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MATHEMATICS: APPLICATIONS AND CONCEPTS, ©2004 COURSE 3
Correlated to
Kansas Mathematics Curriculum Standards
Grade Eight

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 simple algebraic expressions in a variety of situations.**	
Eighth Grade Knowledge Base Indicators The student…	
1. knows, explains, and uses equivalent representations for rational numbers and simple algebraic expressions including integers, fractions, decimals, percents, and ratios; rational number bases with integer exponents; rational numbers written in scientific notation with integer exponents; time; and money (2.4.K1a) **$**.	SE: 63, 98–99, 104, 105, 156, 206, 207, 210, 211, 469, 611 TWE: 63, 98–99, 104, 105, 156, 206, 207, 210, 211, 469, 611
2. compares and orders rational numbers, the irrational number pi, and algebraic expressions (2.4.K1a) **$**, e.g., which expression is greater ¯ 3n or 3n? It depends on the value of n. If n is positive, 3n is greater. If n is negative, ¯3n is greater. If n is zero, they are equal.	SE: 18, 21, 67, 68–69, 105, 127, 212 TWE: 18, 21, 67, 68–69, 105, 127, 212
3. explains the relative magnitude between rational numbers, the irrational number pi, and algebraic expressions (2.4.K1a).	The opportunity to address this objective is available. See the following: SE: 18, 21, 67, 68–69, 105, 127, 212 TWE: 18, 21, 67, 68–69, 105, 127, 212
4. recognizes and describes irrational numbers (2.4.K1a), e.g., ? 2 is a non-repeating, non-terminating decimal; or π (pi) is a non-terminating decimal.	SE: 125 TWE: 125

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5. knows and explains what happens to the product or quotient when (2.4.K1a):	
a. a positive number is multiplied or divided by a rational number greater than zero and less than one, e.g., if 24 is divided by 1/3, will the answer be larger than 24 or smaller than 24? Explain.	SE: 34–36, 71–73, 76–78 TWE: 34–36, 71–73, 76–78
b. a positive number is multiplied or divided by a rational number greater than one,	SE: 72, 76–78 TWE: 72, 76–78
c. a nonzero real number is multiplied or divided by zero.	This objective is covered in Glencoe *Pre-Algebra* ©2003
6. explains and determines the absolute value of real numbers (2.4.K1a).	SE: 19 TWE: 19
Eighth Grade Application Indicators The student…	
1. generates and/or solves real-world problems using equivalent representations of rational numbers and simple algebraic expressions (2.4.A1a) **$**, e.g., a paper reports a company's gross income as $1.2 billion and their total expenses were $30,450,000. What is the company's net profit?	SE: 63–65, 98, 100–101, 104–105, 106–107, 156–157, 206–207, 210, 212–213, 471, 611 TWE: 63–65, 98, 100–101, 104–105, 106–107, 156–157, 206–207, 210, 212–213, 471, 611
2. determines whether or not solutions to real-world problems using rational numbers, the irrational number pi, and simple algebraic expressions are reasonable (2.4.A1a) **$**, e.g., the city park is putting a picket fence around their circular rose garden. The garden has a diameter of 7.5 meters. The planner wants to buy 20 meters of fencing. Is this a reasonable length of fence?	The opportunity to address this objective is available. See the following: SE: 7, 63–65, 98, 100–101, 104–105, 106–107, 156–157, 206–207, 210, 212–213, 471, 611 TWE: 7, 63–65, 98, 100–101, 104–105, 106–107, 156–157, 206–207, 210, 212–213, 471, 611
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.**	
Eighth Grade 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: 125–129 TWE: 125–129

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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.K1l). (For the purpose of assessment, irrational numbers will not be included.)	SE: 125–129 TWE: 125–129
3. names, uses, and describes these properties with the rational number system and demonstrates their meaning including the use of concrete objects (2.4.K1a) **$**:	
a. commutative, associative, distributive, and substitution properties [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; substitution: if a = 2, then 3a = 3 x 2 = 6];	SE: 13, 35, 545 TWE: 13, 35, 545
b. identity properties for addition and multiplication and inverse properties of addition and multiplication (additive identity: a + 0 = a, multiplicative identity: a • 1 = a, additive inverse: $^{+}5 + {}^{-}5 = 0$, multiplicative inverse: 8 x 1/8 = 1);	SE: 13, 25, 50, 76 TWE: 13, 25, 50, 76
c. symmetric property of equality, e.g., 7 + 2 = 9 has the same meaning as 9 = 7 + 2;	This objective is covered in Glencoe *Pre-Algebra* ©2003
d. addition and multiplication properties of equalities, e.g., if a = b, then a + c = b + c;	SE: 46, 51 TWE: 46, 51
e. addition property of inequalities, e.g., if a > b, then a + c > b + c;	SE: 496 TWE: 496
f. zero product property, e.g., if ab = 0, then a = 0 and/or b = 0.	This objective is covered in Glencoe *Pre-Algebra* ©2003
Eighth Grade Application Indicators The student…	
1. generates and/or solves real-world problems with rational numbers using the concepts of these properties to explain reasoning (2.4.A1a) **$**:	
a. commutative, associative, distributive, and substitution properties; e.g., we need to place trim around the outside edges of a bulletin board with dimensions of 3ft by 5 ft. Explain two different methods of solving this problem and why they are equivalent.	The opportunity to address this objective is available. See the following: SE: 13, 35, 545 TWE: 13, 35, 545

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b. identity and inverse properties of addition and multiplication; e.g., I had $50. I went to the mall and spent $20 in one store, $25 at a second store and then $5 at the food court. To solve: [$50 – ($20 + $25 + $5) = $50 - $50 = 0]. Explain your reasoning.	SE: 25, 50 TWE: 25, 50
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 addition and multiplication properties of equality; e.g., the total price (P) of a car, including tax (T), is $14, 685. 33. If the tax is $785.42, what is the sale price of the car (S)? P = S + T $14, 685.33 = S + $785.42 $14, 685.33 - $785.42 = S $13, 899.91 = S	This objective is covered in Glencoe *Pre-Algebra* ©2003
e. zero product property, e.g., Jenny was thinking of two numbers. Jenny said that the product of the two numbers was 0. What could you deduct from this statement? Explain your reasoning.	This objective is covered in Glencoe *Pre-Algebra* ©2003
2. analyzes and evaluates the advantages and disadvantages of using integers, whole numbers, fractions (including mixed numbers), or decimals in solving a given real-world problem (2.4.A1a) **$**, e.g., in the store everything is 33 1/3% off. When calculating the discount, which representation of 33 1/3% would you use and why?	The opportunity to address this objective is available. See the following: SE: 17, 18, 25, 34, 36, 62, 82, 83, 88, 207, 611 TWE: 17, 18, 25, 34, 36, 62, 82, 83, 88, 207, 611
Benchmark 3: Estimation **The student uses computational estimation with real numbers in a variety of situations.**	
Eighth Grade Knowledge Base Indicators The student…	
1. estimates real number quantities using various computational methods including mental math, paper and pencil, concrete objects, and/or appropriate technology (2.4.K1a) **$**.	SE: 120–121, 122, 228, 229, 230, 321, 336, 600, 601 TWE: 120–121, 122, 228, 229, 230, 321, 336, 600, 601
2. uses various estimation strategies and explains how they were used to estimate real number quantities and simple algebraic expressions (2.4.K1a) **$**.	SE: 122, 230, 601 TWE: 122, 230, 601

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3. knows and explains why a decimal representation of the irrational number pi is an approximate value (2.4.K1c).	SE: 319 TWE: 319
4. knows and explains between which two consecutive integers an irrational number lies (2.4.K1a).	SE: 121 TWE: 121
Eighth Grade 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) **$**, e.g., estimate the height of a building from a picture; in the next picture, a person is standing next to the building, and then adjust your original estimate.	The opportunity to address this objective is available. See the following: SE: 121, 228, 229, 230, 321, 601 TWE: 121, 228, 229, 230, 321, 601
2. estimates to check whether or not the result of a real-world problem using rational numbers and/or simple algebraic expressions is reasonable and makes predictions based on the information (2.4.A1a) **$**, e.g., you have a $4,000 debt on a credit card. If you pay the minimum of $30 per month, is it reasonable to pay off the debt in 10 years?	The opportunity to address this objective is available. See the following: SE: 121, 228, 229, 230, 321, 601 TWE: 121, 228, 229, 230, 321, 601
3. determines a reasonable range for the estimation of a quantity given a real-world problem and explains the reasonableness of the range (2.4.A1c) **$**, e.g., determine the reasonable range for the weight of a book and explain why this range is reasonable.	The opportunity to address this objective is available. See the following: SE: 121, 228, 229, 230, 321, 442–443, 601 TWE: 121, 228, 229, 230, 321, 442–443, 601
4. determines if a real-world problem calls for an exact or approximate answer and performs the appropriate computation using various computational methods including mental mathematics, paper and pencil, concrete objects, and/or appropriate technology (2.4.A1a) **$**, e.g., do you need an exact or an approximate answer when calculating the area of the walls in a room to determine the number of rolls of wallpaper needed to paper the room. An approximation is appropriate for the area but an exact answer is needed for the number of roles. What would you do if you were wallpapering 2 rooms?	The opportunity to address this objective is available. See the following: SE: 89 TWE: 89

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5. explains the impact of estimation on the result of a real-world problem (underestimate, overestimate, range of estimates) (2.4.A1a) **$**, e.g., you are estimating the total of three large purchases ($489, $553, and $92). If you rounded each to the nearest $10, would your estimate be slightly lower or higher than the actual amount spent? If you rounded each to the nearest $100, would your estimate be slightly lower or higher than the actual amount spent?	The opportunity to address this objective is available. See the following: SE: 121, 228, 229, 230, 321, 601 TWE: 121, 228, 229, 230, 321, 601
Benchmark 4: Computation **The student models, performs, and explains computation with rational numbers, the irrational number pi, and algebraic expressions in a variety of situations.**	
Eighth Grade Knowledge Base Indicators The student…	
1. computes with efficiency and accuracy using various computational methods including mental math, paper and pencil, concrete objects, and appropriate technology (2.4.K1a) **$**.	This objective is addressed throughout. See, for example: SE: 14–15, 65, 97, 128–129, 171, 218, 242, 269, 313, 361, 495, 535, 582–583 TWE: 14–15, 65, 97, 128–129, 171, 218, 242, 269, 313, 361, 495, 535, 582–583
2. performs and explains these computational procedures with rational numbers (2.4.K1a) **$**:	
a. **N** addition, subtraction, multiplication, and division of integers **$**;	SE: 23–25, 28–29, 34–36 TWE: 23–25, 28–29, 34–36
b. **N** order of operations (evaluates within grouping symbols, evaluates powers to the second or third power, multiplies or divides in order from left to right, then adds or subtracts in order from left to right);	SE: 11 TWE: 11
c. approximation of roots of numbers using calculators;	SE: 117, 121 TWE: 117, 121
d. multiplication or division to find:	
i. a percent of a number, e.g., what is 0.5% of 10?	SE: 216–217, 218–219, 220–221, 222–223 TWE: 216–217, 218–219, 220–221, 222–223
ii. percent of increase and decrease, e.g., ex; if two coins are removed from ten coins, what is the percent of decrease?	SE: 236–237 TWE: 236–237
iii. K1.4.2dii If two coins are removed from ten coins, what is the percent of decrease?	SE: 236–237 TWE: 236–237

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iv. percent one number is of another number, e.g., what percent of 80 is 120?	SE: 216–217, 218–219 TWE: 216–217, 218–219
v. a number when a percent of the number is given, e.g., 15% of what number is 30?	SE: 216–217, 218–219 TWE: 216–217, 218–219
e. addition of polynomials, e.g., $(3x – 5) + (2x + 8) = 5x + 3$.	SE: 574, 575, 576–577 TWE: 574, 575, 576–577
f. simplifies algebraic expressions in one variable by combining like terms or using the distributive property (2.4.K1a), e.g., $^{-}3(x – 4)$ is the same as $^{-}3x + 12$.	SE: 471, 472–473 TWE: 471, 472–473
3. finds factors and common factors of simple monomial expressions (2.4.K1d), e.g., given the monomials $10m^2n^3$ and $15a^2mn^2$; some common factors would be 5, m, and n^2.	SE: 609 TWE: 609
Eighth Grade Application Indicators The student…	
1. generates and/or solves one- and two-step real-world problems using computational procedures and mathematical concepts (2.4.A1a) with **$**:	
a. rational numbers, e.g., find the height of a triangular garden given that the area to be covered is 400 square feet with a base of 12 1/2 feet;	This objective is addressed throughout. See, for example: SE: 36, 78, 105, 143, 171, 217, 258, 316, 343, 389, 421, 451, 502, 540 TWE: 36, 78, 105, 143, 171, 217, 258, 316, 343, 389, 421, 451, 502, 540
b. the irrational number pi as an approximation, e.g., find the radius to the nearest tenth of a foot of a sprinkler system given the area in square feet;	SE: 321 TWE: 321
c. applications of percents, e.g., sales tax or discounts. (For the purpose of assessment, percents greater than or equal to 100% will be used.)	SE: 206–209, 210, 212–214, 217, 218–219, 220, 222–223, 227, 228–229, 230–231, 232–233, 234–235, 236–238, 239–240, 241–242, 243–244 TWE: 206–209, 210, 212–214, 217, 218–219, 220, 222–223, 227, 228–229, 230–231, 232–233, 234–235, 236–238, 239–240, 241–242, 243–244

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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 from a variety of situations.**	
Eighth Grade Knowledge Base Indicators The student…	
1. identifies, states, and continues a pattern presented in various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes:	
a. counting numbers including perfect squares, cubes, and factors and multiples with positive rational numbers (number theory) (2.4.K1a).	SE: 512–513, 514–515 TWE: 512–513, 514–515
b. rational numbers including arithmetic and geometric sequences (arithmetic: sequence of numbers in which the difference of two consecutive numbers is the same, geometric: a sequence of numbers in which each succeeding term is obtained by multiplying the preceding term by the same number) (2.4.K1a), e.g., 1/4, 1/2, 3/4,…;	SE: 512–513, 514–515 TWE: 512–513, 514–515
c. geometric figures (2.4.K1h);	SE: 512 TWE: 512
d. measurements (2.4.K1a);	SE: 515 TWE: 515
e. things related to daily life **$**;	SE: 515 TWE: 515
f. variables and simple expressions, e.g., _1 – x, 2 – x, 3 – x, 4 – x, …; or x, x^2, x^3, …	The opportunity to address this objective is available. See the following: SE: 512–513, 514–515 TWE: 512–513, 514–515
2. generates and explains a pattern (2.4.K1a).	SE: 514–515 TWE: 514–515

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3. generates a pattern limited to two operations (addition, subtraction, multiplication, division, exponents) when given the rule for the nth term (2.4.K1a), e.g., the n^{th} term is n^2+1, find the first 4 terms beginning with n = 1; the terms are 2, 5, 10, and 17.	SE: 512–513, 514–515 TWE: 512–513, 514–515
4. states the rule to find the nth term of a pattern using explicit symbolic notation (2.4.K1a), e.g., given 2, 5, 8, 11, …; find the rule for the nth term, the rule is 3n –1.	The opportunity to address this objective is available. See the following: SE: 512–513, 514–515, 517–518, 519–520 TWE: 512–513, 514–515, 517–518, 519–520
5. describes the pattern when given a table of linear values and plots the ordered pairs on a coordinate plane (2.4.K1f-g), e.g., in the table below, the pattern could be described as the x-coordinates are increasing by 6, or if the x is doubled, add one to find the y realizing that the written descriptions may vary. **X** 2 5 8 11 **Y** 5 11 17 23	SE: 522–523 TWE: 522–523
Eighth Grade Application Indicators The student…	
1. generalizes numerical patterns using algebra and then translates between the equation, graph, and table of values resulting from the generalization (2.4.A1d-e,j) $, e.g., water is billed at $.01 per gallon, plus a basic fee of $10 per month for being connected to the water district. **Gallons | Cost in a given month** Graph these: 1 | $10 = 1*.01 → (1,10.01) 2 | $10 = 2*.01 → (2,10.01) . | . . | . n | 10 = n*.01 → (n, .01n = 10) where C = total cost and G = gallons used, C = .01G = 10] **(Title/Labels needed)**	SE: 517–518, 521, 522–523, 532, 533–535, 544–545, 560–561, 614 TWE: 517–518, 521, 522–523, 532, 533–535, 544–545, 560–561, 614
2. recognizes the same general pattern presented in different representations [numeric (list or table), visual (picture, table, or graph), and written] (2.4.A1a,j) **$**.	SE: 474, 482–483, 512–515, 516, 517–518, 522–523, 526–527, 532, 533–534, 544–545, 560–561, 614 TWE: 474, 482–483, 512–515, 516, 517–518, 522–523, 526–527, 532, 533–534, 544–545, 560–561, 614

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Benchmark 2: Variable, Equations, and Inequalities **The student uses variables, symbols, real numbers, and algebraic expressions to solve equations and inequalities in a variety of situations.**	
Eighth Grade Knowledge Base Indicators The student…	
1. identifies independent and dependent variables within a given situation.	SE: 518 TWE: 518
2. simplifies algebraic expressions in one variable by combining like terms or using the distributive property (2.4.K1a), e.g., $^{-}3(x - 4)$ is the same as $^{-}3x + 12$.	SE: 469–471, 472–479 TWE: 469–471, 472–479
3. solves (2.4.K1a,e) **$**:	
a. one- and two-step linear equations in one variable with rational number coefficients and constants intuitively and/or analytically;	SE: 45–47, 48–49, 50–51, 52–53, 92–93, 94–95, 474–476, 477, 478–479, 480–481, 482–483 TWE: 45–47, 48–49, 50–51, 52–53, 92–93, 94–95, 474–476, 477, 478–479, 480–481, 482–483
b. one-step linear inequalities in one variable with rational number coefficients and constants intuitively, analytically, and graphically e.g., $^{-}2x > 10$;	SE: 496–497, 498–499, 500–502, 503–504 TWE: 496–497, 498–499, 500–502, 503–504
c. systems of given linear equations with whole number coefficients and constants graphically	SE: 544, 545, 546–547 TWE: 544, 545, 546–547
4. knows and describes the mathematical relationship between ratios, proportions, and percents and how to solve for a missing monomial or binomial term in a proportion (2.4.K1c), e.g., 1/2 = 1/x + 2.	SE: 156–157, 170–171, 206–207, 216–217 TWE: 156–157, 170–171, 206–207, 216–217
5. represents and solves algebraically **$**:	
a. the number when a percent and a number are given,	SE: 216–217, 218–219 TWE: 216–217, 218–219
b. what percent one number is of another number,	SE: 216–217, 218–219 TWE: 216–217, 218–219
c. percent of increase or decrease, e.g., finding the percent when given the original and current amount.	SE: 236–238, 239–240 TWE: 236–238, 239–240

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6. evaluates formulas using substitution **$**.	SE: 314–315, 320–321, 335, 347–349, 352–353, 545, 613 TWE: 314–315, 320–321, 335, 347–349, 352–353, 545, 613
Eighth Grade Application Indicators The student…	
1. represents real-world problems using (2.4.A1d) **$**:	
a. variables, symbols, expressions, one- or two-step equations with rational number coefficients and constants, e.g., today John is 3.25 inches more than half his sister's height. If J = John's height, and S = his sister's height, then J = 0.5S + 3.25.	This objective is addressed throughout. See, for example: SE: 34, 76, 117, 160, 232, 268, 321, 389, 426, 478, 517, 540, 570 TWE: 34, 76, 117, 160, 232, 268, 321, 389, 426, 478, 517, 540, 570
b. one-step inequalities with rational number coefficients and constants, e.g., after Randy paid $38.50 for a watch, he had less than $5.50 left. Represent this situation with an inequality. x + 5.50 < 38.50 or x – 38.50 < 5.50	SE: 492, 494–495, 496, 497, 498, 499, 500 TWE: 492, 494–495, 496, 497, 498, 499, 500
c. systems of linear equations with whole number coefficients and constants, e.g., two students collected the same amount of money for a walk-a-thon. One student received $5 per mile and a donation of $10, while the other student received $2 per mile and a donation of $20. How many miles did they walk?	SE: 544–545 TWE: 544–545
2. solves real-world problems with two-step linear equations in one variable with rational number coefficients and constants and rational solutions intuitively, analytically, and graphically (2.4.A1e) **$**.	SE: 474, 478, 479 TWE: 474, 478, 479
3. generates real-world problems that represent (2.4.A1d) **$**:	
a. one- or two-step linear equations, **$**, e.g., given the equation 2x + 10 = 30, the problem could be I bought two shirts and a pair of $10 pants. How much was a shirt, if the total bill was $30?	SE: 40, 50, 51, 92, 93, 474, 479, 484, 544, 545 TWE: 40, 50, 51, 92, 93, 474, 479, 484, 544, 545
b. one-step linear inequalities, e.g., write a real-world situation that represents the inequality x + 10 > 30. The problem could be: If you give me $10, I will have more than $30.	SE: 492, 493, 497, 498–499, 500 TWE: 492, 493, 497, 498–499, 500

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4. explains the mathematical reasoning that was used to solve a real-world problem using one- or two-step linear equations and inequalities and discusses the advantages and disadvantages to various strategies that may have been used to solve the problem, (2.4.A1d) **$**, e.g., given the inequality x + 10 > 30, subtract the same number from both sides of the inequality or graph the left side as y1 and the right side as y2 and find on the graph where y1 is less than y2. The first method gives an exact answer; the second method gives a good visual and can be used to solve harder inequalities.	The opportunity to address this objective is available. See the following: SE: 50, 51, 92, 93, 117, 474, 479, 484, 544, 545 TWE: 50, 51, 92, 93, 117, 474, 479, 484, 544, 545
Benchmark 3: Functions **The student recognizes, describes, and analyzes, constant, linear, and nonlinear relationships in a variety of situations.**	
Eighth Grade Knowledge Base Indicators The student…	
1. recognizes and examines constant, linear, and nonlinear relationships using various methods including mental math, paper and pencil, concrete objects, and graphing utilities or appropriate technology (2.4.K1a,e-g) **$**.	SE: 470, 522–523, 565–566 TWE: 470, 522–523, 565–566
2. knows and describes the difference between constant, linear, and nonlinear relationships (2.4.K1g).	The opportunity to address this objective is available. See the following: SE: 470, 522–523, 565–566 TWE: 470, 522–523, 565–566
3. explains the concepts of slope and x- and y-intercepts of a line (2.4.K1g).	SE: 523, 526–527 TWE: 523, 526–527
4. recognizes and identifies the graphs of constant and linear functions (2.4.K1g) **$**.	SE: 522–523, 565–566 TWE: 522–523, 565–566
5. identifies ordered pairs from a graph, and/or plots ordered pairs using a variety of scales for the x- and y-axis(2.4.K1g).	SE: 142, 532, 534, 535–536, 544–545, 546–547, 548–549, 550–551, 563 TWE: 142, 532, 534, 535–536, 544–545, 546–547, 548–549, 550–551, 563

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Eighth Grade Application Indicators The student…	
1. represents a variety of constant and linear relationships using written or oral descriptions of the rule, tables, graphs, and symbolic notation (2.4.A1d-f) **$**.	SE: 522–523, 544–545, 565–566 TWE: 522–523, 544–545, 565–566
2. interprets, describes, and analyzes the mathematical relationships of numerical, tabular, and graphical representations (2.4.A1j) **$**.	SE: 522–523, 544–545, 565–566 TWE: 522–523, 544–545, 565–566
3. translates between the numerical, tabular, graphical, and symbolic representations of linear relationships with integer coefficients and constants (2.4.A1a,,j), e.g., a fish tank is being filled with water with a 2-liter jug. There are already 5 liters of water in the fish tank. Therefore, you are showing how full the tank is as you empty 2-liter jugs of water into it. Y = 2x = 5 (symbolic) can be represented in a table (tabular) – **X** 0 1 2 3 **Y** 5 7 9 11 and as a graph (graphical)	The opportunity to address this objective is available. See the following: SE: 522–523, 544–545, 565–566 TWE: 522–523, 544–545, 565–566
Benchmark 4: Models **The student generates and uses mathematical models to represent and justify mathematical relationships found in a variety of situations.**	
Eighth Grade 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.K1–6, 1.2.K1, 1.2.K3, 1.3.K1–2, 1.3.K4, 1.4.K1–2, 2.1.K1a-b, 2.1.K1d-e, 2.1.K2–4, 2.2.K2–3, 3.1.K9, 3.2.K1–4, 3.3.K1–4, 3.4.K4, 4.2.K4–5) **$**;	This objective is addressed throughout. See, for example: SE: 6, 45, 116, 178, 216, 262, 319, 380, 400, 512, 565, 590 TWE: 6, 45, 116, 178, 216, 262, 319, 380, 400, 512, 565, 590
b. place value models (place value mats, hundred charts, base ten blocks, or unifix cubes) to compare, order, and represent numerical quantities and to model computational procedures **$**;	This objective is covered in Glencoe *Mathematics: Applications and Concepts,* Course 1 ©2004

CONTENT STANDARDS	PAGE REFERENCES
c. fraction and mixed number models (fraction strips or pattern blocks and decimal and money models (base ten blocks or coins to compare, order, and represent numerical quantities (1.3.K3, 2.3.K6) **$**:	SE: 71, 85, 212 TWE: 71, 85, 212
d. factor trees to model least common multiple, greatest common factor, and prime factorization (1.4.K3);	SE: 609 TWE: 609
e. equations and inequalities to model numerical relationships (2.2.K3, (3.4.K2) **$**;	SE: 13, 18, 40, 45–47, 50–51, 92–93, 474–476, 478–479, 482–483, 484–485, 492–493, 496–497, 500–502, 544–545, 548–549, 551 TWE: 13, 18, 40, 45–47, 50–51, 92–93, 474–476, 478–479, 482–483, 484–485, 492–493, 496–497, 500–502, 544–545, 548–549, 551
f. function tables to model numerical and algebraic relationships (2.1.K5, 3.4.K2) **$** ;	SE: 518, 522–523, 533, 560–561, 565–566 TWE: 518, 522–523, 533, 560–561, 565–566
g. coordinate planes to model relationships between ordered pairs and linear equations and inequalities (2.1.K5, 2.3.K1–5, 3.4.K2–3) **$**;	SE: 522–523, 532, 533–534, 544–545, 548–549, 563, 614 TWE: 522–523, 532, 533–534, 544–545, 548–549, 563, 614
h. two- and three-dimensional geometric models (geoboards, dot paper, nets, or solids) and real-world objects to model perimeter, area, volume, surface area, and properties of two-and three-dimensional figures (2.1.K1c, 3.1.K1–6, 3.1.K8, 3.1.K10, 3.2.K5, 3.3.K4–5);	SE: 314–315, 319, 326–327, 330, 331–334, 335–337, 342–345, 346, 347–350, 352–355 TWE: 314–315, 319, 326–327, 330, 331–334, 335–337, 342–345, 346, 347–350, 352–355
i. scale drawings to model large and small real-world objects (3.3.K3–4);	SE: 184–185, 186–187 TWE: 184–185, 186–187
j. geometric models (spinners, targets, or number cubes), process models (coins, pictures, or diagrams), and tree diagrams to model probability (4.1.K1–5) **$**;	SE: 374–375, 376, 380, 382–383, 392, 396–397, 398, 400–401, 402–403 TWE: 374–375, 376, 380, 382–383, 392, 396–397, 398, 400–401, 402–403
k. frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, charts, tables, single and double stem-and-leaf plots, scatter plots, box-and-whisker plots, and histograms to organize and display data (4.2.K1, 4.2.K6) **$**;	SE: 123, 420–421, 425, 426–427, 446–447, 518, 539–540, 602 TWE: 123, 420–421, 425, 426–427, 446–447, 518, 539–540, 602

CONTENT STANDARDS	PAGE REFERENCES
l. Venn diagrams to sort data and to show relationships (1.2.K2).	SE: 123 TWE: 123
Eighth Grade 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.A1–2, 1.2.A1–2, 1.3.A1–5, 1.4.A1, 2.1.A1, 3.1.A1, 3.2.A1–2, 3.3.A1, 3.4.A1–2) **$**;	The opportunity to address this objective is available throughout. See, for example: SE: 6, 45, 116, 178, 216, 262, 319, 380, 400, 512, 565, 590 TWE: 6, 45, 116, 178, 216, 262, 319, 380, 400, 512, 565, 590
b. place value models (place value mats, hundred charts, base ten blocks, or unifix cubes) to model problem situations **$**;	This objective is covered in Glencoe *Mathematics: Applications and Concepts,* Course 1 ©2004
c. fraction and mixed number models (fraction strips or pattern blocks) and decimal and money models (base ten blocks or coins) to compare, order, and represent numerical quantities (3.2.A3) **$**;	SE: 212 TWE: 212
d. equations and inequalities to model numerical relationships (2.1.A2, 2.2.A1–2, 2.3.A1, 3.4.A2) **$**;	The opportunity to address this objective is available. See the following: SE: 13, 18, 40, 45–47, 50–51, 92–93, 474–476, 478–479, 482–483, 484–485, 492–493, 496–497, 500–502, 544–545, 548–549, 551 TWE: 13, 18, 40, 45–47, 50–51, 92–93, 474–476, 478–479, 482–483, 484–485, 492–493, 496–497, 500–502, 544–545, 548–549, 551
e. function tables to model numerical and algebraic relationships (2.1.A2, 2.3.A2, 3.4.A2) **$**;	SE: 518, 522–523, 533, 560–561, 565–566 TWE: 518, 522–523, 533, 560–561, 565–566
f. coordinate planes to model relationships between ordered pairs and linear equations and inequalities (2.3.A1 3.4.A2) **$**;	SE: 522–531, 532, 533–534, 544–545, 548–549, 563 TWE: 522–531, 532, 533–534, 544–545, 548–549, 563

CONTENT STANDARDS	PAGE REFERENCES
g. two- and three-dimensional geometric models (geoboards, dot paper, nets, or solids) and real-world objects to model perimeter, area, volume, surface area and properties of two- and three-dimensional figures (3.3.A3, 3.4.A2);	SE: 314–315, 319, 326–327, 330, 331–334, 335–337, 342–345, 346, 347–350, 352–355 TWE: 314–315, 319, 326–327, 330, 331–334, 335–337, 342–345, 346, 347–350, 352–355
h. scale drawings to model large and small real-world objects (3.1.A1–2, 3.3.A4);	SE: 184–185, 186–187 TWE: 184–185, 186–187
i. geometric models (spinners, targets, or number cubes), process models (coins, pictures, or diagrams), and tree diagrams to model probability (4.1.A1–4);	SE: 374–375, 376, 380, 382–383, 392, 396–397, 398, 400–401, 402–403 TWE: 374–375, 376, 380, 382–383, 392, 396–397, 398, 400–401, 402–403
j. 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, and histograms to describe, interpret, and analyze data (2.1.A1–2, 2.3.A2–3, 4.2.A1, 4.2.A3, 4.2.A1–3) **$**;	SE: 123, 420–421, 425, 426–427, 446–447, 518, 539–540, 602 TWE: 123, 420–421, 425, 426–427, 446–447, 518, 539–540, 602
k. Venn diagrams to sort data and to show relationships.	SE: 123 TWE: 123
2. determines if a given graphical, algebraic, or geometric model is an accurate representation of a given real-world situation **$**.	SE: 430–431, 432–433, 450–451, 452–453, 603 TWE: 430–431, 432–433, 450–451, 452–453, 603
3. uses the mathematical modeling process to analyze and make inferences about real-world situations **$**.	This objective is addressed throughout. See, for example: SE: 6, 45, 116, 178, 216, 262, 319, 380, 400, 512, 533, 590 TWE: 6, 45, 116, 178, 216, 262, 319, 380, 400, 512, 533, 590

CONTENT STANDARDS	PAGE REFERENCES
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 their properties in a variety of situations.**	
Eighth Grade 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: 143, 178–180, 194–195, 262–263, 267–268, 272–273, 283, 290–291, 300–301, 314–315, 319–321, 322–323, 326–327, 330, 331–332, 333, 333–337, 342–343, 345, 346, 347–349, 350–351, 352–353, 354–355 TWE: 143, 178–180, 194–195, 262–263, 267–268, 272–273, 283, 290–291, 300–301, 314–315, 319–321, 322–323, 326–327, 330, 331–332, 333, 333–337, 342–343, 345, 346, 347–349, 350–351, 352–353, 354–355
2. discusses properties of triangles and quadrilaterals related to (2.4.K1h):	
a. sum of the interior angles of any triangle is 180°;	SE: 262 TWE: 262
b. sum of the interior angles of any quadrilateral is 360°;	
i. parallelograms have opposite sides that are parallel and congruent, opposite angles are congruent;	SE: 272 TWE: 272
ii. rectangles have angles of 90°, sides may or may not be equal;	SE: 273 TWE: 273
iii. rhombi have all sides equal in length, angles may or may not be equal;	SE: 273 TWE: 273
iv. squares have angles of 90°, all sides congruent;	SE: 273 TWE: 273
v. trapezoids have one pair of opposite sides parallel and the other pair of opposites sides are not parallel;	SE: 273 TWE: 273
vi. kites have two distinct pairs of adjacent congruent sides.	The opportunity to address this objective is available. See the following: SE: 273 TWE: 273

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3. recognizes and describes the rotational symmetries and line symmetries that exist in two-dimensional figures (2.4.K1h), e.g., draw a picture with a line of symmetry in it. Explain why it is a line of symmetry.	SE: 287 TWE: 287
4. recognizes and uses properties of corresponding parts of similar and congruent triangles and quadrilaterals to find side or angle measures using standard notation for similarity (~) and congruence ($\cong$) (2.4.K1h).	SE: 178–180, 181–182, 279–280, 281–282, 283 TWE: 178–180, 181–182, 279–280, 281–282, 283
5. knows and describes Triangle Inequality Theorem to determine if a triangle exists (2.4.K1h).	The opportunity to address this objective is available. See the following: SE: 262–263, 267–268 TWE: 262–263, 267–268
6. uses the Pythagorean theorem to (2.4.K1h):	
a. determine if a triangle is a right triangle,	SE: 132–134, 135–136, 137–138, 139–140 TWE: 132–134, 135–136, 137–138, 139–140
b. find a missing side of a right triangle where the lengths of all three sides are whole numbers.	SE: 192–193, 267–268, 269–270 TWE: 192–193, 267–268, 269–270
7. recognizes and compares the concepts of a point, line, and plane.	SE: 331 TWE: 331
8. describes the intersection of plane figures, e.g., two circles could intersect at no point, one point, two points, or all points.	SE: 331 TWE: 331
9. describes and explains angle relationships:	
a. when two lines intersect including vertical and supplementary angles;	SE: 256–258, 259–260 TWE: 256–258, 259–260
b. when formed by parallel lines cut by a transversal including corresponding, alternate interior, and alternate exterior angles.	SE: 256–258, 259–260, 261 TWE: 256–258, 259–260, 261
10. recognizes and describes arcs and semicircles as parts of a circle and uses the standard notation for arc and circle (2.4.K1h).	The opportunity to address this objective is available. See the following: SE: 319–321, 322–323 TWE: 319–321, 322–323

CONTENT STANDARDS	PAGE REFERENCES
Eighth Grade 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, proportions, or indirect measurements.	SE: 182, 279, 281–282 TWE: 182, 279, 281–282
b. applying the Pythagorean Theorem, e.g., indirect measurements, map reading/distance, or diagonals.	SE: 133, 134, 136, 137, 138, 139, 140 TWE: 133, 134, 136, 137, 138, 139, 140
Benchmark 2: Measurement and Estimation **The student estimates, measures, and uses geometric formulas in a variety of situations.**	
Eighth Grade Knowledge Base Indicators The student…	
1. determines and uses rational number approximations (estimations) for length, width, weight, volume, temperature, time, perimeter, area, and surface area using standard and nonstandard units of measure (2.4.K1a) **$**.	The opportunity to address this objective is available. See the following: SE: 101, 178–180, 192, 314–315, 319–321, 335–337, 342–343, 345, 347–349, 352–353, 613 TWE: 101, 178–180, 192, 314–315, 319–321, 335–337, 342–343, 345, 347–349, 352–353, 613
2. selects and uses measurement tools, units of measure, and level of precision appropriate for a given situation to find accurate real number representations for length, weight, volume, temperature, time, perimeter, area, surface area, and angle measurements (2.4.K1a) **$**.	SE: 358–360, 361–362 TWE: 358–360, 361–362
3. converts within the customary system and within the metric system.	SE: 604–605, 606–607 TWE: 604–605, 606–607
4. estimates the measure of a concrete object in one system given the measure of that object in another system and the approximate conversion factor (2.4.K1a), e.g., a mile is about 2.2 kilometers; how far is 2 miles?	SE: 604–605, 606–607 TWE: 604–605, 606–607
5. uses given measurement formulas to find (2.4.K1h):	
a. area of parallelograms and trapezoids;	SE: 314–316 TWE: 314–316
b. surface area of rectangular prisms, triangular prisms, and cylinders;	SE: 347–349 TWE: 347–349

CONTENT STANDARDS	PAGE REFERENCES
c. volume of rectangular prisms, triangular prisms, and cylinders.	SE: 335–337 TWE: 335–337
6. recognizes how ratios and proportions can be used to measure inaccessible objects (2.4.K1c), e.g., using shadows to measure the height of a flagpole.	SE: 188–189, 190–191 TWE: 188–189, 190–191
7. calculates rates of change, e.g., speed or population growth.	SE: 160–162, 163–164, 165, 166–167, 168–169 TWE: 160–162, 163–164, 165, 166–167, 168–169
Eighth Grade Application Indicators The student…	
1. solves real-world problems (2.4.A1a) by **$**:	
a. converting within the customary and the metric systems, e.g., James added 30 grams of sand to his model boat that weighed 2 kg before it sank. What is the total weight of his boat after the addition?	SE: 604–605, 606–607 TWE: 604–605, 606–607
b. finding perimeter and area of circles, squares, rectangles, triangles, parallelograms, and trapezoids; e.g., what is the total length of molding to repair the wall on the staircase with a floor length of 22 feet, height of 12 feet, ceiling length of 9 feet and diagonal for the stairway of 17 feet?	SE: 316, 318, 321, 326, 327 TWE: 316, 318, 321, 326, 327
c. finding the volume and surface area of rectangular prisms, e.g., how much paint would be needed to cover a box with dimensions of 3 feet by 4 feet by 5 feet?	SE: 337, 338, 339, 348, 350, 351 TWE: 337, 338, 339, 348, 350, 351
2. estimates to check whether or not measurements or calculations for length, weight, volume, temperature, time, perimeter, area, and surface area in real world problems are reasonable and adjusts original measurement or estimation based on additional information (a frame of reference) (2.4.A1a) **$**, e.g., to check your calculation in finding the area of the floor in the kitchen; you count how many foot-square tiles there are on the floor.	SE: 321, 336 TWE: 321, 336
3. uses ratio and proportion to measure inaccessible objects (2.4.A1c), e.g., using the length of a shadow to measure the height of a flagpole.	SE: 188–189, 190–191 TWE: 188–189, 190–191

CONTENT STANDARDS	PAGE REFERENCES
Benchmark 3: Transformational Geometry **The student recognizes and applies transformations on geometric figures in a variety of situations.**	
Eighth Grade Knowledge Base Indicators The student…	
1. identifies, describes, and performs single and multiple transformations [reflection, rotation, translation, reduction (contraction/shrinking), enlargement (magnification/growing)] on a two-dimensional figure (2.4.K1a).	SE: 194–195, 290–292, 293–294, 296–297, 300–301 TWE: 194–195, 290–292, 293–294, 296–297, 300–301
2. describes a reflection of a given two-dimensional figure that moves it from its initial placement (preimage) to its final placement (image) in the coordinate plane over the x- and y-axis (2.4.K1a,i).	SE: 290–292, 293–294 TWE: 290–292, 293–294
3. draws (2.4.K1a):	
a. three-dimensional figures from a variety of perspectives (top, bottom, sides, corners);	The opportunity to address this objective is available. See the following: SE: 330, 331–332, 335–337, 342–343, 344–345, 347–349, 350–351, 352–353, 354–355 TWE: 330, 331–332, 335–337, 342–343, 344–345, 347–349, 350–351, 352–353, 354–355
b. a scale drawing of a two-dimensional figure;	The opportunity to address this objective is available. See the following: SE: 184–185, 186–187 TWE: 184–185, 186–187
c. a two-dimensional drawing of a three-dimensional figure.	SE: 330 TWE: 330
4. determines where and how an object or a shape can be tessellated using single or multiple transformations (2.4.K1a).	SE: 304–305 TWE: 304–305
Eighth Grade Application Indicators The student…	
1. generalizes the impact of transformations on the area and perimeter of any two-dimensional geometric figure (2.4.A1a), e.g., enlarging by a factor of three triples the perimeter (circumference) and multiplies the area by a factor of nine.	The opportunity to address this objective is available. See the following: SE: 194–195, 290–292, 293–294, 296–297, 300–301 TWE: 194–195, 290–292, 293–294, 296–297, 300–301

CONTENT STANDARDS	PAGE REFERENCES
2. describes and draws a two-dimensional figure after undergoing two specified transformations without using a concrete object.	The opportunity to address this objective is available. See the following: SE: 194–195, 290–292, 293–294, 296–297, 300–301 TWE: 194–195, 290–292, 293–294, 296–297, 300–301
3. investigates congruency, similarity, and symmetry of geometric figures using transformations (2.4.A1g).	SE: 194–195, 290–292, 296–297 TWE: 194–195, 290–292, 296–297
4. uses a scale drawing to determine the actual dimensions and/or measurements of a two-dimensional figure represented in a scale drawing (2.4.A1h).	SE: 184–185 TWE: 184–185
Benchmark 4: Geometry from an Algebraic Perspective **The student uses an algebraic perspective to examine the geometry of two-dimensional figures in a variety of situations.**	
Eighth Grade Knowledge Base Indicators The student…	
1. uses the coordinate plane to (2.4.K1a):	
a. list several ordered pairs on the graph of a line and finds the slope of the line;	SE: 142, 526–527, 533–534 TWE: 142, 526–527, 533–534
b. recognize that ordered pairs that lie on the graph of an equation are solutions to that equation;	SE: 533–534, 535–536, 544–545 TWE: 533–534, 535–536, 544–545
c. recognize that points that do not lie on the graph of an equation are not solutions to that equation;	The opportunity to address this objective is available. See the following: SE: 533–534, 535–536, 544–545 TWE: 533–534, 535–536, 544–545
d. determine the length of a side of a figure drawn on a coordinate plane with vertices having the same x- or y-coordinates;	SE: 142–143 TWE: 142–143
e. solve simple systems of linear equations.	SE: 544–545 TWE: 544–545
2. uses a given linear equation with integer coefficients and constants and an integer solution to find the ordered pairs, organizes the ordered pairs using a T-table, and plots the ordered pairs on a coordinate plane (2.4.K1e-g).	SE: 533–534, 535–536 TWE: 533–534, 535–536

CONTENT STANDARDS	PAGE REFERENCES
3. examines characteristics of two-dimensional figures on a coordinate plane using various methods including mental math, paper and pencil, concrete objects, and graphing utilities or other appropriate technology (2.4.A1g).	SE: 194–195, 290–291, 296–297, 300–301, 529 TWE: 194–195, 290–291, 296–297, 300–301, 529
Eighth Grade Application Indicators The student…	
1. represents, generates, and/or solves distance problems (including the use of the Pythagorean theorem, but not necessarily the distance formula) (2.4.A1a), e.g., a student lives five miles west and three miles north of school and another student lives 4 miles south and 7 miles east of school. What is the shortest distance between the students' homes (as the crow flies)?	SE: 132–134, 135–136, 137–138, 139–140, 142–143, 144–145 TWE: 132–134, 135–136, 137–138, 139–140, 142–143, 144–145
2. translates between the written, numeric, algebraic, and geometric representations of a real-world problem (2.4.A1a,d-g), e.g., given a situation (ex), make a T-table, define the algebraic relationship, and graph the ordered pairs.	The opportunity to address this objective is available throughout. See, for example: SE: 31, 73, 101, 140, 186, 227, 258, 299, 325, 377, 401, 448, 489, 504, 545, 589 TWE: 31, 73, 101, 140, 186, 227, 258, 299, 325, 377, 401, 448, 489, 504, 545, 589
Standard 4: Data **The student uses concepts and procedures of data analysis in a variety of situations.**	
Benchmark 1: Probability **The student applies the concepts of probability to draw conclusions, generate convincing arguments, and make predictions and decisions including the use of concrete objects in a variety of situations.**	
Eighth Grade Knowledge Base Indicators The student…	
1. knows and explains the difference between independent and dependent events in an experiment, simulation, or situation (2.4.K1j) **$**.	SE: 396–397, 398–399 TWE: 396–397, 398–399
2. identifies situations with independent or dependent events in an experiment, simulation, or situation (2.4.K1j), e.g., There are three marbles in a bag. If you draw one marble and give it to your brother, and another marble and give it to your sister, are these independent events or dependent events?	SE: 396–397, 398–399 TWE: 396–397, 398–399
3. finds the probability of a compound event composed of two independent events in an experiment, simulation, or situation (2.4.K1j), e.g., what is the probability of getting two heads, if you toss a dime and a quarter?	SE: 396–397 TWE: 396–397

CONTENT STANDARDS	PAGE REFERENCES
4. finds the probability of simple and/or compound events using geometric models (spinners or dartboards) (2.4.K1j).	SE: 374–375, 376, 382–383, 396, 398 TWE: 374–375, 376, 382–383, 396, 398
5. finds the odds of a desired outcome in an experiment or simulation and expresses the answer as a ratio (2/3 or 2:3 or 2 to 3) (2.4.K1j).	SE: 377 TWE: 377
6. describes the difference between probability and odds.	SE: 374–377 TWE: 374–377
Eighth Grade Application Indicators The student…	
1. conducts an experiment or simulation with independent or dependent events including the use of concrete objects; records the results in a chart, table, or graph; and uses the results to draw conclusions and make predictions about future events (2.4.A1i-j).	SE: 400, 404–405 TWE: 400, 404–405
2. analyzes the results of an experiment or simulation of two independent events to generate convincing arguments, draw conclusions, and make predictions and decisions in a variety of real-world situations (2.4.A1i-j), e.g., examine the precipitation totals for the last 20 years to estimate the probability that the rainfall for this year will be more than 17 inches.	SE: 400, 404–405 TWE: 400, 404–405
3. compares theoretical probability (expected results) with empirical probability (experimental results) in an experiment or simulation with a compound event composed of two independent events and understands that the larger the sample size, the greater the likelihood that the experimental results will equal the theoretical probability (2.4.A1i).	SE: 400–401 TWE: 400–401
4. makes predictions based on the theoretical probability of (2.4.A1a,i):	
a. a simple event in an experiment or simulation,	SE: 22, 401 TWE: 22, 401
b. compound events composed of two independent events in an experiment or simulation.	The opportunity to address this objective is available. See the following: SE: 396–397 TWE: 396–397

CONTENT STANDARDS	PAGE REFERENCES
Benchmark 2: Statistics **The student collects, organizes, displays, explains, and interprets numerical (rational) and non-numerical data sets in a variety of situations.**	
Eighth Grade 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.K1k) **$**:	
a. frequency tables;	SE: 418 TWE: 418
b. bar, line, and circle graphs;	SE: 426–427, 430, 602 TWE: 426–427, 430, 602
c. Venn diagrams or other pictorial displays;	SE: 123 TWE: 123
d. charts and tables;	SE: 430–431, 603 TWE: 430–431, 603
e. stem-and-leaf plots (single and double);	SE: 430, 602 TWE: 430, 602
f. scatter plots;	SE: 539–540 TWE: 539–540
g. box-and-whiskers plots;	SE: 446–447 TWE: 446–447
h. histograms.	SE: 420–421, 425, 430 TWE: 420–421, 425, 430
2. recognizes valid and invalid data collection and sampling techniques.	SE: 406–407 TWE: 406–407
3. determines and explains the measures of central tendency (mode, median, mean) for a rational number data set (2.4.K1a).	SE: 435–436, 437–438, 451 TWE: 435–436, 437–438, 451
4. determines and explains the range, quartiles, and interquartile range for a rational number data set (2.4.K1a).	SE: 442 TWE: 442

CONTENT STANDARDS	PAGE REFERENCES
5. explains the effects of outliers on the median, mean, and range of a rational number data set (2.4.K1a).	SE: 443 TWE: 443
6. makes a scatter plot and draws a line that approximately represents the data, determines whether a correlation exists, and if that correlation is positive, negative, or that no correlation exists (2.4.K1k).	SE: 539–540, 541–542 TWE: 539–540, 541–542
Eighth Grade Application Indicators The student…	
1. uses data analysis (mean, median, mode, 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.A1j) **$**:	
a. frequency tables;	The opportunity to address this objective is available. See the following: SE: 418 TWE: 418
b. bar, line, and circle graphs;	The opportunity to address this objective is available. See the following: SE: 426–427, 430, 602 TWE: 426–427, 430, 602
c. Venn diagrams or other pictorial displays;	The opportunity to address this objective is available. See the following: SE: 123 TWE: 123
d. charts and tables;	The opportunity to address this objective is available. See the following: SE: 430–431, 603 TWE: 430–431, 603
e. stem-and-leaf plots (single and double);	The opportunity to address this objective is available. See the following: SE: 430, 602 TWE: 430, 602
f. scatter plots;	SE: 539–540 TWE: 539–540

CONTENT STANDARDS	PAGE REFERENCES
g. box-and-whiskers plots;	The opportunity to address this objective is available. See the following: SE: 446–447 TWE: 446–447
h. histograms.	The opportunity to address this objective is available. See the following: SE: 420–421, 425, 430 TWE: 420–421, 425, 430
2. explains advantages and disadvantages of various data collection techniques (observations, surveys, or interviews), and sampling techniques (random sampling, samples of convenience, biased sampling, or purposeful sampling) in a given situation (2.4.A1j) **$**.	SE: 406–407 TWE: 406–407
3. recognizes and explains (2.4.A1j):	
a. misleading representations of data;	SE: 450–453 TWE: 450–453
b. the effects of scale or interval changes on graphs of data sets.	SE: 450–453 TWE: 450–453
4. recognizes faulty arguments and common errors in data analysis.	The opportunity to address this objective is available. See the following: SE: 406–407, 421, 427, 447, 450–453 TWE: 406–407, 421, 427, 447, 450–453