

ALGEBRA 1 ©2005
 Correlated to
 Kansas Mathematics Curriculum Standards
 Grades Nine-Ten

CONTENT STANDARDS	PAGE REFERENCES
Standard 1: Number and Computation The student uses numerical and computational concepts and procedures in a variety of situations.	
Benchmark 1: Number Sense The student demonstrates number sense for real numbers and algebraic expressions in a variety of situations.	
Ninth and Tenth Grades Knowledge Base Indicators The student...	
1. knows, explains, and uses equivalent representations for real numbers and algebraic expressions including integers, fractions, decimals, percents, ratios; rational number bases with integer exponents; rational numbers written in scientific notation; absolute value; time; and money (2.4.K1a) \$, e.g., $^{-}4/2 = (^{-}2)$; $a^{(-2)} b^{(3)} = b^3/a^2$.	SE: 5, 15, 68–69, 70–73, 79, 119, 144, 147, 155, 157, 172, 345–348, 361–362, 418–420, 425–430, 465–466, 567–569, 623–630, 684–689, 753, 798–799, 800–801, 802–805, 825, 842 TWE: 5, 15, 68–69, 70–73, 79, 119, 144, 147, 155, 157, 172, 345–348, 361–362, 418–420, 425–430, 465–466, 567–569, 623–630, 684–689, 753, 798–799, 800–801, 802–805, 825, 842
2. compares and orders real numbers and/or algebraic expressions and explains the relative magnitude between them (2.4.K1a) \$, e.g., will $3n + 2$ always, sometimes, or never be larger than $3n$? The student might respond with $(5n)^2$ is greater than $5n$, if $n > 1$ and $(5n)^2$ is smaller than $5n$, if $0 < n < 1$ or that the square root of 5 is between 2 and 3.	SE: 12–14, 68–72, 319, 337, 530, 565, 585, 664, 713, 736–738, 767, 821–824, 833 TWE: 12–14, 68–72, 319, 337, 530, 565, 585, 664, 713, 736–738, 767, 821–824, 833
3. knows and explains what happens to the product or quotient when a real number is multiplied or divided by (2.4.K1a):	
a. a rational number greater than zero and less than one,	SE: 5, 20, 136, 262, 753, 800–801 TWE: 5, 20, 136, 262, 753, 800–801
b. a rational number greater than one,	SE: 5, 79–83, 326–328 TWE: 5, 79–83, 326–328
c. a rational number less than zero.	SE: 326–328 TWE: 326–328

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Ninth and Tenth Grades Application Indicators	
The student...	
1. generates and/or solves real-world problems using equivalent representations of real numbers and algebraic expressions (2.4.A1a) \$, e.g., a math classroom needs 30 books and 15 calculators. If B represents the cost of a book and C represents the cost of a calculator, generate two different expressions to represent the cost of 9 math classrooms.	SE: 6–10, 15, 20, 42, 119, 142, 820 TWE: 6–10, 15, 20, 42, 119, 142, 820
2. determines whether or not solutions to real-world problems using real numbers and algebraic expressions are reasonable (2.4.A1a) \$, e.g., in January, a business gave its employees a 10% raise. The following year, due to the sluggish economy, the employees decided to take a 10% reduction in their salary. Is it reasonable to say they are now making the same wage they made prior to the 10% raise?	SE: 37–42, 61, 239–240, 707 TWE: 37–42, 61, 239–240, 707
Benchmark 2: Number Systems and Their Properties	
The student demonstrates an understanding of the real number system; recognizes, applies, and explains their properties, and extends these properties to algebraic expressions.	
Ninth and Tenth Grades Knowledge Base Indicators	
The student...	
1. explains and illustrates the relationship between the subsets of the real number system [natural (counting) numbers, whole numbers, integers, rational numbers, irrational numbers] using mathematical models (2.4.K1a), e.g., number lines or Venn diagrams.	SE: 68–72, 73–74, 104, 144–147, 285, 337, 474–473, 825, 842 TWE: 68–72, 73–74, 104, 144–147, 285, 337, 474–473, 825, 842
2. identifies all the subsets of the real number system [natural (counting) numbers, whole numbers, integers, rational numbers, irrational numbers] to which a given number belongs (2.4.K1m).	SE: 68–72, 73–74, 104, 144–147, 285, 337, 474–473, 825, 842 TWE: 68–72, 73–74, 104, 144–147, 285, 337, 474–473, 825, 842
3. names, uses, and describes these properties with the real number system and demonstrates their meaning including the use of concrete objects (2.4.K1a) \$:	
a. commutative ($a + b = b + a$ and $ab = ba$), associative [$a + (b + c) = (a + b) + c$ and $a(bc) = (ab)c$], distributive [$a(b + c) = ab + ac$], and substitution properties (if $a = 2$, then $3a = 3 \times 2 = 6$);	SE: 26–31, 32–35, 60, 148, 150, 170, 191, 196, 332, 360, 451, 464, 473, 479, 481–486 TWE: 26–31, 32–35, 60, 148, 150, 170, 191, 196, 332, 360, 451, 464, 473, 479, 481–486
b. identity properties for addition and multiplication and inverse properties of addition and multiplication (additive identity: $a + 0 = a$, multiplicative identity: $a \cdot 1 = a$, additive inverse: $+5 + ^-5 = 0$, multiplicative inverse: $8 \times 1/8 = 1$);	SE: 21–23, 42, 48, 54, 74–77, 111, 170, 231, 291, 432–440, 467, 482, 641, 673, 821 TWE: 21–23, 42, 48, 54, 74–77, 111, 170, 231, 291, 432–440, 467, 482, 641, 673, 821

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c. symmetric property of equality (if $a = b$, then $b = a$);	SE: 22, 26, 59, 170, 199, 821 TWE: 22, 26, 59, 170, 199, 821
d. addition and multiplication properties of equality (if $a = b$, then $a + c = b + c$ and if $a = b$, then $ac = bc$) and inequalities (if $a > b$, then $a + c > b + c$ and if $a > b$, and $c > 0$ then $ac > bc$);	SE: 33, 42, 48, 59, 128–131, 135–139, 149, 180, 318–319, 325–326, 821 TWE: 33, 42, 48, 59, 128–131, 135–139, 149, 180, 318–319, 325–326, 821
e. zero product property (if $ab = 0$, then $a = 0$ and/or $b = 0$).	SE: 33, 483, 492 TWE: 33, 483, 492
4. uses and describes these properties with the real number system (2.4.K1a) \$:	
a. transitive property (if $a = b$ and $b = c$, then $a = c$),	SE: 22, 25, 59 TWE: 22, 25, 59
b. reflexive property ($a = a$).	SE: 22, 42, 59, 170, 231, 821 TWE: 22, 42, 59, 170, 231, 821
Ninth and Tenth Grades Application Indicators The student...	
1. generates and/or solves real-world problems with real numbers using the concepts of these properties to explain reasoning (2.4.A1a) \$:	
a. commutative, associative, distributive, and substitution properties, e.g., the chorus is sponsoring a trip to an amusement park. They need to purchase 15 adult tickets at \$6 each and 15 student tickets at \$4 each. How much money will the chorus need for tickets? The expression that models the problem is $(15)(6) + (15)(4)$. To simplify the expression, the distributive property can be used – $(15)(6) + (15)(4) = (15)(6 + 4) = (15)(10) = 150$. Therefore, the chorus needs \$150 to purchase the tickets.	SE: 22, 26–31, 32–35, 42, 59, 130, 170, 351 TWE: 22, 26–31, 32–35, 42, 59, 130, 170, 351
b. identity and inverse properties of addition and multiplication, e.g., the purchase price (P) of a series EE Savings Bond is found by the formula $\frac{1}{2}F = P$ where F is the face value of the bond. Use the formula to find the face value of a savings bond purchased for \$500. $\frac{1}{2}F = P$ $\frac{1}{2}F = 500$ $2 \frac{1}{2}F = 2(500)$ $1F = 1,000$ or $F = 1,000$	SE: 21–25, 42, 48, 59, 166–170, 231, 821 TWE: 21–25, 42, 48, 59, 166–170, 231, 821

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<p>c. symmetric property of equality, e.g., Sam took a \$15 check to the bank and received a \$10 bill and a \$5 bill. Later Sam took a \$10 bill and a \$5 bill to the bank and received a check for \$15. $\\$15 = \\$10 + \\$5$ is the same as $\\$10 + \\$5 = \\$15$.</p>	<p>SE: 22–26, 59, 170, 199, 821 TWE: 22–26, 59, 170, 199, 821</p>
<p>d. addition and multiplication properties of equality, e.g., the total price for the purchase of three shirts is \$62.54 including tax. If the tax is 3.89, what is the cost of one shirt?</p> $T = 3s + t$ $\$62.54 = 3s + \3.89 $\$62.54 - \$3.89 = 3s$ $\$58.65 = 3s$ $\$19.55 = s$	<p>SE: 128–136, 149, 180 TWE: 128–136, 149, 180</p>
<p>e. zero product property, e.g., Jenny was thinking of two numbers. Jenny said that the product of the two numbers was 0. What could you deduct from this statement? Explain your reasoning.</p>	<p>SE: 33, 483, 492 TWE: 33, 483, 492</p>
<p>2. analyzes and evaluates the advantages and disadvantages of using integers, whole numbers, fractions (including mixed numbers), decimals or irrational numbers and their rational approximations in solving a given real-world problem (2.4.A1a) \$, e.g., a store sells CDs for \$12.99 each. Knowing that the sales tax is 7%, Marie estimates the cost of a CD plus tax to be \$14.30. She selects nine CDs. The clerk tells Marie her bill is \$157.18. How can Marie explain to the clerk she has been overcharged?</p>	<p>SE: 18, 50, 52, 54, 142, 147, 535, 614 TWE: 18, 50, 52, 54, 142, 147, 535, 614</p>
<p>Benchmark 3: Estimation The student uses computational estimation with real numbers in a variety of situations.</p>	
<p>Ninth and Tenth Grades Knowledge Base Indicators The student...</p>	
<p>1. estimates real number quantities using various computational methods including mental math, paper and pencil, concrete objects, and/or appropriate technology (2.4.K1a) \$.</p>	<p>SE: 18, 50, 52, 54, 142, 147, 535, 614 TWE: 18, 50, 52, 54, 142, 147, 535, 614</p>
<p>2. uses various estimation strategies and explains how they were used to estimate real number quantities and algebraic expressions (2.4.K1a) \$.</p>	<p>SE: 18, 50, 52, 54, 142, 147, 535, 614 TWE: 18, 50, 52, 54, 142, 147, 535, 614</p>

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3. knows and explains why a decimal representation of an irrational number is an approximate value (2.4.K1a).	SE: 104–105 TWE: 104–105
4. knows and explains between which two consecutive integers an irrational number lies (2.4.K1a).	SE: 105–106 TWE: 105–106
Ninth and Tenth Grades Application Indicators The student...	
1. adjusts original rational number estimate of a real-world problem based on additional information (a frame of reference) (2.4.A1a) \$, e.g., estimate how long it takes to walk from here to there; time how long it takes to take five steps and adjust your estimate.	SE: 18, 50, 52, 54, 142, 147, 535, 614 TWE: 18, 50, 52, 54, 142, 147, 535, 614
2. estimates to check whether or not the result of a real-world problem using real numbers and/or algebraic expressions is reasonable and makes predictions based on the information (2.4.A1a) \$, e.g., if you have a \$4,000 debt on a credit card and the minimum of \$30 is paid per month, is it reasonable to pay off the debt in 10 years?	SE: 37–42, 61, 239–240, 707 TWE: 37–42, 61, 239–240, 707
3. determines if a real-world problem calls for an exact or approximate answer and performs the appropriate computation using various computational strategies including mental math, paper and pencil, concrete objects, and/or appropriate technology (2.4.A1a) \$, e.g., do you need an exact or an approximate answer in calculating the area of the walls and to determine the number of rolls of wallpaper needed to paper a room? What would you do if you were wallpapering 2 rooms?	SE: 18, 50, 52, 54, 142, 147, 535, 614 TWE: 18, 50, 52, 54, 142, 147, 535, 614
4. explains the impact of estimation on the result of a real-world problem (underestimate, overestimate, range of estimates) (2.4.A1a) \$, e.g., if the weight of 25 pieces of paper was measured as 530.6 grams, what would the weight of 2000 pieces of paper equal to the nearest gram? If the student were to estimate the weight of one piece of paper as about 20 grams and then multiply this by 2,000 rather than multiply the weight of 25 pieces of paper by 80; the answer would differ by about 2,400 grams. In general, multiplying or dividing by a rounded number will cause greater discrepancies than rounding after multiplying or dividing.	SE: 18, 50, 52, 54, 142, 147, 535, 614 TWE: 18, 50, 52, 54, 142, 147, 535, 614

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Benchmark 4: Computation The student models, performs, and explains computation with real numbers and polynomials in a variety of situations.	
Ninth and Tenth Grades Knowledge Base Indicators The student...	
1. computes with efficiency and accuracy using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology (2.4.K1a) \$.	SE: 15, 148, 217, 224–225, 269, 294, 398, 430, 494, 530, 591, 603, 721, 728, 787 TWE: T5, 4B, 15, 118B, 148, 196B, 217, 224–225, 254B, 269, 294, 316B, 366B, 398, 408B, 430, 472B, 494, 522B, 530, 584B, 591, 603, 640B, 706B, 721, 728, 752B, 787
2. performs and explains these computational procedures (2.4.K1a):	
a. N addition, subtraction, multiplication, and division using the order of operations	SE: 11–15, 17, 58, 119, 140, 181 TWE: 11–15, 17, 58, 119, 140, 181
b. multiplication or division to find \$:	
i. a percent of a number, e.g., what is 0.5% of 10?	SE: 160–165, 177, 183, 185, 357, 802–803, 821 TWE: 160–165, 177, 183, 185, 357, 802–803, 821
ii. percent of increase and decrease, e.g., a college raises its tuition from \$1,320 per year to \$1,425 per year. What percent is the change in tuition?	SE: 160–165, 183, 357, 821 TWE: 160–165, 183, 357, 821
iii. percent one number is of another number, e.g., 89 is what percent of 82?	SE: 160–165, 177, 183, 185, 357, 802–803, 821 TWE: 160–165, 177, 183, 185, 357, 802–803, 821
iv. a number when a percent of the number is given, e.g., 80 is 32% of what number?	SE: 160–165, 177, 183, 185, 357, 802–803, 821 TWE: 160–165, 177, 183, 185, 357, 802–803, 821
c. manipulation of variable quantities within an equation or inequality (2.4.K1d), e.g., $5x - 3y = 20$ could be written as $5x - 20 = 3y$ or $5x(2x + 3) = 8$ could be written as $8/(5x) = 2x + 3$;	SE: 120–126, 128–134, 135–141, 142–148, 149–154, 270 TWE: 120–126, 128–134, 135–141, 142–148, 149–154, 270
d. simplification of radical expressions (without rationalizing denominators) including square roots of perfect square monomials and cube roots of perfect cubic monomials;	SE: 586–592, 595, 597, 603, 610, 632–633 TWE: 586–592, 595, 597, 603, 610, 632–633
e. simplification or evaluation of real numbers and algebraic monomial expressions raised to a whole number power and algebraic binomial expressions squared or cubed;	SE: 410–415, 452–453, 463–464, 540 TWE: 410–415, 452–453, 463–464, 540

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f. simplification of products and quotients of real number and algebraic monomial expressions using the properties of exponents;	SE: 418–421, 460 TWE: 418–421, 460
g. matrix addition \$, e.g., when computing (with one operation) a building’s expenses (data) monthly, a matrix is created to include each of the different expenses; then at the end of the year, each type of expense for the building is totaled;	SE: 716–719, 728, 746, 749, 849 TWE: 716–719, 728, 746, 749, 849
h. scalar-matrix multiplication \$, e.g., if a matrix is created with everyone’s salary in it, and everyone gets a 10% raise in pay; to find the new salary, the matrix would be multiplied by 1.1.	SE: 717–719, 728, 746, 749, 849 TWE: 717–719, 728, 746, 749, 849
3. finds prime factors, greatest common factor, multiples, and the least common multiple of algebraic expressions (2.4.K1b).	SE: 474–479, 515, 544, 641, 649, 678–679, 681, 798 TWE: 474–479, 515, 544, 641, 649, 678–679, 681, 798
Ninth and Tenth Grades Application Indicators The student...	
1. generates and/or solves multi-step real-world problems with real numbers and algebraic expressions using computational procedures (addition, subtraction, multiplication, division, roots, and powers excluding logarithms), and mathematical concepts with \$:	
a. applications from business, chemistry, and physics that involve addition, subtraction, multiplication, division, squares, and square roots when the formulae are given as part of the problem and variables are defined (2.4.A1a) \$, e.g., given $F = ma$, where F = force in newtons, m = mass in kilograms, a = acceleration in meters per second squared. Find the acceleration if a force of 20 newtons is applied to a mass of 3 kilograms.	This objective is addressed throughout the text. See, for example: SE: 13, 85, 196, 222, 340, 350, 374, 485, 505, 563, 596, 610, 621, 630, 669, 676, 688, 725, 729, 814 TWE: 13, 85, 196, 222, 340, 350, 374, 485, 505, 563, 596, 610, 621, 630, 669, 676, 688, 725, 729, 814
b. volume and surface area given the measurement formulas of rectangular solids and cylinders (2.4.A1f), e.g., ex;	SE: 9, 122, 124, 456, 513, 670, 855, 860 TWE: 9, 122, 124, 456, 513, 670, 855, 860
c. probabilities (2.4.A1h), e.g., if the probability of getting a defective light bulb is 2%, and you buy 150 light bulbs, how many would you expect to be defective?	SE: 782–785 TWE: 782–785
d. application of percents (2.4.A1a), e.g., compound interest given the formula.	SE: 562, 577–578 TWE: 562, 577–578

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e. simple exponential growth and decay (excluding logarithms) and economics (2.4.A1a) \$, e.g., a population of cells doubles every 20 years. If there are 20 cells to start with, how long will it take for there to be more than 150 cells? <i>or</i> If the radiation level is now 400 and it decays by 1/2 or its half-life is 8 hours, how long will it take for the radiation level to be below an acceptable level of 5? <i>or</i> If \$1000 is placed in a savings account with a 6% annual interest rate and is compounded semiannually, how much money will be in the account at the end of 2 years?	SE: 561–565, 566, 577–578 TWE: 561–565, 566, 577–578
Standard 2: Algebra The student uses algebraic concepts and procedures in a variety of situations.	
Benchmark 1: Patterns The student recognizes, describes, extends, develops, and explains the general rule of a pattern in a variety of situations.	
Ninth and Tenth Grades Knowledge Base Indicators The student...	
1. identifies, states, and continues the following patterns using various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written	
a. arithmetic and geometric sequences using real numbers and/or exponents (2.4.K1a); e.g., radioactive half-lives;	SE: 232–236, 238, 243, 244–250, 561–566, 567–572, 578–579 TWE: 232–236, 238, 243, 244–250, 561–566, 567–572, 578–579
b. patterns using geometric figures (2.4.K1h);	SE: 240–245, 250 TWE: 240–245, 250
c. algebraic patterns including consecutive number patterns or equations of functions, e.g., n , $n + 1$, $n + 2$, ... or $f(n) = 2n - 1$ (2.4.K1c,e);	SE: 232–236, 238, 245, 249–251, 567–572, 578–579, 592, 653, 721 TWE: 232–236, 238, 245, 249–251, 567–572, 578–579, 592, 653, 721
d. special patterns (2.4.K1a), e.g., Pascal's triangle and the Fibonacci sequence.	SE: 102, 244 TWE: 102, 244
2. generates and explains a pattern (2.4.K1f).	SE: 240–243, 250 TWE: 240–243, 250
3. classify sequences as arithmetic, geometric, or neither.	SE: 233, 567 TWE: 233, 567

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4. defines (2.4.K1a):	
a. a recursive or explicit formula for arithmetic sequences and finds any particular term,	SE: 234–236 TWE: 234–236
b. a recursive or explicit formula for geometric sequences and finds any particular term.	SE: 567–569 TWE: 567–569
Ninth and Tenth Grades Application Indicators	
The student...	
1. recognizes the same general pattern presented in different representations [numeric (list or table), visual (picture, table, or graph), and written] (2.4.A1i) \$.	SE: 240–245, 250 TWE: 240–245, 250
2. solves real-world problems with arithmetic or geometric sequences by using the explicit equation of the sequence (2.4.K1c) \$, e.g., radioactive half-life, population growth, depreciation; an example of an arithmetic sequence: A brick wall is 3 feet high and the owners want to build it higher. If the builders can lay 2 feet every hour, how long will it take to raise it to a height of 20 feet? and – an example of a geometric sequence: A savings program can double your money every 12 years. If you place \$100 in the program, how many years will it take to have over \$1000?	SE: 232–236, 238, 243, 244–250, 561–566, 567–572, 578–579 TWE: 232–236, 238, 243, 244–250, 561–566, 567–572, 578–579
Benchmark 2: Variables, Equations, and Inequalities	
The student uses variables, symbols, real numbers, and algebraic expressions to solve equations and inequalities in variety of situations.	
Ninth and Tenth Grades Knowledge Base Indicators	
The student...	
1. knows and explains the use of variables as parameters for a specific variable situation (2.4.K1f), e.g., the m and b in $y = mx + b$ or the h, k, and r in $(x - h)^2 + (y - k)^2 = r^2$.	SE: 272–274, 274, 280–283, 286–291, 310–311, 524–528, 533–538 TWE: 272–274, 274, 280–283, 286–291, 310–311, 524–528, 533–538
2. manipulates variable quantities within an equation or inequality (2.4.K1e), e.g., $5x - 3y = 20$ could be written as $5x - 20 = 3y$ or $5x(2x + 3) = 8$ could be written as $8/(5x) = 2x + 3$.	SE: 120–126, 128–134, 135–141, 142–148, 149–154, 270 TWE: 120–126, 128–134, 135–141, 142–148, 149–154, 270

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3. solves (2.4.K1d) \$:	
a. N linear equations and inequalities both analytically and graphically;	SE: 128–134, 135–141, 142–148, 149–154, 218–224, 248–249, 318–324, 325–331, 332–338, 352–356, 367 TWE: 128–134, 135–141, 142–148, 149–154, 218–224, 248–249, 318–324, 325–331, 332–338, 352–356, 367
b. quadratic equations with integer solutions (may be solved by trial and error, graphing, quadratic formula, or factoring);	SE: 533–538, 539–544, 546–553 TWE: 533–538, 539–544, 546–553
c. systems of linear equations with two unknowns using integer coefficients and constants;	SE: 369–375, 376–381, 382–386, 387–392 TWE: 369–375, 376–381, 382–386, 387–392
d. radical equations with no more than one inverse operation around the radical expression;	SE: 598–604 TWE: 598–604
e. equations where the solution to a rational equation can be simplified as a linear equation with a nonzero denominator, e.g., $3/(x + 2) = 5/(x - 3)$.	SE: 690–695 TWE: 690–695
f. equations and inequalities with absolute value quantities containing one variable with a special emphasis on using a number line and the concept of absolute value.	SE: 345–351, 352–456 TWE: 345–351, 352–456
g. exponential equations with the same base without the aid of a calculator or computer, e.g., $3^{x+2} = 3^5$.	SE: 554–560, 561–565 TWE: 554–560, 561–565
Ninth and Tenth Grades Application Indicators	
The student...	
1. represents real-world problems using variables, symbols, expressions, equations, inequalities, and simple systems of linear equations (2.4.A1c-e) \$.	SE: 120–127, 128–134, 135–141, 142–148, 149–154, 318–323, 325–331, 332, 338, 369–375, 376–381, 382–386, 387–393 TWE: 120–127, 128–134, 135–141, 142–148, 149–154, 318–323, 325–331, 332, 338, 369–375, 376–381, 382–386, 387–393
2. represents and/or solves real-world problems with (2.4.A1c) \$:	
a. N linear equations and inequalities both analytically and graphically, e.g., tickets for a school play are \$5 for adults and \$3 for students. You need to sell at least \$65 in tickets. Give an inequality and a graph that represents this situation and three possible solutions.	SE: 369–374, 375–381, 382–386, 387–393, 394–398 TWE: 369–374, 375–381, 382–386, 387–393, 394–398

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b. quadratic equations with integer solutions (may be solved by trial and error, graphing, quadratic formula, or factoring), e.g., a fence is to be built onto an existing fence. The three sides will be built with 2,000 meters of fencing. To maximize the rectangular area, what should be the dimensions of the fence?	SE: 533–538, 539–544, 546–553 TWE: 533–538, 539–544, 546–553
c. systems of linear equations with two unknowns, e.g., when comparing two cellular telephone plans, Plan A costs \$10 per month and \$.10 per minute and Plan B costs \$12 per month and \$.07 per minute. The problem is represented by Plan A = $.10x + 10$ and Plan B = $.07x + 12$ where x is the number of minutes.	SE: 369–375, 376–381, 382–386, 387–392 TWE: 369–375, 376–381, 382–386, 387–392
d. radical equations with no more than one inverse operation around the radical expression, e.g., a box has a volume of 400 cubic inches with a height of 5 inches. What is the length of the side of the square base?	SE: 598–604 TWE: 598–604
e. a rational equation where the solution can be simplified as a linear equation with a nonzero denominator	SE: 690–695 TWE: 690–695
3. explains the mathematical reasoning that was used to solve a real-world problem using equations and inequalities and analyzes the advantages and disadvantages of various strategies that may have been used to solve the problem (2.4.A1c).	SE: 121–123, 141–144, 151, 157, 320–321 TWE: 121–123, 141–144, 151, 157, 320–321
Benchmark 3: Functions The student analyzes functions in a variety of situations.	
Ninth and Tenth Grades Knowledge Base Indicators The student...	
1. evaluates and analyzes functions using various methods including mental math, paper and pencil, concrete objects, and graphing utilities or other appropriate technology (2.4.K1a,d-f).	SE: 226–232, 523–532, 533–540 TWE: 226–232, 523–532, 533–540
2. matches equations and graphs of constant and linear functions and quadratic functions limited to $y = ax^2 + c$ (2.4.K1d,f).	SE: 218–221, 248–249, 533–538, 544, 574–575 TWE: 218–221, 248–249, 533–538, 544, 574–575
3. determines whether a graph, list of ordered pairs, table of values, or rule represents a function (2.4.K1e-f).	SE: 226–232 TWE: 226–232

CONTENT STANDARDS	PAGE REFERENCES
4. determines x- and y-intercepts and maximum and minimum values of the portion of the graph that is shown on a coordinate plane (2.4.K1f).	SE: 220–222, 526–530, 538, 544 TWE: 220–222, 526–530, 538, 544
5. identifies domain and range of:	
a. relationships given the graph or table (2.4.K1e-f),	SE: 206–211 TWE: 206–211
b. linear, constant, and quadratic functions given the equation(s) (2.4.K1d).	SE: 218–225, 524–532, 533–538 TWE: 218–225, 524–532, 533–538
6. recognizes how changes in the constant and/or slope within a linear function changes the appearance of a graph (2.4.K1f) \$.	SE: 220–221, 256–263, 272–277, 295–297, 308–310 TWE: 220–221, 256–263, 272–277, 295–297, 308–310
7. uses function notation.	SE: 228, 830 TWE: 228, 830
8. evaluates function(s) given a specific domain \$.	SE: 226–231 TWE: 226–231
9. describes the difference between independent and dependant variables and identifies independent and dependent variables \$.	SE: 44–46, 213–216, 271 TWE: 44–46, 213–216, 271
Ninth and Tenth Grades Application Indicators	
The student...	
1. translates between the numerical, graphical, and symbolic representations of functions (2.4.A1c-e) \$.	SE: 226–232, 272–279, 280–285, 286–291, 533–544, 546–553 TWE: 226–232, 272–279, 280–285, 286–291, 533–544, 546–553
2. interprets the meaning of the x- and y-intercepts, slope, and/or points on and off the line on a graph in the context of a real-world situation (2.4.A1e) \$, e.g., the graph below represents a tank full of water being emptied. What does the y-intercept represent? What does the x-intercept represent? What is the rate at which it is emptying? What does the point (2, 25) represent in this situation? What does the point (2,30) represent in this situation?	SE: 220–223, 258–259, 264–270, 272–277 TWE: 220–223, 258–259, 264–270, 272–277

CONTENT STANDARDS	PAGE REFERENCES
3. analyzes (2.4.A1c-e):	
a. the effects of parameter changes (scale changes or restricted domains) on the appearance of a function's graph,	SE: 524–532 TWE: 524–532
b. how changes in the constants and/or slope within a linear function affects the appearance of a graph,	SE: 218–221, 272–279, 280–285 TWE: 218–221, 272–279, 280–285
c. how changes in the constants and/or coefficients within a quadratic function in the form of $y = ax^2 + c$ affects the appearance of a graph.	SE: 524–531, 533–538 TWE: 524–531, 533–538
Benchmark 4: Models	
The student develops and uses mathematical models to represent and justify mathematical relationships found in a variety of situations involving tenth grade knowledge and skills.	
Ninth and Tenth Grades Knowledge Base Indicators	
The student...	
1. knows, explains, and uses mathematical models to represent and explain mathematical concepts, procedures, and relationships. Mathematical models include:	
a. process models (concrete objects, pictures, diagrams, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate grids) to model computational procedures, algebraic relationships, and mathematical relationships and to solve equations (1.1.K1–3, 1.2.K1, 1.2.K3–4, 1.3.K1–4, 1.4.K1, 1.4.K2a-b, 2.1.K1a, 2.1.K1d, 2.1.K2, 2.2.K4, 2.3.K1, 3.2.K1–3, 3.2.K6, 3.3.K1–4, 4.2.K3–4) \$;	SE: 68–70, 72–74, 78, 110, 201–202, 237, 736–739, 754–757, 760–761, 789–790 TWE: T5, 4B, 68–70, 72–74, 78, 110, 118B, 196B, 201–202, 237, 254B, 316B, 366B, 408B, 472B, 522B, 584B, 640B, 706B, 736–739, 752B, 754–757, 760–761, 789–790, 15, 148, 217, 224–225, 269, 294, 398, 430, 494, 530, 591, 603, 721, 728, 787
b. factor trees to model least common multiple, greatest common factor, and prime factorization (1.4.K3);	SE: 474–476, 479, 486, 515, 530, 544, 677–679 TWE: 474–476, 479, 486, 515, 530, 544, 677–679
c. algebraic expressions to model relationships between two successive numbers in a sequence or other numerical patterns (2.1.K1c);	SE: 232–235, 567–572 TWE: 232–235, 567–572
d. equations and inequalities to model numerical and geometric relationships (1.4.K2c, 2.2.K3, 2.3.K1–2, 3.2.K7) \$;	SE: 232–238, 241–245, 567–572 TWE: 232–238, 241–245, 567–572
e. function tables to model numerical and algebraic relationships (2.1.K1c, 2.2.K2, 2.3.K1, 2.3.K3, 2.3.K5) \$;	SE: 208–209, 223, 226–231, 247–246 TWE: 208–209, 223, 226–231, 247–246

CONTENT STANDARDS	PAGE REFERENCES
f. coordinate planes to model relationships between ordered pairs and equations and inequalities and linear and quadratic functions (2.2.K1, 2.3.K1–6, 3.4.K1–8) \$;	SE: 43–48, 192–195, 209–214, 218–225, 246–247, 292–293, 352–355, 369–375, 524–532 TWE: 43–48, 192–195, 209–214, 218–225, 246–247, 292–293, 352–355, 369–375, 524–532
g. constructions to model geometric theorems and properties (3.1.K2, 3.1.K6);	This standard is taught in Glencoe <i>Geometry</i> ©2004
h. two- and three-dimensional geometric models (geoboards, dot paper, coordinate plane, nets, or solids) and real-world objects to model perimeter, area, volume, and surface area, properties of two- and three-dimensional figures, and isometric views of three-dimensional figures (2.1.K1b, 3.1.K1–8, 3.2.K1, 3.2.K4–5, 3.3.K1–4);	SE: 7–8, 14–15, 34, 85, 122, 124–125, 163, 168, 199–202, 237, 409, 412, 414–415, 456, 596, 616–721, 635–636, 683, 810–811, 813–814, 853, 855 TWE: 7–8, 14–15, 34, 85, 122, 124–125, 163, 168, 199–202, 237, 409, 412, 414–415, 456, 596, 616–721, 635–636, 683, 810–811, 813–814, 853, 855
i. scale drawings to model large and small real-world objects;	SE: 156–157 TWE: 156–157
j. Pascal's Triangle to model binomial expansion and probability;	SE: 102–103 TWE: 102–103
k. geometric models (spinners, targets, or number cubes), process models (concrete objects, pictures, diagrams, or coins), and tree diagrams to model probability (4.1.K1–3);	SE: 754–758, 760, 769–776, 778–784 TWE: 754–758, 760, 769–776, 778–784
l. frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, charts, tables, single and double stem-and-leaf plots, scatter plots, box-and-whisker plots, histograms, and matrices to organize and display data (4.2.K1, 4.2.K5–6) \$;	SE: 48, 50, 53, 62, 70, 78, 88–92, 112–113, 715, 722–728, 734–735, 737–742, 743–744, 746–747, 748–749, 806–809 TWE: 48, 50, 53, 62, 70, 78, 88–92, 112–113, 715, 722–728, 734–735, 737–742, 743–744, 746–747, 748–749, 806–809
m. Venn diagrams to sort data and show relationships (1.2.K2).	SE: 70 TWE: 70

CONTENT STANDARDS	PAGE REFERENCES
Ninth and Tenth Grades Application Indicators The student...	
1. recognizes that various mathematical models can be used to represent the same problem situation. Mathematical models include:	
a. process models (concrete objects, pictures, diagrams, flowcharts, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate grids) to model computational procedures, algebraic relationships, mathematical relationships, and problem situations and to solve equations (1.1.K1, 1.2.A1–2, 1.3.A1–4, 1.4.A1a, 1.4A1d–e, 3.1.A1–3, 3.2.A1–3, 3.3.A2, 3.3.A4, 3.4.A2, 4.2.A1a–b) \$;	SE: 68–70, 72–74, 78, 110, 201–202, 237, 736–739, 754–757, 760–761, 789–790 TWE: T5, 4B, 68–70, 72–74, 78, 110, 118B, 196B, 201–202, 237, 254B, 316B, 366B, 408B, 472B, 522B, 584B, 640B, 706B, 736–739, 752B, 754–757, 760–761, 789–790, 15, 148, 217, 224–225, 269, 294, 398, 430, 494, 530, 591, 603, 721, 728, 787
b. algebraic expressions to model relationships between two successive numbers in a sequence or other numerical patterns;	SE: 232–235, 567–572 TWE: 232–235, 567–572
c. equations and inequalities to model numerical and geometric relationships (2.1.A2, 2.2.A1–3, 2.3.A1) \$;	SE: 232–238, 241–245, 567–572 TWE: 232–238, 241–245, 567–572
d. function tables to model numerical and algebraic relationships (2.3.A1, 2.3.A3, 3.4.A2) \$;	SE: 208–209, 223, 226–231, 247–246 TWE: 208–209, 223, 226–231, 247–246
e. coordinate planes to model relationships between ordered pairs and equations and inequalities and linear and quadratic functions (2.2.A1, 2.3.A1–3, 3.4.A1–2, 3.4.A4) \$;	SE: 43–48, 192–195, 209–214, 218–225, 246–247, 292–293, 352–355, 369–375, 524–532 TWE: 43–48, 192–195, 209–214, 218–225, 246–247, 292–293, 352–355, 369–375, 524–532
f. two- and three-dimensional geometric models (geoboards, dot paper, coordinate plane, nets, or solids) and real-world objects to model perimeter, area, volume, and surface area, properties of two and three-dimensional figures and isometric views of three-dimensional figures (3.3.A1, 4.2.A1c);	SE: 7–8, 14–15, 34, 85, 122, 124–125, 163, 168, 199–202, 237, 409, 412, 414–415, 456, 596, 616–721, 635–636, 683, 810–811, 813–814, 853, 855 TWE: 7–8, 14–15, 34, 85, 122, 124–125, 163, 168, 199–202, 237, 409, 412, 414–415, 456, 596, 616–721, 635–636, 683, 810–811, 813–814, 853, 855
g. scale drawings to model large and small real-world objects (3.3.A3, 3.4.A3);	SE: 156–157 TWE: 156–157

CONTENT STANDARDS	PAGE REFERENCES
h. geometric models (spinners, targets, or number cubes), process models (coins, pictures, or diagrams), and tree diagrams to model probability (1.4.A1c, 4.2.A1, 4.2.A3);	SE: 754–758, 760, 769–776, 778–784 TWE: 754–758, 760, 769–776, 778–784
i. frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, charts, tables, single and double stem-and-leaf plots, scatter plots, box-and-whisker plots, histograms, and matrices to describe, interpret, and analyze data (2.1.A1, 4.1.A1, 4.1.A3–4, 4.1.A6, 4.2.A1) \$;	SE: 48, 50, 53, 62, 70, 78, 88–92, 112–113, 715, 722–728, 734–735, 737–742, 743–744, 746–747, 748–749, 806–809 TWE: 48, 50, 53, 62, 70, 78, 88–92, 112–113, 715, 722–728, 734–735, 737–742, 743–744, 746–747, 748–749, 806–809
j. Venn diagrams to sort data and show relationships.	SE: 70 TWE: 70
2. uses the mathematical modeling process to analyze and make inferences about real-world situations \$.	SE: 28, 127, 141, 274, 324, 376, 431–432, 437–438, 450–451, 462, 480, 500, 524, 526, 540, 611, 667 TWE: 28, 127, 141, 274, 324, 376, 431–432, 437–438, 450–451, 462, 480, 500, 524, 526, 540, 611, 667
Standard 3: Geometry The student uses geometric concepts and procedures in a variety of situations.	
Benchmark 1: Geometric Figures and Their Properties The student recognizes geometric figures and compares and justifies their properties of geometric figures in a variety of situations.	
Ninth and Tenth Grades Knowledge Base Indicators The student...	
1. recognizes and compares properties of two- and three-dimensional figures using concrete objects, constructions, drawings, appropriate terminology, and appropriate technology (2.4.K1h).	SE: 9, 125, 338, 596, 605–610, 613, 810–813, 855, 860 TWE: 9, 125, 338, 596, 605–610, 613, 810–813, 855, 860
2. discusses properties of regular polygons related to (2.4.K1g-h):	
a. angle measures,	SE: 47, 336, 457, 647, 571, 755, 810–811 TWE: 47, 336, 457, 647, 571, 755, 810–811
b. diagonals.	SE: 296, 613, 860 TWE: 296, 613, 860
3. recognizes and describes the symmetries (point, line, plane) that exist in three-dimensional figures (2.4.K1h).	SE: 22, 26, 59, 170, 199, 525–529, 544, 574, 579, 841 TWE: 22, 26, 59, 170, 199, 525–529, 544, 574, 579, 841

CONTENT STANDARDS	PAGE REFERENCES
4. recognizes that similar figures have congruent angles, and their corresponding sides are proportional (2.4.K1h).	SE: 616–621, 635–636, 845 TWE: 616–621, 635–636, 845
5. uses the Pythagorean Theorem to (2.4.K1h):	
a. determine if a triangle is a right triangle,	SE: 605–610, 634 TWE: 605–610, 634
b. find a missing side of a right triangle.	SE: 605–610, 634 TWE: 605–610, 634
6. recognizes and describes (2.4.K1g-h):	
a. congruence of triangles using: Side-Side-Side (SSS), Angle-Side-Angle (ASA), Side-Angle-Side (SAS), and Angle-Angle-Side (AAS);	This standard is taught in <i>Glencoe Geometry</i> ©2004
b. the ratios of the sides in special right triangles: 30°-60°-90° and 45°-45°-90°.	This standard is taught in <i>Glencoe's Geometry</i> ©2004 and <i>Algebra 2</i> ©2003
7. recognizes, describes, and compares the relationships of the angles formed when parallel lines are cut by a transversal (2.4.K1h).	This standard is taught in <i>Glencoe Geometry</i> ©2004
8. recognizes and identifies parts of a circle: arcs, chords, sectors of circles, secant and tangent lines, central and inscribed angles (2.4.K1h).	This standard is taught in <i>Glencoe's Geometry</i> ©2004 and <i>Algebra 2</i> ©2003
Ninth and Tenth Grades Application Indicators	
The student...	
1. solves real-world problems by (2.4.A1a):	
a. using the properties of corresponding parts of similar and congruent figures, e.g., scale drawings, map reading, or proportions;	SE: 157, 616–621, 635–636 TWE: 157, 616–621, 635–636
b. applying the Pythagorean Theorem, e.g., when checking for square corners on concrete forms for a foundation, determine if a right angle is formed by using the Pythagorean Theorem;	SE: 605–610 TWE: 605–610
c. using properties of parallel lines, e.g., street intersections.	This standard is taught in <i>Glencoe Geometry</i> ©2004
2. uses deductive reasoning to justify the relationships between the sides of 30°-60°-90° and 45°-45°-90° triangles using the ratios of sides of similar triangles (2.4.A1a).	This standard is taught in <i>Glencoe's Geometry</i> ©2004 and <i>Algebra 2</i> ©2003

CONTENT STANDARDS	PAGE REFERENCES
3. understands the concepts of and develops a formal or informal proof through understanding of the difference between a statement verified by proof (theorem) and a statement supported by examples (2.4.A1a).	This standard is taught in Glencoe's <i>Geometry</i> ©2004 and <i>Algebra 2</i> ©2003
Benchmark 2: Measurement and Estimation The student estimates, measures and uses geometric formulas in a variety of situations.	
Ninth and Tenth Grades Knowledge Base Indicators The student...	
1. determines and uses real number approximations (estimations) for length, width, weight, volume, temperature, time, distance, perimeter, area, surface area, and angle measurement using standard and nonstandard units of measure (2.4.K1a) \$.	This standard is taught in Glencoe's <i>Geometry: Concepts and Applications</i> ©2004 and <i>Advanced Mathematical Concepts</i> ©2004
2. selects and uses measurement tools, units of measure, and level of precision appropriate for a given situation to find accurate real number representations for length, weight, volume, temperature, time, distance, area, surface area, mass, midpoint, and angle measurements (2.4.K1a) \$.	This standard is taught in Glencoe <i>Geometry</i> ©2004
3. approximates conversions between customary and metric systems given the conversion unit or formula (2.4.K1a).	This standard is taught in Glencoe <i>Geometry: Concepts and Applications</i> ©2004
4. states, recognizes, and applies formulas for (2.4.K1h) \$:	
a. perimeter and area of squares, rectangle, and triangles;	SE: 15, 65, 122–124, 132, 147, 153, 237, 688 TWE: 15, 65, 122–124, 132, 147, 153, 237, 688
b. circumference and area of circles;	SE: 8, 134, 167, 268, 420, 512, 601, 815–816 TWE: 8, 134, 167, 268, 420, 512, 601, 815–816
c. volume of rectangular solids.	SE: 124, 414–415, 456, 513, 670, 860 TWE: 124, 414–415, 456, 513, 670, 860
5. uses given measurement formulas to find perimeter, area, volume, and surface area of two- and three-dimensional figures (regular and irregular) (2.4.K1h).	SE: 7–8, 14–15, 34, 85, 122, 124–125, 163, 168, 199–202, 237, 409, 412, 414–415, 456, 596, 635–636, 683, 810–811, 813–814, 853, 855 TWE: 7–8, 14–15, 34, 85, 122, 124–125, 163, 168, 199–202, 237, 409, 412, 414–415, 456, 596, 635–636, 683, 810–811, 813–814, 853, 855

CONTENT STANDARDS	PAGE REFERENCES
6. recognizes and applies properties of corresponding parts of similar and congruent figures to find measurements of missing sides (2.4.K1a).	SE: 157, 616, 621, 635–636 TWE: 157, 616, 621, 635–636
7. knows, explains, and uses ratios and proportions to describe rates of change (2.4.K1d) \$, e.g., miles per gallon, meters per second, calories per ounce, or rise over run.	SE: 155–157, 182, 217, 567–569, 578, 802–803 TWE: 155–157, 182, 217, 567–569, 578, 802–803
Ninth and Tenth Grades Application Indicators The student...	
1. solves real-world problems by (2.4.A1a) \$:	
a. converting within the customary and the metric systems, e.g., Marti and Ginger are making a huge batch of cookies and so they are multiplying their favorite recipe quite a few times. They find that they need 45 tablespoons of liquid. To the nearest $\frac{1}{4}$ of a cup, how many cups would be needed?	This standard is taught in Glencoe <i>Geometry: Concepts and Applications</i> ©2004
b. finding the perimeter and the area of circles, squares, rectangles, triangles, parallelograms, and trapezoids, e.g., a track is made up of a rectangle with dimensions 100 meters by 50 meters with semicircles at each end (having a diameter of 50 meters). What is the distance of one lap around the inside lane of the track?	SE: 7–8, 14–15, 34, 85, 122, 124–125, 163, 168, 199–202, 237, 409, 412, 414–415, 456, 596, 635–636, 683, 810–811, 813–814, 853, 855 TWE: 7–8, 14–15, 34, 85, 122, 124–125, 163, 168, 199–202, 237, 409, 412, 414–415, 456, 596, 635–636, 683, 810–811, 813–814, 853, 855
c. finding the volume and the surface area of rectangular solids and cylinders, e.g., if a car engine has 6 cylinders and each cylinder has a height of 8.4 cm and a diameter of 8.8 cm, then what is the total volume of the cylinders?	SE: 9, 122–124, 409, 414–415, 456, 513, 670, 817, 860 TWE: 9, 122–124, 409, 414–415, 456, 513, 670, 817, 860
d. using the Pythagorean theorem, e.g., a baseball diamond is a square with 90 feet between each base. What is the approximate distance from home plate to second base?	SE: 605–610 TWE: 605–610
e. using rates of change, e.g., the equation $w = -52 + 1.6t$ can be used to approximate the wind chill temperatures for a wind speed of 40 mph. Find the wind chill temperature (w) when the actual temperature (t) is 32 degrees. What part of the equation represents the rate of change?	SE: 258–259, 271, 274 TWE: 258–259, 271, 274

CONTENT STANDARDS	PAGE REFERENCES
2. estimates to check whether or not measurements or calculations for length, weight, volume, temperature, time, distance, perimeter, area, surface area, and angle measurement in real-world problems are reasonable and adjusts original measurement or estimation based on additional information (a frame of reference) (2.4.A1a) \$.	This objective is taught in Glencoe <i>Geometry: Concepts and Applications</i> ©2004
3. uses indirect measurements to measure inaccessible objects (2.4.A1a), e.g., you are standing next to the railroad tracks and a train passes. The number of cars in the train can be determined if you know how long it takes for one car to pass and the length of time the whole train takes to pass you.	SE: 605–610, 616–621, 635–636 TWE: 605–610, 616–621, 635–636
Benchmark 3: Transformational Geometry The student recognizes and applies transformations on two- and three-dimensional figures in a variety of situations.	
Ninth and Tenth Grades Knowledge Base Indicators The student...	
1. describes and performs single and multiple transformations [reflection, rotation, translation, reduction (contraction/shrinking), enlargement (magnification/growing)] on two- and three-dimensional figures (2.4.K1a).	SE: 197–203, 211, 217, 247, 415, 828 TWE: 197–203, 211, 217, 247, 415, 828
2. recognizes a three-dimensional figure created by rotating a simple two-dimensional figure around a fixed line (2.4.K1a), e.g., a rectangle rotated about one of its edges generates a cylinder; an isosceles triangle rotated about a fixed line that runs from the vertex to the midpoint of its base generates a cone.	This objective can be met during teacher/class discussion.
3. generates a two-dimensional representation of a three-dimensional figure (2.4.K1a).	This standard is taught in Glencoe's <i>Geometry</i> ©2004 and <i>Geometry: Concepts and Applications</i> ©2004
4. determines where and how an object or a shape can be tessellated using single or multiple transformations and creates a tessellation (2.4.K1a).	This standard is taught in Glencoe's <i>Geometry</i> ©2004 and <i>Geometry: Concepts and Applications</i> ©2004

CONTENT STANDARDS	PAGE REFERENCES
Ninth and Tenth Grades Application Indicators	
The student...	
1. analyzes the impact of transformations on the perimeter and area of circles, rectangles, and triangles and volume of rectangular prisms and cylinders (2.4.A1f), e.g., reducing by a factor of 1/2 multiplies an area by a factor of 1/4 and multiplies the volume by a factor of 1/8, whereas, rotating a geometric figure does not change perimeter or area.	SE: 197–203 TWE: 197–203
2. describes and draws a simple three-dimensional shape after undergoing one specified transformation without using concrete objects to perform the transformation (2.4.A1a).	This objective can be met during teacher/class discussion.
3. uses a variety of scales to view and analyze two- and three-dimensional figures (2.4.A1g).	This standard is taught in Glencoe's <i>Geometry</i> ©2004 and <i>Geometry: Concepts and Applications</i> ©2004
4. analyzes and explains transformations using such things as sketches and coordinate systems (2.4.A1a).	SE: 197–203, 211, 217, 247, 415, 828 TWE: 197–203, 211, 217, 247, 415, 828
Benchmark 4: Geometry from an Algebraic Perspective	
The student uses an algebraic perspective to analyze the geometry of two- and three-dimensional figures in a variety of situations.	
Ninth and Tenth Grades Knowledge Base Indicators	
The student...	
1. recognizes and examines two- and three-dimensional figures and their attributes including the graphs of functions on a coordinate plane using various methods including mental math, paper and pencil, concrete objects, and graphing utilities or other appropriate technology (2.4.K1f).	SE: 224–225, 269, 294, 375, 398, 530–533, 538, 545, 556, 603, 729–730, 787 TWE: 224–225, 269, 294, 375, 398, 530–533, 538, 545, 556, 603, 729–730, 787
2. determines if a given point lies on the graph of a given line or parabola without graphing and justifies the answer (2.4.K1f).	SE: 218–219, 524–528, 579 TWE: 218–219, 524–528, 579
3. calculates the slope of a line from a list of ordered pairs on the line and explains how the graph of the line is related to its slope (2.4.K1f).	SE: 256–264, 280–285, 300–301 TWE: 256–264, 280–285, 300–301
4. finds and explains the relationship between the slopes of parallel and perpendicular lines (2.4.K1f), e.g., $2x + 3y = 12$ name a linear function. What is the slope of the line that is formed by this equation? Write an equation of a perpendicular to $2x + 3y = 12$. Explain how the slopes of all three of these lines relate to each other.	SE: 292–295, 311–312 TWE: 292–295, 311–312

CONTENT STANDARDS	PAGE REFERENCES
5. uses the Pythagorean Theorem to find distance (may use the distance formula) (2.4.K1f).	SE: 605–610, 611–615 TWE: 605–610, 611–615
6. recognizes the equation of a line and transforms the equation into slope-intercept form in order to identify the slope and y-intercept and uses this information to graph the line (2.4.K1f).	SE: 272–275, 280–285 TWE: 272–275, 280–285
7. recognizes the equation $y = ax^2 + c$ as a parabola; represents and identifies characteristics of the parabola including opens upward or opens downward, steepness (wide/narrow), the vertex, maximum and minimum values, and line of symmetry; and sketches the graph of the parabola (2.4.K1f).	SE: 524–532, 533–537 TWE: 524–532, 533–537
8. explains the relationship between the solution(s) to systems of equations and systems of inequalities in two unknowns and their corresponding graphs (2.4.K1f), e.g., for equations, the lines intersect in either one point, no points, or infinite points; and for inequalities, all points in double-shaded areas are solutions for both inequalities.	SE: 369–374, 376–380, 382–385, 387–390, 394–398 TWE: 369–374, 376–380, 382–385, 387–390, 394–398
Ninth and Tenth Grades Application Indicators The student...	
1. represents, generates, and/or solves real-world problems that involve distance and two-dimensional geometric figures including parabolas in the form $ax^2 + c$ (2.4.A1e), e.g., compare the heights of 2 different objects whose paths are represented $h_1(t) = 3t^2 + 1$ and $h_2(t) = 1/2t^2 + 4$ (where h represents the height in feet and t represents elapsed time in seconds) during the interval from 0–5 seconds.	SE: 524–532, 533–537 TWE: 524–532, 533–537
2. translates between the written, numeric, algebraic, and geometric representations of a real-world problem (2.4.A1a-e), e.g., given a situation, write a function rule, make a T-table of the algebraic relationship, and graph the order pairs.	SE: 208–209, 223, 226–231, 247–246 TWE: 208–209, 223, 226–231, 247–246
3. recognizes and explains the effects of scale changes on the appearance of the graph of an equation involving a line or parabola (2.4.A1g).	SE: 208–209, 223, 226–231, 247–246, 524–532, 533–537 TWE: 208–209, 223, 226–231, 247–246, 524–532, 533–537

CONTENT STANDARDS	PAGE REFERENCES
4. analyzes how changes in the constants and/or leading coefficients within the equation of a line or parabola affects the appearance of the graph of the equation (2.4.A1e).	SE: 208–209, 223, 226–231, 247–246, 524–532, 533–537 TWE: 208–209, 223, 226–231, 247–246, 524–532, 533–537
Standard 4: Data The student uses concepts and procedures of data analysis in a variety of situations.	
Benchmark 1: Probability The student applies probability theory to draw conclusions, generate convincing arguments, make predictions and decisions, and analyze decisions including the use of concrete objects in a variety of situations.	
Ninth and Tenth Grades Knowledge Base Indicators The student...	
1. finds the probability of two independent events in an experiment, simulation, or situation (2.4.K1k).	SE: 769–775, 790 TWE: 769–775, 790
2. finds the conditional probability of two dependent events in an experiment, simulation, or situation (2.4.K1k).	SE: 769–775, 790 TWE: 769–775, 790
3. explains the relationship between probability and odds and computes one given the other (2.4.K1a,k).	SE: 97–98, 114 TWE: 97–98, 114
Ninth and Tenth Grades Application Indicators The student...	
1. conducts an experiment or simulation with two dependent events; records the results in charts, tables, or graphs; and uses the results to generate convincing arguments, draw conclusions and make predictions (2.4.A1h-i).	SE: 769–775, 790 TWE: 769–775, 790
2. uses theoretical or empirical probability of a simple or compound event composed of two or more simple, independent events to make predictions and analyze decisions about real-world situations including:	
a. work in economics, quality control, genetics, meteorology, and other areas of science (2.4.A1a);	SE: 782–792, 852 TWE: 782–792, 852
b. games (2.4.A1a);	SE: 782–792, 852 TWE: 782–792, 852
c. situations involving geometric models, e.g., spinners or dartboards (2.4.A1f).	SE: 754–758, 760, 769–776, 778–784 TWE: 754–758, 760, 769–776, 778–784

CONTENT STANDARDS	PAGE REFERENCES
3. compares theoretical probability (expected results) with empirical probability (experimental results) of two independent and/or dependent events and understands that the larger the sample size, the greater the likelihood that experimental results will match theoretical probability (2.4.A1h).	SE: 769–770, 773, 782–784, 792, 852 TWE: 769–770, 773, 782–784, 792, 852
4. uses conditional probabilities of two dependent events in an experiment, simulation, or situation to make predictions and analyze decisions.	SE: 769–770, 773–790 TWE: 769–770, 773–790
Benchmark 2: Statistics The student collects, organizes, displays, explains, and interprets numerical (rational) and non-numerical data sets in a variety of situations.	
Ninth and Tenth Grades Knowledge Base Indicators The student...	
1. organizes, displays, and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized, and accurate manner including a title, labels, categories, and rational number intervals using these data displays (2.4.K1I).	
a. frequency tables;	SE: 806–807 TWE: 806–807
b. bar, line, and circle graphs;	SE: 48, 50–53, 62, 806–807 TWE: 48, 50–53, 62, 806–807
c. Venn diagrams or other pictorial displays;	SE: 70 TWE: 70
d. charts and tables;	SE: 50–55, 62 TWE: 50–55, 62
e. stem-and-leaf plots (single and double);	SE: 88–92, 101, 112–113, 134, 449, 734–735, 758, 824 TWE: 88–92, 101, 112–113, 134, 449, 734–735, 758, 824
f. scatter plots;	SE: 298–299, 300–304, 312, 323, 729 TWE: 298–299, 300–304, 312, 323, 729
g. box-and-whiskers plots;	SE: 737–742, 748–749, 758 TWE: 737–742, 748–749, 758

CONTENT STANDARDS	PAGE REFERENCES
h. histograms.	SE: 722–728, 736, 741–742, 746–749, 781 TWE: 722–728, 736, 741–742, 746–749, 781
2. explains how the reader’s bias, measurement errors, and display distortions can affect the interpretation of data.	SE: 709–710, 721, 745–746 TWE: 709–710, 721, 745–746
3. calculates and explains the meaning of range, quartiles and interquartile range for a real number data set (2.4.K1a).	SE: 732–736, 747–748, 850 TWE: 732–736, 747–748, 850
4. explains the effects of outliers on the measures of central tendency (mean, median, mode) and range and interquartile range of a real number data set (2.4.K1a).	SE: 732–736, 747–748, 850 TWE: 732–736, 747–748, 850
5. approximates a line of best fit given a scatter plot and makes predictions using the equation of that line (2.4.K1k).	SE: 298–299, 300–304, 312, 323, 729 TWE: 298–299, 300–304, 312, 323, 729
6. compares and contrasts the dispersion of two given sets of data in terms of range and the shape of the display including (2.4.K1k):	
a. symmetrical (including normal),	This standard is taught in Glencoe’s <i>Algebra 2</i> ©2003 and <i>Advanced Mathematical Concepts</i> ©2004
b. skew-left or skew-right,	This standard is taught in Glencoe’s <i>Algebra 2</i> ©2003 and <i>Advanced Mathematical Concepts</i> ©2004
c. bimodal,	This standard is taught in Glencoe <i>Advanced Mathematical Concepts</i> ©2004
d. uniform (rectangular).	This standard is taught in Glencoe <i>Advanced Mathematical Concepts</i> ©2004
Ninth and Tenth Grades Application Indicators The student...	
1. uses data analysis (mean, median, mode, range, quartile, interquartile range) in real-world problems with rational number data sets to compare and contrast two sets of data, to make accurate inferences and predictions, to analyze decisions, and to develop convincing arguments from these data displays (2.4.A1i) \$:	
a. frequency tables;	SE: 806–807 TWE: 806–807
b. bar, line, and circle graphs;	SE: 48, 50–53, 62, 806–807 TWE: 48, 50–53, 62, 806–807
c. Venn diagrams or other pictorial displays;	SE: 70 TWE: 70

CONTENT STANDARDS	PAGE REFERENCES
d. charts and tables;	SE: 50–55, 62 TWE: 50–55, 62
e. stem-and-leaf plots (single and double);	SE: 88–92, 101, 112–113, 134, 449, 734–735, 758, 824 TWE: 88–92, 101, 112–113, 134, 449, 734–735, 758, 824
f. scatter plots	SE: 298–299, 300–304, 312, 323, 729 TWE: 298–299, 300–304, 312, 323, 729
g. box-and-whiskers plots;	SE: 737–742, 748–749, 758 TWE: 737–742, 748–749, 758
h. histograms.	SE: 722–728, 736, 741–742, 746–749, 781 TWE: 722–728, 736, 741–742, 746–749, 781
2. determines and describes appropriate data collection techniques (observations, surveys, or interviews) and sampling techniques (random sampling, samples of convenience, biased sampling, census of total population, or purposeful sampling) in a given situation.	SE: 709–710, 721, 745–746 TWE: 709–710, 721, 745–746
3. uses changes in scales, intervals, and categories to help support a particular interpretation of the data (2.4.A1i).	SE: 48, 50, 53, 62, 70, 78, 88–92, 112–113, 715, 722–728, 734–735, 737–742, 743–744, 746–747, 748–749, 806–809 TWE: 48, 50, 53, 62, 70, 78, 88–92, 112–113, 715, 722–728, 734–735, 737–742, 743–744, 746–747, 748–749, 806–809
4. determines and explains the advantages and disadvantages of using each measure of central tendency and the range to describe a data set (2.4.K1i).	SE: 88–95, 732–736, 747–748 TWE: 88–95, 732–736, 747–748
5. analyzes the effects of:	
a. outliers on the mean, median, and range of a real number data set;	SE: 732–736, 747–748, 850 TWE: 732–736, 747–748, 850
b. changes within a real number data set on mean, median, mode, range, quartiles, and interquartile range.	SE: 88–95, 732–736, 747–748 TWE: 88–95, 732–736, 747–748

CONTENT STANDARDS	PAGE REFERENCES
6. approximates a line of best fit given a scatter plot, makes predictions, and analyzes decisions using the equation of that line (2.4.A1i).	SE: 298–299, 300–304, 312, 323, 729 TWE: 298–299, 300–304, 312, 323, 729