve problems.</i></p> <p>MA-HS-NPO-S-PNO4 <i>Students will justify the solution steps in simplifying expressions or solving an equation.</i></p>	
<p>MA-HS-1.5.1 <i>Students will identify real number properties (commutative properties of addition and multiplication, associative properties of addition and multiplication, distributive property of multiplication over addition and subtraction, identity properties of addition and multiplication and inverse properties of addition and multiplication) when used to justify a given step in simplifying an expression or solving an equation.</i></p>	<p>Student Edition: 206 <i>Graphing Calculator Exploration 86</i></p>

STANDARDS	PAGE REFERENCES
<p>MA-HS-1.5.2 <i>Students will use equivalence relations (reflexive, symmetric, transitive).</i></p>	<p>This standard can be met in Glencoe's <i>Algebra 1</i> © 2008 on the following pages. Student Edition: 21-25</p>
<p>MA-HS-NPO-U-3 <i>Students will understand that computing fluently and accurately with real numbers and making reasonable estimates increases the ability to solve realistic problems encountered in everyday life.</i></p>	
<p>MA-HS-NPO-S-E1 <i>Students will use calculators appropriately and regularly make estimations without a calculator to detect potential errors.</i></p>	
<p>MA-HS-NPO-S-E2 <i>Students will estimate solutions to problems with real numbers (including very large and very small quantities) in both realistic and mathematical situations.</i></p>	
<p>MA-HS-NPO-S-E3 <i>Students will establish and apply benchmarks for real numbers in context.</i></p>	
<p>MA-HS-NPO-S-NO1 <i>Students will add, subtract, multiply and divide real numbers.</i></p>	
<p>MA-HS-NPO-S-NO2 <i>Students will add, subtract and multiply complex numbers.</i></p>	
<p>MA-HS-NPO-S-NO3 <i>Students will multiply and divide numbers expressed in scientific notation.</i></p>	
<p>MA-HS-NPO-S-NO4 <i>Students will apply absolute value, integer exponents, roots and factorials to solve problems.</i></p>	
<p>MA-HS-NPO-S-NO9 <i>Students will solve realistic problems to a specified degree of accuracy.</i></p>	
<p>MA-HS-NPO-S-NO10 <i>Students will judge the effects of multiplication, division and computing powers and roots on the magnitudes of quantities.</i></p>	
<p>MA-HS-NPO-S-NO11 <i>Students will develop an understanding of the properties and representations for the addition and multiplication of vectors and matrices.</i></p>	
<p>MA-HS-NPO-S-NO12 <i>Students will develop fluency in operations with real numbers and matrices, using mental computation or paper-and-pencil calculations for simple cases and calculators and/or computers for more complicated cases.</i></p>	
<p>MA-HS-NPO-S-NO13 <i>Students will use concrete, pictorial and abstract models to develop and/or generalize a procedure.</i></p>	

STANDARDS	PAGE REFERENCES
<p>MA-HS-1.2.1 <i>Students will estimate solutions to problems with real numbers (including very large and very small quantities) in both real-world and mathematical problems, and use the estimations to check for reasonable computational results.</i></p>	<p>Student Edition: 272 ex 2, 744 #6c, 745 #14c, 747 #21d, 974 #45</p>
<p>MA-HS-1.3.1 Students will solve real-world and mathematical problems to specified accuracy levels by simplifying expressions with real numbers involving addition, subtraction, multiplication, division, absolute value, integer exponents, roots (square, cube) and factorials. DOK 2</p>	<p>Student Edition: 695-703, 716 #18, 717 #3-#5, 750 #19-#20, 753 #1 <i>Chapter 11 Test A66</i></p> <p>Teacher Wraparound Edition: A 703; EC 702; FTC 699; ICE 697, 698, 699; TT 697</p>
<p>MA-HS-NPO-U-4 Students will understand that problem solving and connections with other content areas require a strong sense of number, including applications of absolute value (magnitude) and the ordering of numbers.</p>	
<p>MA-HS-NPO-S-NS1 Students will compare real numbers using order relations.</p> <p>MA-HS-NPO-S-NS2 Students will locate the position of a real number on the number line, find its distance from the origin (absolute value/magnitude) and find the distance between two numbers on the number line (the absolute value of their difference).</p> <p>MA-HS-NPO-S-NS3 Students will determine the relative position on the number line of real numbers, including very large and very small numbers, and the relative magnitude of numbers expressed in fractional form, in decimal form, as roots or in scientific notation.</p>	
<p>MA-HS-1.1.1 <i>Students will compare real numbers using order relations (less than, greater than, equal to) and represent problems using real numbers.</i></p>	<p>This standard can be met in Glencoe's <i>Algebra 1</i> © 2008 on the following pages.</p> <p>Student Edition: 46-52</p>
<p>MA-HS-NPO-U-5 Students will understand that proportional reasoning is a tool for modeling and solving problems encountered in everyday situations.</p>	
<p>MA-HS-NPO-S-RP1 Students will calculate and apply ratios, proportions, rates and percentages to solve problems.</p> <p>MA-HS-NPO-S-RP2 Students will translate real-world proportional relationships into mathematical expressions and vice versa.</p> <p>MA-HS-NPO-S-RP3 Students will represent slope graphically, numerically and symbolically and relate it to a graph of an equation based on a realistic situation.</p>	

STANDARDS	PAGE REFERENCES
<p>MA-HS-1.4.1 Students will apply ratios, percents and proportional reasoning to solve real-world problems (e.g., those involving slope and rate, percent of increase and decrease) and will explain how slope determines a rate of change in linear functions representing real-world problems. DOK 2</p>	<p>Student Edition: 189-196, 200 #56-#58, 248 #35, 283 #72, 284-290, 298 #54, 677 #56, 692 ex 1 Teacher Wraparound Edition: A 196; EC 196</p>
<p>Big Idea: Measurement High school students continue to measure and estimate measurements including fractions and decimals. They use formulas to find surface areas and volumes. They use US Customary and metric units of measurement. They use the Pythagorean theorem and other right triangle relationships to solve realistic problems.</p> <p>Academic Expectations</p> <p>2.9 Students understand space and dimensionality concepts and use them appropriately and accurately.</p> <p>2.10 Students understand measurement concepts and use measurements appropriately and accurately.</p>	
<p>Program of Studies: Understandings MA-HS-M-U-1 Students will understand that measurable attributes of objects and the units, systems and processes of measurement are powerful tools for making sense of the world around them.</p>	
<p>Program of Studies: Skills and Concepts MA-HS-M-S-SM5 Students will compare and contrast the use of US Customary and metric systems of measurement.</p>	
<p>MA-HS-M-U-2 Students will understand that numerical values associated with measurements of physical quantities must be assigned units of measurement or dimensions.</p>	

STANDARDS

PAGE REFERENCES

MA-HS-M-S-MPA1

Students will apply units of measurements of physical quantities correctly in expressions, equations and problem solutions that involve measurement.

MA-HS-M-S-MPA4

Students will describe how change in one or more dimensions of a geometric figure or object affects the perimeter, circumference, area and/or volume of the figure or object.

MA-HS-M-S-SM1

Students will convert a measurement using one unit of measurement to another unit of measurement given the relationship between the units (e.g., miles per hour to feet per second, °F to °C).

MA-HS-M-S-SM2

Students will apply to both real world and mathematical situations US Customary and metric systems of measurement.

MA-HS-M-S-SM3

Students will make decisions about units and scales that are appropriate for problem solving situations involving measurement.

MA-HS-2.1.2

Students will describe how a change in one or more dimensions of a geometric figure affects the perimeter, area and volume of the figure.

DOK 3

This standard can be met in Glencoe's *Geometry* © 2008 on the following pages.

Student Edition:

55, 56, 65, 635, 645, 690, 716, 734

MA-HS-2.2.1

Students will continue to apply to both real-world and mathematical problems U.S. customary and metric systems of measurement.

Student Edition:

353 ex 3, 354 ex 6, 355 #8-#9

Teacher Wraparound Edition:

AIN 354; ICE 353; MTL 352

MA-HS-M-U-3

Students will understand that measurements are determined by using appropriate techniques, tools, formulas and degree of accuracy needed for the situation.

STANDARDS

PAGE REFERENCES

MA-HS-M-S-MPA2

Students will analyze precision, accuracy and approximate error in measurement situations.

MA-HS-M-S-MPA3

Students will determine the surface area and volume of right rectangular prisms, pyramids, cylinders, cones and spheres in realistic problems.

MA-HS-M-S-MPA5

Students will explore the relationships between the right triangle trigonometric functions, using technology (e.g., graphing calculator) as appropriate.

MA-HS-M-S-MPA6

Students will apply definitions and properties of right triangle relationships (basic right triangle trigonometry and the Pythagorean theorem) to determine length and angle measures to solve realistic problems

MA-HS-M-S-MPA7

Students will apply special right triangles and the converse of the Pythagorean theorem to solve realistic problems.

MA-HS-M-S-MPA8

Students will explore periodic real-world phenomena, using technology (e.g., graphing calculator) as appropriate.

MA-HS-M-S-SM4

Students will use unit analysis to check measurement computations.

MA-HS-2.1.1

Students will determine the surface area and volume of right rectangular prisms, pyramids, cylinders, cones and spheres in real-world and mathematical problems.
DOK 2

Student Edition:

168 #46, 178 #35, 187 #44, 192 ex 5, 226 #13, 227 #44, 233 #9, 235 #10, 492 #50, 549 #8, 701 #68, 975 #50

MA-HS-2.1.3

Students will apply definitions and properties of right triangle relationships (right triangle trigonometry and the Pythagorean theorem) to determine length and angle measures to solve real-world and mathematical problems.
DOK 3

Student Edition:

286 ex 4, 291, 294 ex 4, 298 #50, 306 ex 2, 327, 337 #37-#39, 340 ex 1, 341 #1, 423, 489 ex 6, 616 ex 2, 620 #11, 632 ex 1

Teacher Wraparound Edition:

A 290; ICE 286, 294, 423, 489

MA-HS-2.1.4

Students will apply special right triangles and the converse of the Pythagorean theorem to solve real-world problems.

Student Edition:

286 ex 4, 291, 294 ex 4, 298 #50, 306 ex 2, 327, 337 #37-#39, 340 ex 1, 341 #1, 423, 489 ex 6, 616 ex 2, 620 #11, 632 ex 1

Teacher Wraparound Edition:

A 290; ICE 286, 294, 423, 489

STANDARDS**PAGE REFERENCES****Big Idea: Geometry**

High school students expand analysis of two-dimensional figures and three-dimensional objects. They translate figures in a coordinate plane. They extend work with congruent and similar figures, including proportionality.

Academic Expectations

- 2.9** Students understand space and dimensionality concepts and use them appropriately and accurately.
- 2.10** Students understand measurement concepts and use them appropriately and accurately.
- 2.12** Students understand mathematical structure concepts including the properties and logic of various mathematical systems.

Program of Studies: Understandings**MA-HS-G-U-1**

Students will understand that characteristics and properties of two-dimensional figures and three-dimensional objects describe the world and are used to develop mathematical arguments about geometric relationships and to evaluate the arguments of others.

Program of Studies: Skills and Concepts**MA-HS-G-S-SR1**

Students will identify and apply the definitions, properties and theorems about line segments, rays and angles and use them to prove theorems in Euclidean geometry, solve problems and perform basic geometric constructions using a straight edge and a compass.

MA-HS-G-S-SR2

Students will identify and apply properties and theorems about parallel and perpendicular lines and use them to prove theorems and to perform constructions.

MA-HS-G-S-SR3

Students will analyze and apply angle relationships (e.g., linear pairs, vertical, complementary, supplementary, corresponding and alternate interior angles) in real-world or mathematical situations.

MA-HS-G-S-SR4

Students will use the definitions, properties and theorems about congruent and similar triangles and other figures to prove additional theorems and apply these to solve real-world problems.

MA-HS-G-S-SR5

Students will use the definitions and basic properties of a circle (e.g., arcs, chords, central angles, inscribed angles) to prove basic theorems and solve problems.

MA-HS-G-S-SR6

Students will analyze and apply spatial relationships (not using Cartesian coordinates) among points, lines and planes (e.g., "betweenness" of points, midpoint, segment length, collinear, coplanar, parallel, perpendicular, skew).

STANDARDS

PAGE REFERENCES

MA-HS-G-S-SR7

Students will classify, determine attributes of, analyze and apply properties of two-dimensional geometric figures and three-dimensional objects.

MA-HS-G-S-SR8

Students will describe the intersection of lines, planes and solids and visualize three-dimensional objects and spaces from different perspectives and analyze their cross sections.

MA-HS-G-S-SR9

Students will classify and apply properties of three-dimensional geometric figures.

MA-HS-G-S-SR10

Students will visualize solids and surfaces in three-dimensional space when given two-dimensional representations and create two-dimensional representations for the surfaces of three-dimensional objects.

MA-HS-G-S-FS3

Students will establish the validity of geometric conjectures using deduction, prove theorems and critique arguments made by others.

MA-HS-G-S-SR13

Students will explore geometry to make and test conjectures using geometric tools and technology.

MA-HS-G-S-FS1

Students will identify, explain the necessity of and give examples of definitions, axioms and theorems.

MA-HS-G-S-FS2

Students will explore geometries other than Euclidean geometry, in which the parallel postulate is not true.

Related Core Content for Assessment**MA-HS-3.1.1**

Students will analyze and apply spatial relationships (not using Cartesian coordinates) among points, lines and planes (e.g., betweenness of points, midpoint, segment length, collinear, coplanar, parallel, perpendicular, skew).

DOK 2

Coordinate planes can be found on the following pages:

Student Edition:

32-37, 51 #32, 56 #29, 59 #47-#52, 273 #8, 471 ex 1, 557 ex 5, 615, 633, 643

Teacher Wraparound Edition:

A 37; AIN 34; EC 37; ICE 32, 34, 35

MA-HS-3.1.2

Students will use spatial relationships to prove basic theorems.

Student Edition:

36 #11, 92 ex 4, 93 #14, 302 #20-#21, 549 #2, 623, 624 ex 1, 626 ex 3, 628 #412

Teacher Wraparound Edition:

ICE 92, 346, 626

STANDARDS	PAGE REFERENCES
<p>MA-HS-3.1.3 Students will analyze and apply angle relationships (e.g., linear pairs, vertical, complementary, supplementary, corresponding and alternate interior angles) in real-world and mathematical problems. DOK 2</p>	<p>Student Edition: 302 #3, 305-311, 314 ex 1, 316-317</p>
<p>MA-HS-3.1.4 Students will use angle relationships to prove basic theorems.</p>	<p>Student Edition: 302 #3, 305-311, 314 ex 1, 316-317</p>
<p>MA-HS-3.1.5 Students will classify and apply properties of two-dimensional geometric figures (e.g., number of sides, vertices, length of sides, sum of interior and exterior angle measures). DOK 2</p>	<p>Student Edition: 36 #11, 273 #3, 483 #3, 613 #3, 617 ex 3, 620 #23-#27, 640 #55, 652 #51, 688 #13, 887 #2, 948 #57</p> <p>Teacher Wraparound Edition: EC 621; TT 617</p>
<p>MA-HS-3.1.6 Students will know the definitions and basic properties of a circle and will use them to prove basic theorems and solve problems.</p>	<p>Student Edition: 95 #31, 105 #62, 283 #78, 300 ex 3, 317 #30, 343-351, 476 #32, 548 ex 1, 612 ex 2, 623-630, 969 #1</p> <p>Teacher Wraparound Edition: ICE 300, 346</p>
<p>MA-HS-3.1.7 Students will solve real-world and mathematical problems by applying properties of triangles (e.g., Triangle Sum theorem and Isosceles Triangle theorems). DOK 2</p>	<p>Student Edition: 36 #31, 71 #33, 302 #8, 326 #40, 419 #10, 473 ex 3, 483 #10, 516 ex 4, 619 #3, 620 #9, 621 #30, 833 #56</p>
<p>MA-HS-3.1.8 Students will use the properties of triangles to prove basic theorems.</p>	<p>Student Edition: 36 #31, 71 #33, 302 #8, 326 #40, 419 #10, 473 ex 3, 483 #10, 516 ex 4, 619 #3, 620 #9, 621 #30, 833 #56</p>
<p>MA-HS-3.1.9 Students will classify and apply properties of three-dimensional geometric figures. DOK 2</p>	<p>This standard can be met in Glencoe's <i>Geometry</i> © 2008 on the following pages.</p> <p>Student Edition: 60-66</p>
<p>MA-HS-3.1.10 <i>Students will describe the intersection of a plane with a three-dimensional figure.</i></p>	<p>Student Edition: 623</p>
<p>MA-HS-3.4.1 Students will identify definitions, axioms and theorems, explain the necessity for them and give examples of them.</p>	<p>This standard can be met in Glencoe's <i>Geometry</i> © 2008 on the following pages.</p> <p>Student Edition: 105-109</p>

STANDARDS	PAGE REFERENCES
<p>MA-HS-3.4.2 Students will recognize that there are geometries, other than Euclidean geometry, in which the parallel postulate is not true.</p>	<p>This standard can be met in Glencoe's <i>Geometry</i> © 2008 on the following pages. Student Edition: 188-189, 395 #56</p>
<p>MA-HS-G-U-2 Students will understand that representational systems, including coordinate geometry, are means for specifying locations and describing spatial relationships and are organizers for making sense of the world around them.</p>	
<p>MA-HS-G-S-CG1 Students will express the intuitive concept of the “slant” of a line as slope, use the coordinates of two points on a line to determine its slope and use slope to express the parallelism and perpendicularity of lines.</p> <p>MA-HS-G-S-CG2 Students will describe a line by a linear equation.</p> <p>MA-HS-G-S-CG3 Students will find the distance between two points using their coordinates and the Pythagorean theorem or the distance formula.</p> <p>MA-HS-G-S-CG4 Students will find the equation of a circle given its center and radius; given the equation of a circle, find its center and radius.</p> <p>MA-HS-G-S-CG5 Students will find the midpoint of a segment when the coordinates of the endpoints are identified.</p> <p>MA-HS-G-S-CG6 Students will use Cartesian coordinates and other coordinate systems (e.g., navigational, polar, spherical systems) to analyze geometric situations.</p> <p>MA-HS-G-S-CG7 Students will investigate conjectures and solve problems involving two-dimensional figures and three dimensional objects represented graphically.</p> <p>MA-HS-G-S-CG8 Students will use a variety of technological tools to explore and test conjectures about slope, midpoints and other geometric ideas that can be expressed using the Cartesian plane.</p>	
<p>MA-HS-3.3.1 Students will apply algebraic concepts and graphing in the coordinate plane to analyze and solve problems (e.g., finding the final coordinates for a specified polygon, midpoints, between-ness of points, parallel and perpendicular lines, the distance between two points, the slope of a segment). DOK 2</p>	<p>Student Edition: 32-37, 51 #32, 56 #29, 59 #47-#52, 273 #8, 471 ex 1, 557 ex 5, 615, 633, 643 Teacher Wraparound Edition: A 37; AIN 34; EC 37; ICE 32, 34, 35</p>
<p>MA-HS-G-U-3 Students will understand that transformations and symmetry are used to analyze real-world situations (e.g., art, nature, construction and scientific exploration).</p>	

STANDARDS	PAGE REFERENCES
<p>MA-HS-G-S-TS1 Students will understand and represent transformations within a plane (translations, reflections, rotations and dilations) of figures by using sketches, coordinates, vectors, function notation, matrices and technology.</p> <p>MA-HS-G-S-TS2 Students will use various representations, including electronic displays, to understand the effects of simple transformations within a plane and compositions of transformations.</p>	
<p>MA-HS-3.2.1 Students will identify and describe properties of and apply geometric transformations within a plane to solve real-world and mathematical problems.</p> <p style="text-align: right;">DOK 3</p>	<p>Student Edition: 88-96, 104 #53, 121 #28-#33, 123 #1, 535-542, 546 #53-#54</p> <p>Teacher Wraparound Edition: A 96, 542; AIN 539; EC 96, 542; ICE 89, 90, 91, 92, 536, 537, 538; TT 91</p>
<p>MA-HS-G-U-4 Students will understand that similarity of figures and scale factors are used to analyze and solve problems.</p>	
<p>MA-HS-G-S-SR4 Students will use the definitions, properties and theorems about congruent and similar triangles and other figures to prove additional theorems and apply these to solve real-world problems.</p> <p>MA-HS-G-S-SR7 Students will classify, determine attributes of, analyze and apply properties of two-dimensional geometric figures and three-dimensional objects.</p>	
<p>MA-HS-3.1.12 Students will apply the concepts of congruence and similarity to solve real-world and mathematical problems.</p> <p style="text-align: right;">DOK 3</p>	<p>Student Edition: 92 ex 4, 93 #14, 483 #8, 717 #25 <i>Graphing Calculator Exploration 284</i></p>
<p>MA-HS-3.1.13 Students will prove triangles congruent and similar.</p>	<p>Student Edition: 483 #8 <i>Graphing Calculator Exploration 284</i></p>
<p>MA-HS-G-U-5 Students will understand that visualization, spatial reasoning and geometric relationships model real-world situations.</p>	

STANDARDS

PAGE REFERENCES

MA-HS-G-S-SR10

Students will visualize solids and surfaces in three-dimensional space when given two-dimensional representations and create two-dimensional representations for the surfaces of three-dimensional objects.

MA-HS-G-S-SR11

Students will draw and construct representations of two-dimensional figures and three-dimensional objects using a variety of tools.

MA-HS-G-S-SR12

Students will use geometric models and ideas to gain insights into and answer questions in other areas of mathematics and into other disciplines and areas of interest, such as art and architecture.

MA-HS-G-S-SR13

Students will explore geometry to make and test conjectures using geometric tools and technology.

MA-HS-G-S-FS4

Students will perform constructions such as a line parallel to a given line through a point not on the line, the perpendicular bisector of a line segment and the bisector of an angle.

MA-HS-3.1.11

Students will visualize solids and surfaces in three-dimensional space when given two-dimensional representations (e.g., nets, multiple views) and create two-dimensional representations for the surfaces of three-dimensional objects.

Student Edition:

227 #43

MA-HS-3.4.3

Students will be able to perform constructions such as a line parallel to a given line through a point not on the line, the perpendicular bisector of a line segment and the bisector of an angle.

This standard can be met in Glencoe's *Geometry* © 2008 on the following pages.

Student Edition:

25, 35, 172, 182, 186, 266, 268

Big Idea: Data Analysis and Probability

High school students extend data representations, interpretations and conclusions. They describe data distributions in multiple ways and connect data gathering issues with data interpretation issues. They relate curve-of-best-fit with two-variable data and determine a line-of-best-fit for a given set of data. They distinguish between combinations and permutations and compare and contrast theoretical and experimental probability.

Academic Expectations

2.8 Students understand various mathematical procedures and use them appropriately and accurately.

2.13 Students understand and appropriately use statistics and probability.

Program of Studies: Understandings**MA-HS-DAP-U-1**

Students will understand that quantitative literacy is a necessary tool to be an intelligent consumer and citizen.

STANDARDS

PAGE REFERENCES

Program of Studies: Skills and Concepts**MA-HS-DAP-S-DR1**

Students will be familiar with the definitions of measurement data and categorical data, univariate and bivariate data and the term variable.

MA-HS-DAP-S-CDS1

Students will understand the distinction between a statistic and a parameter.

MA-HS-DAP-U-2

Students will understand that data analysis requires developing a plan for collecting, organizing and analyzing data in order to make decisions.

MA-HS-DAP-S-CDS12

Students will evaluate reports based on data published in the media by considering the source of the data, the design of the study and the way the data are displayed and analyzed.

MA-HS-DAP-S-ES1

Students will understand and explain the differences among various kinds of studies (e.g., randomized experiments and observational studies) and which types of inferences can be legitimately be drawn from each.

MA-HS-DAP-S-ES2

Students will know the characteristics of well-designed studies, including the role of randomization in surveys and experiments.

MA-HS-DAP-S-ES3

Students will use simulations to explore the variability of sample statistics from a known population and to construct sampling distributions.

MA-HS-DAP-S-ES4

Students will evaluate published reports that are based on interpretations of data by examining the design of the study, the appropriateness of the data analysis and the validity of the conclusions.

MA-HS-DAP-S-ES5

Students will explain the impact of sampling methods, bias and the phrasing of questions asked during data collection and the conclusions that can be justified.

MA-HS-DAP-S-ES6

Students will design and conduct simple experiments or investigations to collect data to answer student generated questions.

MA-HS-4.3.1

Students will recognize potential for bias resulting from the misuse of sampling methods (e.g., non-random sampling, polling only a specific group of people, using limited or extremely small sample sizes) and explain why these samples can lead to inaccurate inferences.

DOK 2

This standard can be met in Glencoe's *Algebra 1* © 2008 on the following pages.

Student Edition:

642-648

STANDARDS	PAGE REFERENCES
<p>MA-HS-4.3.2 <i>Students will design simple experiments or investigations to collect data to answer questions of interest.</i></p>	<p>Student Edition: 927-932, 936 #29-#40 <i>Graphing Calculator Exploration 877</i> Teacher Wraparound Edition: A 932; AIN 929; EC 932; ICE 928, 929</p>
<p>MA-HS-4.3.3 <i>Students will explain the differences between randomized experiments and observational studies.</i></p>	<p>This standard can be met during teacher/class discussion.</p>
<p>MA-HS-DAP-U-3 <i>Students will understand that graphical and numerical techniques can be used to study patterns and analyze data.</i></p> <p>MA-HS-DAP-S-DR3 <i>Students will display the distribution, analyze patterns and describe relationships in paired data for univariate measurement data.</i></p> <p>MA-HS-DAP-S-DR4 <i>Students will display a scatterplot and describe its shape for bivariate data.</i></p> <p>MA-HS-DAP-S-DR5 <i>Students will display and discuss bivariate data where at least one variable is categorical.</i></p> <p>MA-HS-DAP-S-DR6 <i>Students will organize and display data using appropriate methods (e.g., spreadsheets and graphing calculators) to detect patterns and departures from patterns.</i></p> <p>MA-HS-DAP-S-CDS2 <i>Students will describe the shape and select and calculate summary statistics for univariate measurement data, using technological tools as necessary.</i></p> <p>MA-HS-DAP-S-CDS3 <i>Students will recognize how linear transformations of univariate data affect shape, center and spread.</i></p> <p>MA-HS-DAP-S-CDS4 <i>Students will determine regression coefficients, regression equations and correlation coefficients for bivariate data using technological tools.</i></p> <p>MA-HS-DAP-S-CDS5 <i>Students will apply line-of-best fit equations for a set of two-variable data to make predictions.</i></p> <p>MA-HS-DAP-S-CDS6 <i>Students will collect, organize and display bivariate data and use a curve of best fit as a model to make predictions.</i></p> <p>MA-HS-DAP-S-CDS7 <i>Students will identify trends in bivariate data and find functions that model the data or transform the data, so that they can be modeled.</i></p>	

STANDARDS	PAGE REFERENCES
<p>MA-HS-4.1.1 Students will analyze and make inferences from a set of data with no more than two variables, and will analyze problems for the use and misuse of data representations. DOK 3</p>	<p>Student Edition: 38-44, 51 #31, 60 #53, 61 #69, 145 #49, 151 #51, 258-264, 739 #7, 743 ex 4, 744 #6, 745 #15, 747 #21</p> <p>Teacher Wraparound Edition: AIN 40, 260; EC 44</p>
<p>MA-HS-4.1.2 Students will construct data displays for data with no more than two variables. DOK 2</p>	<p>Student Edition: 38-44, 51 #31, 60 #53, 61 #69, 145 #49, 151 #51, 258-264, 739 #7, 743 ex 4, 744 #6, 745 #15, 747 #21</p> <p>Teacher Wraparound Edition: AIN 40, 260; EC 44</p>
<p>MA-HS-4.2.3 Students will:</p> <ul style="list-style-type: none"> • identify an appropriate curve of best fit (linear, quadratic, exponential) for a set of two-variable data; • determine a line of best fit equation for a set of linear two-variable data and • apply a line of best fit to make predictions within and beyond a given set of two-variable data. DOK 3 	<p>Student Edition: 38-44, 51 #31, 60 #53, 61 #69, 145 #49, 151 #51, 258-264, 739 #7, 743 ex 4, 744 #6, 745 #15, 747 #21</p> <p>Teacher Wraparound Edition: AIN 40, 260; EC 44</p>
<p>MA-HS-DAP-U-4 Students will understand that the choice of data display can affect the visual message communicated.</p>	
<p>MA-HS-DAP-S-DR2 Students will apply histograms, parallel box plots and scatterplots to display data.</p>	
<p>MA-HS-DAP-S-DR7 Students will identify and explain misleading uses of data displays.</p>	
<p>MA-HS-DAP-U-5 Students will understand that inferences and predictions from data are used to make critical and informed decisions.</p>	

STANDARDS

PAGE REFERENCES

MA-HS-DAP-S-CDS8

Students will understand how simple statistics reflect the values of population parameters and use sampling distributions as the basis for informal inference.

MA-HS-DAP-S-CDS9

Students will explore how basic statistical techniques monitor process characteristics in the workplace.

MA-HS-DAP-S-CDS10

Students will compare data sets using graphs and summary statistics.

MA-HS-DAP-S-CDS11

Students will know the characteristics of the Gaussian normal distribution (bell-shaped curve).

MA-HS-DAP-S-CDS12

Students will evaluate reports based on data published in the media by considering the source of the data, the design of the study and the way the data are displayed and analyzed.

MA-HS-DAP-S-CDS13

Students will identify and explain misleading uses of data.

MA-HS-4.2.1

Students will describe and compare data distributions and make inferences from the data based on the shapes of graphs, measures of center (mean, median, mode) and measures of spread (range, standard deviation). DOK 2

Student Edition:

38-44, 51 #31, 60 #53, 61 #69, 145 #49, 151 #51, 258-264, 739 #7, 743 ex 4, 744 #6, 745 #15, 747 #21

Teacher Wraparound Edition:

AIN 40, 260; EC 44

MA-HS-4.2.2

Students will know the characteristics of the Gaussian normal distribution (bell-shaped curve).

Student Edition:

918-925, 932 #34, 935 #23-#28, 937 #42
Graphing Calculator Exploration 926

Teacher Wraparound Edition:

A 925, 926; EC 925; F 927; MTL 919, 926

MA-HS-4.2.4

Students will recognize when arguments based on data confuse correlation and causation.

Student Edition:

38-44

MA-HS-DAP-U-6

Students will understand that probability can be used to make decisions or predictions or to draw conclusions.

STANDARDS**PAGE REFERENCES****MA-HS-DAP-S-P1**

Students will design and conduct probability simulations and interpret the results.

MA-HS-DAP-S-P2

Students will apply the concepts of sample space and probability distribution to construct sample spaces and distributions in simple cases.

MA-HS-DAP-S-P3

Students will design simulations to construct empirical probability distributions and report/interpret the results.

MA-HS-DAP-S-P4

Students will compute and interpret the expected value of random variables in simple cases.

MA-HS-DAP-S-P5

Students will apply the concepts of conditional probability and independent events and be able to compute those probabilities.

MA-HS-DAP-S-P6

Students will compute the probability of a compound event.

MA-HS-DAP-S-P7

Students will explain how probability quantifies the likelihood that an event occurs in terms of numbers.

MA-HS-DAP-S-P8

Students will explain how the relative frequency of a specified outcome of an event can be used to estimate the probability of the outcome.

MA-HS-DAP-S-P9

Students will explain how the law of large numbers can be applied in simple examples.

MA-HS-DAP-S-P10

Students will determine and compare theoretical and experimental probabilities.

MA-HS-DAP-S-P11

Students will determine the probability of an event and the probability of its complement.

MA-HS-DAP-S-P12

Students will make predictions and draw inferences from probabilities. And apply probability concepts to practical situations to make informed decisions.

MA-HS-DAP-S-P13

Students will determine probabilities involving replacement and non-replacement.

MA-HS-DAP-S-P14

Students will recognize and identify the differences between combinations and permutations and use them to count discrete quantities.

MA-HS-DAP-S-P15

Students will represent probabilities in multiple ways (e.g., fractions, decimals, percentages, geometric area models).

STANDARDS	PAGE REFERENCES
<p>MA-HS-4.4.1 Students will:</p> <ul style="list-style-type: none"> • determine theoretical and experimental (from given data) probabilities; • make predictions and draw inferences from probabilities; • compare theoretical and experimental probabilities and • determine probabilities involving replacement and non-replacement. <p style="text-align: right;">DOK 3</p>	<p>Student Edition: 837, 838 ex 1, 839 ex 2, 843 #6, 852-858, 859-867, 868-874, 884 #41-#43, 885 #51</p> <p>Teacher Wraparound Edition: A 867, 874; AIN 854, 862, 869; EC 873; ICE 838, 839, 860, 861, 862; TT 838</p>
<p><i>MA-HS-4.4.2</i> <i>Students will recognize and identify the differences between combinations and permutations and use them to count discrete quantities.</i></p>	<p>Student Edition: 837-845, 846-851, 857 #44-#45, 867 #57, 882 #14-#26</p> <p>Teacher Wraparound Edition: A 845, 851; AIN 841, 848; EC 845, 850; F 846, 852; FTC 838; ICE 838, 839, 840, 841, 842, 847</p>
<p><i>MA-HS-4.4.3</i> <i>Students will represent probabilities in multiple ways, such as fractions, decimals, percentages and geometric area models.</i></p>	<p>Student Edition: 837, 838 ex 1, 839 ex 2, 843 #6, 852-858, 859-867, 868-874, 884 #41-#43, 885 #51</p> <p>Teacher Wraparound Edition: A 867, 874; AIN 854, 862, 869; EC 873; ICE 838, 839, 860, 861, 862; TT 838</p>
<p>MA-HS-4.4.4 Students will explain how the law of large numbers can be applied in simple examples.</p>	<p>This standard can be met in Glencoe's <i>Algebra 1</i> © 2008 on the following pages.</p> <p>Student Edition: 678</p>
<p>Big Idea: Algebraic Thinking High school students extend analysis and use of functions and focus on linear, quadratic, absolute value and exponential functions. They explore parametric changes on graphs of functions. They use rules and properties to simplify algebraic expressions. They combine simple rational expressions and simple polynomial expressions. They factor polynomial expressions and quadratics of the form $1x^2+bx+c$.</p> <p>Academic Expectations</p> <p>2.7 Students understand number concepts and use numbers appropriately and accurately.</p> <p>2.8 Students understand various mathematical procedures and use them appropriately and accurately.</p> <p>2.11 Students understand mathematical change concepts and use them appropriately and accurately.</p> <p>2.12 Students understand mathematical structure concepts including the properties and logic of various mathematical systems.</p>	

STANDARDS	PAGE REFERENCES
<p>Program of Studies: Understandings MA-HS-AT-U-1 Students will understand that patterns, relations and functions are tools that help explain or predict real-world phenomena.</p>	
<p>Program of Studies: Skills and Concepts MA-HS-AT-S-PRF1 Students will use explicitly-defined or recursively defined functions to generalize patterns.</p>	
<p>Related Core Content for Assessment</p> <p>MA-HS-5.1.1 Students will identify multiple representations (tables, graphs, equations) of functions (linear, quadratic, absolute value, exponential) in real-world or mathematical problems. DOK 2</p>	<p>Student Edition: 5-12, 20-25, 59 #31-#38 <i>Graphing Calculator Exploration 26</i></p> <p>Teacher Wraparound Edition: ICE 5, 6, 21, 22</p>
<p>MA-HS-AT-U-2 Students will understand that there are relationships between and among patterns and functions, their representations and their properties.</p>	

STANDARDS

PAGE REFERENCES

MA-HS-AT-S-PRF1

Students will use explicitly-defined or recursively defined functions to generalize patterns.

MA-HS-AT-S-PRF2

Students will understand relations and functions and use various representations for them.

MA-HS-AT-S-PRF6

Students will interpret representations of functions of two variables.

MA-HS-AT-S-PRF9

Students will determine whether a relationship given in symbolic or graphical form is a function.

MA-HS-AT-S-PRF11

Students will understand functional notation and evaluate a function at a specified point in its domain.

MA-HS-AT-S-PRF12

Students will combine functions by addition, subtraction, multiplication and compositions.

MA-HS-AT-S-PRF13

Students will graph linear, absolute value, quadratic and exponential functions and identify their key characteristics.

MA-HS-AT-S-PRF16

Students will see the patterns in arithmetic and geometric sequences using recursion.

MA-HS-AT-S-PRF17

Students will see patterns in other sequences (e.g., quadratic, cubic).

MA-HS-AT-S-PRF18

Students will relate the patterns in arithmetic sequences to linear functions.

MA-HS-AT-S-PRF19

Students will relate the patterns in geometric sequences to exponential functions.

MA-HS-5.1.1

Students will identify multiple representations (tables, graphs, equations) of functions (linear, quadratic, absolute value, exponential) in real-world or mathematical problems. DOK 2

Student Edition:

5-12, 20-25, 59 #31-#38
Graphing Calculator Exploration 26
Teacher Wraparound Edition:
 ICE 5, 6, 21, 22

MA-HS-5.1.2

Students will identify, relate and apply representations (graphs, equations, tables) of a piecewise function (such as long distance telephone rates) from mathematical or real-world information.

Student Edition:

45-51, 56 #28, 60 #54-#58, 61 #3, 72 #40, 196 #46
Teacher Wraparound Edition:
 A 51; AIN 47; EC 51; FTC 46; ICE 45, 46, 47, 48;
 MTL 45

MA-HS-5.1.4

Students will recognize and solve problems that can be modeled using an exponential function, such as compound interest problems.

Student Edition:

704, 706 ex 2, 707 ex 3, 708 #8-#9, 709 #24-#26, 710 #28, 714 #5-#7, 715 #12, 716 #7, 717 #8, 725 #68, 750 #27-#29, 753 #75
Teacher Wraparound Edition:
 A 711; EC 711, 717; ICE 706, 707, 713; MTL 704

STANDARDS	PAGE REFERENCES
<p>MA-HS-5.1.5 Students will:</p> <ul style="list-style-type: none"> • determine if a relation is a function; • determine the domain and range of a function (linear and quadratic); • determine the slope and intercepts of a linear function; • determine the maximum, minimum, and intercepts (roots/zeros) of a quadratic function and • evaluate a function written in function notation for a specified rational number. DOK 2 	<p>Student Edition: 5-11, 19 #34, 25 #44, 31 #1, 37 #39, 44 #18, 51 #36, 61 #67, 72 #44, 105 #6, 111 #32</p> <p>Teacher Wraparound Edition: A 12; AIN 7; ICE 5, 6, 7</p>
<p>MA-HS-5.1.8 Students will identify the changes and explain how changes in parameters affect graphs of functions (linear, quadratic, absolute value, exponential) (e.g., compare $y = x^2$, $y = 2x^2$, $y = (x-4)^2$, and $y = x^2+3$). DOK 2</p>	<p>Student Edition: <i>Graphing Calculator Exploration 26</i></p>
<p>MA-HS-AT-U-3 Students will understand that algebra represents mathematical situations and structures for analysis and problem solving.</p>	

STANDARDS**PAGE REFERENCES**

MA-HS-AT-S-VEO1 Students will write expressions, equations, inequalities and relations in equivalent forms.

MA-HS-AT-S-VEO2

Students will use symbolic algebra to represent and explain mathematical relationships.

MA-HS-AT-S-VEO3

Students will use symbolic expressions, including iterative and recursive forms, to represent relationships among various contexts.

MA-HS-AT-S-VEO4

Students will judge the meaning, utility and reasonableness of the results of symbol manipulations, including those carried out using technology.

MA-HS-AT-S-VEO5

Students will understand the properties of integer exponents and roots and apply these properties to simplify algebraic expressions.

MA-HS-AT-S-VEO6

Students will add, subtract and multiply polynomials.

MA-HS-AT-S-VEO7

Students will divide a polynomial by a first-degree polynomial.

MA-HS-AT-S-VEO8

Students will factor polynomials by removing the greatest common factor.

MA-HS-AT-S-VEO9

Students will factor quadratic polynomials.

MA-HS-AT-S-VEO10

Students will determine when an expression is undefined.

MA-HS-AT-S-VEO11

Students will add, subtract, multiply, divide and simplify rational expressions.

MA-HS-AT-S-VEO12

Students will evaluate polynomial and rational expressions and expressions containing radicals and absolute values at specified values of their variables.

MA-HS-AT-S-EI1

Students will write equivalent forms of equations, inequalities and systems of equations and inequalities and solve them with fluency - mentally or with paper and pencil in simple cases and using technology in all cases.

MA-HS-AT-S-EI2

Students will draw reasonable conclusions about a situation being modeled.

MA-HS-AT-S-EI3

Students will solve one-variable equations and inequalities using manipulatives, symbols, procedures and graphing, including graphing the solution set on a number line.

STANDARDS	PAGE REFERENCES
<p>MA-HS-AT-S-EI4 Students will solve linear equations and inequalities in one variable including those involving the absolute value of a linear function.</p> <p>MA-HS-AT-S-EI5 Students will solve an equation involving several variables for one variable in terms of the others.</p> <p>MA-HS-AT-S-EI6 Students will solve systems of two linear equations in two variables.</p> <p>MA-HS-AT-S-EI7 Students will solve systems of three linear equations in three variables.</p> <p>MA-HS-AT-S-EI8 Students will solve quadratic equations in one variable.</p> <p>MA-HS-AT-S-EI9 Students will approximate and interpret rates of change from graphical and numerical data.</p>	
<p>MA-HS-5.2.1 Students will apply order of operations, real number properties (identity, inverse, commutative, associative, distributive, closure) and rules of exponents (integer) to simplify algebraic expressions. DOK 1</p>	<p>Student Edition: 31 #55, 37 #40, 86 #64, 96 #42, 118 #28, 145 #53, 184 ex 4, 202 ex 2, 203 #6, 235 #33, 312 #60, 695-703, 716 #18, 717 #3-#5, 750 #19-#20, 753 #1</p> <p>Teacher Wraparound Edition: A 703; EC 702; FTC 699; ICE 697, 698, 699; TT 697</p>
<p>MA-HS-5.2.2 Students will evaluate polynomial and rational expressions and expressions containing radicals and absolute values at specified values of their variables.</p>	<p>Student Edition: 7 ex 6, 8 ex 7, 9 #13-#14, 11 #41-#46, 25 #43, 31 #32, 58 #11-#17, 125 #6, 203 #9</p> <p>Teacher Wraparound Edition: EC 11; ICE 7, 8</p>
<p>MA-HS-5.2.3 Students will:</p> <ul style="list-style-type: none"> • add, subtract and multiply polynomial expressions; • factor polynomial expressions using the greatest common monomial factor and • factor quadratic polynomials of the form $ax^2 + bx + c$, when $a = 1$ and b and c are integers. <p>DOK 2</p>	<p>Student Edition: 184 ex 4, 202 ex 2, 203 #6</p>
<p>MA-HS-5.2.4 <i>Students will factor quadratic polynomials, such as perfect square trinomials and quadratic polynomials of the form $ax^2 + bx + c$ when $a \neq 1$ and b and c are integers.</i></p>	<p>Student Edition: 202 ex 1, 203 #1, 210 #9, 213 ex 1, 214 ex 1, 217, 218 ex 5, 219 #9, 220 #3, #29, 268 #16</p> <p>Teacher Wraparound Edition: FTC 214; ICE 214</p>

STANDARDS	PAGE REFERENCES
<p>MA-HS-5.2.5 Students will add, subtract, multiply and divide simple rational expressions with monomial first-degree denominators and integer numerators $\left(\text{e.g., } \frac{3}{5x} + \frac{4}{3y}; \frac{9}{2a} - \frac{-7}{4b}; \frac{-3}{-5x} \times \frac{-4}{7y}; \frac{5}{2c} \div \frac{9}{-11d} \right),$ and will express the results in simplified form. DOK 1</p>	<p>Student Edition: 180-188, 202 ex 1, 203 #1, 243-250 Teacher Wraparound Edition: H 181</p>
<p>MA-HS-5.3.1 Students will model, solve and graph first degree, single variable equations and inequalities, including absolute value, based in real-world and mathematical problems and graph the solutions on a number line. DOK 2</p>	<p>Student Edition: 37 #40, 38-44, 86 #64, 96 #42, 118 #28, 125 #6, 213-221, 228 #46, 235 #3, 236-242, 258-264, 653-661, 662-669 Teacher Wraparound Edition: A 44, 221, 264, 661; AIN 40, 260, 657; EC 44; FTC 214, 655; ICE 214, 656</p>
<p><i>MA-HS-5.3.2</i> <i>Students will solve for a specified variable in a multivariable equation.</i></p>	<p>This standard can be met in Glencoe's <i>Algebra 1</i> © 2008 on the following pages. Student Edition: 117-121</p>
<p>MA-HS-AT-U-4 Students will understand that real-world situations can be represented using mathematical models to analyze quantitative relationships.</p>	
<p>MA-HS-AT-S-PRF14 Students will recognize and solve problems that can be modeled using linear, absolute value, quadratic or exponential functions.</p>	
<p><i>MA-HS-5.1.2</i> <i>Students will identify, relate and apply representations (graphs, equations, tables) of a piecewise function (such as long distance telephone rates) from mathematical or real-world information.</i></p>	<p>Student Edition: 45-51, 56 #28, 60 #54-#58, 61 #3, 72 #40, 196 #46 Teacher Wraparound Edition: A 51; AIN 47; EC 51; FTC 46; ICE 45, 46, 47, 48; MTL 45</p>
<p><i>MA-HS-5.1.3</i> <i>Students will demonstrate how equations and graphs are models of the relationship between two real-world quantities (e.g., the relationship between degrees Celsius and degrees Fahrenheit).</i></p>	<p>Student Edition: 5-12, 20-25, 59 #31-#38 <i>Graphing Calculator Exploration 26</i> Teacher Wraparound Edition: ICE 5, 6, 21, 22</p>
<p>MA-HS-AT-U-5 Students will understand that functions are used to analyze change in various contexts and model real-world phenomena.</p>	

STANDARDS**PAGE REFERENCES****MA-HS-AT-S-PRF3**

Students will analyze functions by investigating rates of change, intercepts, zeros, asymptotes and local and global behavior.

MA-HS-AT-S-PRF10

Students will determine the domain of a function represented in either symbolic or graphical form.

MA-HS-AT-S-PRF15

Students will extend the ideas of transformations and parametric changes of linear function, such as vertical and horizontal shifts, to transformations of non-linear functions.

MA-HS-AT-S-PRF20

Students will solve problems that have direct or inverse relationships for any variable.

MA-HS-AT-S-EI10

Students will graph a linear equation and demonstrate that it has a constant rate of change.

MA-HS-AT-S-EI11

Students will relate the coefficients of a linear equation and the slope and x- and y-intercepts of its graph.

MA-HS-AT-S-EI12

Students will relate a solution of a system of two linear equations in two variables and the graphs of the corresponding lines.

MA-HS-AT-S-EI13

Students will graph the solution set of a linear inequality and identify whether the solution set is an open or closed half-plane.

MA-HS-AT-S-EI14

Students will graph the solution set of a system of two or three linear inequalities.

MA-HS-AT-S-EI15

Students will read information and draw conclusions from graphs and identify properties of a graph that provide useful information about the original problem.

MA-HS-AT-S-EI16

Students will graph a quadratic function and understand the relationship between its real zeros and the x-intercepts of the graph.

MA-HS-AT-S-EI17

Students will write and solve linear sentences, describing real-world situations by using and relating formulas, tables, graphs and equations.

MA-HS-AT-S-EI18

Students will recognize and solve problems that can be modeled using a linear equation in one variable, a quadratic equation or a system of linear equations.

MA-HS-AT-S-EI19

Students will use the skills learned to solve linear equations and inequalities to solve numerically, graphically or symbolically non-linear equations (e.g., absolute value, quadratic, exponential equations).

MA-HS-AT-S-EI20

Students will use graphing technology to explore the meaning of quadratic equations with complex solutions.

STANDARDS	PAGE REFERENCES
<p>MA-HS-5.1.4</p> <p>Students will recognize and solve problems that can be modeled using an exponential function, such as compound interest problems.</p>	<p>Student Edition: 704, 706 ex 2, 707 ex 3, 708 #8-#9, 709 #24-#26, 710 #28, 714 #5-#7, 715 #12, 716 #7, 717 #8, 725 #68, 750 #27-#29, 753 #75</p> <p>Teacher Wraparound Edition: A 711; EC 711, 717; ICE 706, 707, 713; MTL 704</p>
<p>MA-HS-5.1.5</p> <p>Students will:</p> <ul style="list-style-type: none"> • determine if a relation is a function; • determine the domain and range of a function (linear and quadratic); • determine the slope and intercepts of a linear function; • determine the maximum, minimum, and intercepts (roots/zeros) of a quadratic function and • evaluate a function written in function notation for a specified rational number. DOK 2 	<p>Student Edition: 5-11, 19 #34, 25 #44, 31 #1, 37 #39, 44 #18, 51 #36, 61 #67, 72 #44, 105 #6, 111 #32</p> <p>Teacher Wraparound Edition: A 12; AIN 7; ICE 5, 6, 7</p>
<p>MA-HS-5.1.6</p> <p><i>Students will find the domain and range for absolute value functions.</i></p>	<p>Student Edition: 5 ex 1, 6 ex 3, 9 #6-#7, 10 #20-#25, 19 #35, 31 #1</p> <p>Teacher Wraparound Edition: ICE 5, 6</p>
<p>MA-HS-5.1.7</p> <p><i>Students will apply and use direct and inverse variation to solve real-world and mathematical problems.</i></p>	<p>Student Edition: 189-196, 200 #56-#58</p> <p>Teacher Wraparound Edition: A 196; AIN 192; EC 196; ICE 190, 191, 192; MTL 190</p>
<p>MA-HS-5.1.8</p> <p>Students will identify the changes and explain how changes in parameters affect graphs of functions (linear, quadratic, absolute value, exponential) (e.g., compare $y = x^2$, $y = 2x^2$, $y = (x-4)^2$, and $y = x^2+3$). DOK 2</p>	<p>Student Edition: <i>Graphing Calculator Exploration 26</i></p>
<p>MA-HS-AT-U-6</p> <p>Students will understand that functions can be written in words, in a symbolic sentence or in a table or graph.</p>	

STANDARDS

PAGE REFERENCES

MA-HS-AT-S-PRF4

Students will transform functions (e.g., arithmetically combining, composing and inverting commonly used functions), using technology on more complicated symbolic expressions.

MA-HS-AT-S-PRF5

Students will understand and compare the properties of classes of functions (e.g., absolute value, step, exponential, polynomial, rational, logarithmic, periodic).

MA-HS-AT-S-PRF7

Students will use a variety of symbolic representations, including recursive and parametric equations, for functions and relations.

MA-HS-AT-S-PRF8

Students will identify essential quantitative relationships in a situation and determine the class or classes of functions that might model the relationship.

MA-HS-5.3.3

Students will model, solve and graph first degree, two-variable equations and inequalities in real-world and mathematical problems.

Student Edition:

37 #40, 38-44, 86 #64, 96 #42, 118 #28, 125 #6, 213-221, 228 #46, 235 #3, 236-242, 258-264, 653-661, 662-669

Teacher Wraparound Edition:

A 44, 221, 264, 661; AIN 40, 260, 657; EC 44; FTC 214, 655; ICE 214, 656

MA-HS-5.3.4

Students will model, solve and graph systems of two linear equations in real-world and mathematical problems. DOK 3

Student Edition:

67-72, 73-77, 86 #55, 96 #36, 104 #55, 120 #17-#19

Teacher Wraparound Edition:

A 72, 77; AIN 69, 75; EC 72, 76; ICE 74, 75

MA-HS-5.3.5

Students will write, graph, and solve systems of two linear inequalities based on real-world or mathematical problems and interpret the solution.

Student Edition:

107-111, 112-118, 122 #49-#51, 123 #54, 135 #43, 145 #45, 158 #50

Teacher Wraparound Edition:

A 111, 118; AIN 109, 114; EC 111, 118; F 112; FTC 108; ICE 108, 109, 113, 114; MTL 107

MA-HS-5.3.6

Students will model, solve and graph quadratic equations in real-world and mathematical problems. DOK 2

Student Edition:

202 ex 1, 203 #1, 210 #9, 213 ex 1, 214 ex 1, 217, 218 ex 5, 219 #9, 220 #3, #29, 268 #16

Teacher Wraparound Edition:

FTC 214; ICE 214