



ADVANCED Mathematical Concepts

Precalculus
with Applications
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| STANDARDS | PAGE REFERENCES |
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| <p>Standard 1: Students will acquire number sense and perform operations with real and complex numbers.</p> | |
| <p>Objective 1.1: Compute fluently and make reasonable estimates.</p> | |
| <p>1. Add, subtract, multiply, and find the absolute value using complex numbers.</p> | <p>Student Edition: 580-585, 591 #51, 606 #41, 609 #36-#42, 611 #1, 621 #38 Teacher Wraparound Edition: A 585; F 586; ICE 581; TT 581</p> |
| <p>2. Add, subtract and perform scalar multiplication on vectors using a variety of techniques with or without the use of technology.</p> | <p>Student Edition: 485-492, 493-499, 500-504 Teacher Wraparound Edition: A 492, 499; AIN 495; EC 492, 498; F 500; ICE 494</p> |
| <p>Objective 1.2: Represent complex numbers and vectors in a variety of ways.</p> | |
| <p>1. Represent vectors graphically and symbolically.</p> | <p>Student Edition: 485-492, 493-499, 500-504 Teacher Wraparound Edition: A 492, 499; AIN 495; EC 492, 498; F 500; ICE 494</p> |
| <p>2. Represent complex numbers in rectangular and polar form and convert between rectangular and polar form.</p> | <p>Student Edition: 586-591, 593-598 Teacher Wraparound Edition: A 591; AIN 587; EC 591, 597; ICE 588, 589, 594, 595</p> |

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| Objective 1.3: Identify relationships among complex numbers and vectors and operations involving these items. | |
| 1. Analyze properties of vectors and their effects on vector operations. | Student Edition: 485-492, 493-499, 500-504 Teacher Wraparound Edition: A 492, 499; AIN 495; EC 492, 498; F 500; ICE 494 |
| 2. Analyze properties of complex numbers and their effects on operations in rectangular and polar form. | Student Edition: 586-591, 593-598 Teacher Wraparound Edition: A 591; AIN 587; EC 591, 597; ICE 588, 589, 594, 595 |
| 3. Develop and use the limit definition of e . | Student Edition: 712, 714 #5, 716 #16 |
| Standard 2: Students will represent and analyze mathematical situations and properties using patterns, relations, functions, and algebraic symbols. | |
| Objective 2.1: Use patterns, relations, and functions to represent mathematical situations. | |
| 1. Identify the domain, range , and other attributes of families of functions and their inverses, i.e., exponential, polynomial, rational, logarithmic, piece-wise , and trigonometric . | Student Edition: 137-145, 151 #46, 159-168, 171-179, 180-188 Teacher Wraparound Edition: A 145; EC 168; FTC 139; ICE 140 |
| 2. Simplify expressions or solve equations using a variety of approaches and techniques, e.g., polynomial long division, Rational Root Theorem, logarithms, and partial fractions. | Student Edition: 229-235, 242 #39, 248 #37, 269 #26-#33, 271 #58, 718-725, 735 #5-#8 Teacher Wraparound Edition: A 235; ICE 230, 719 |
| 3. Write functions and relations in parametric form . | Student Edition: 526, 527-533, 546 #45-#49, 662-669 Teacher Wraparound Edition: A 533 |
| 4. Identify vector-valued functions using a variety of approaches, e.g., algebraically or graphically. | Student Edition: 488, 489 ex 5, 490 #8-#10, 491 #18-#21 Teacher Wraparound Edition: AIN 489; ICE 489 |
| 5. Identify and generate arithmetic and geometric sequences and series recursively and explicitly using correct notation. | Student Edition: 759-765, 766-773, 774-783, 794-800 Teacher Wraparound Edition: A 783, 785, 800; EC 764, 773, 799 |

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| 6. Identify a geometric series as convergent or divergent . | Student Edition: 786-793, 799 #51 Teacher Wraparound Edition: A 793; EC 793; ICE 787, 788, 789; MTL 786; TT 789, 790 |
| 7. Raise a binomial to a power using the Binomial Theorem . | Student Edition: 801-805, 814 #43, 821 #37, 832 #35-#40 <i>Chapter 12 Test #14 A67</i> Teacher Wraparound Edition: A 805; AIN 803; EC 805; ICE 802, 803 |
| Objective 2.2: Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols. | |
| 1. Solve equations and inequalities involving exponential, logarithmic, power, polynomial, rational, and trigonometric functions, including real-world situations. | Student Edition: 86 #64, 213-221, 228 #46, 235 #3, 243-250 Teacher Wraparound Edition: FTC 214; ICE 214, 215, 216, 218 |
| 2. Compare logarithmic and exponential functions. | Student Edition: 740-748 Teacher Wraparound Edition: MTL 740; TT 742, 743 |
| 3. Combine and compose functions using algebraic methods or by using technology when appropriate. | Student Edition: 13-19, 25 #40, 31 #32, 37 #38, 44 #17 Teacher Wraparound Edition: A 19; AIN 16; EC 19; ICE 14, 15, 16 |
| 4. Identify the domain and range of a function resulting from the combination or composition of functions. | Student Edition: 16 ex 4, 17 #8, 18 #22-#24 Teacher Wraparound Edition: ICE 16 |
| 5. Solve systems of linear equations involving three or more variables using a variety of methods. | Student Edition: 73-77, 86 #55, 96 #36, 104 #55, 120 #17-#18 Teacher Wraparound Edition: A 77; AIN 74; EC 76; ICE 74, 75 |
| 6. Solve systems of non-linear equations and inequalities. | Student Edition: 685-686, 678-684, 690 #55-#62, 702 #75 Teacher Wraparound Edition: A 686; EC 684; ICE 679, 680, 681; TT 681 |

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| 7. Find the x- and y-intercepts, zeros (roots), maxima , and minima of functions. | Student Edition: 23 #2, 24 #24-#30, 171-179, 216 ex 4, 221 #39 Teacher Wraparound Edition: A 179; ICE 22, 172, 175 |
| 8. Approximate instantaneous rates of change and find average rates of change using graphical and numerical data. | Student Edition: 956, 958 #46, 959 #48 |
| 9. Determine intervals over which a function is increasing or decreasing. | Student Edition: 164 ex 4, 165 #9-#10, 166 #26-#31, 167 #34, 199 #42-#43 Teacher Wraparound Edition: AIN 164; ICE 164 |
| Objective 2.3: Represent quantitative relationships using mathematical models and symbols. | |
| 1. Represent quantitative, real-world situations using exponential, logarithmic, power, polynomial, rational, and trigonometric functions, vector and parametric equations, and sequences and series. | Student Edition: 706 ex 2, 707 ex 3, 708 #9, 709 #25, 720 #4, 723 #19 Teacher Wraparound Edition: ICE 706, 707, 720 |
| 2. Identify and analyze graphical features of functions such as asymptotes , holes, local, global, and end behavior . | Student Edition: 159-168, 169, 179 #41, 181 ex 1, 185 #5-#6 Teacher Wraparound Edition: A 168; EC 168; ICE 160, 162, 181 |
| 3. Recognize symmetric properties of even and odd functions . | Student Edition: 133, 145 #44, 163, 166 #3, 732 #75 Teacher Wraparound Edition: EC 134; TT 132 |
| 4. Relate the graphical representation of discontinuities and end-behavior to the concept of limit. | Student Edition: 159-168, 169, 179 #41, 181 ex 1, 185 #5-#6 Teacher Wraparound Edition: A 168; EC 168; ICE 160, 162, 181 |
| 5. Identify the effects of changing the parameters in transformations of functions. | Student Edition: 137-145, 151 #46, 168 #41, 198 #19-#22, 709 #23, 748 #31 Teacher Wraparound Edition: A 145; AIN 141; ICE 140; MTL 138 |
| 6. Identify a family or families of functions that model real-world relationships. | Student Edition: 141 ex 5, 142 #12, 144 #40 Teacher Wraparound Edition: ICE 141 |

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| Standard 3: Students will solve problems using spatial and logical reasoning, applications of geometric principles, and modeling. | |
| Objective 3.1: Analyze characteristics and properties of two- and three-dimensional shapes and develop mathematical arguments about geometric relationships. | |
| 1. Determine and analyze the characteristics of graphs and the related equations of conic sections. | Student Edition: 623-630, 631-641, 642-652, 653-661 Teacher Wraparound Edition: A 641; EC 651; F 631, 642; ICE 635, 648 |
| 2. Analyze problems and solutions involving vectors using algebraic and graphical techniques. | Student Edition: 485-492, 493-499, 500-504, 505-511, 512, 513-519 Teacher Wraparound Edition: A 499, 511; AIN 495 |
| Objective 3.2: Specify locations and describe spatial relationships using coordinate geometry. | |
| 1. Perform transformations on exponential, power, polynomial, rational, logarithmic, and trigonometric functions. | Student Edition: 137-145, 151 #46, 168 #41, 198 #19-#22, 709 #23, 748 #31 Teacher Wraparound Edition: A 145; AIN 141; ICE 140; MTL 138 |
| 2. Draw or sketch polar equations using technology and other techniques. | Student Edition: 556 ex 4, 558 #32-#40, 561-567, 573 #46, 579 #39 Teacher Wraparound Edition: A 567; EC 567; ICE 556, 563; MTL 562 |
| Standard 4: Students will understand and apply measurement tools, formulas, and techniques. | |
| Objective 4.1: Understand measurable attributes of objects and the units, systems, and processes of measurement. | |
| 1. Select appropriate units and scales for situations involving measurement. | Student Edition: 157 #46 |
| 2. Recognize the changes in magnitude with various measurement scales, e.g., Richter, pH, decibel. | Student Edition: 366 #68, 782 #45, 828 #35, 833 #56 |

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| Standard 5: Students will draw conclusions using concepts of probability after collecting, organizing, and analyzing a data set. | |
| Objective 5.1: Formulate and answer questions by collecting, organizing, and analyzing data. | |
| 1. Find regression equation for bivariate data including power, exponential, logarithmic, polynomial, and sinusoidal curves using technology. | Student Edition: 739 #7, 743 ex 4, 744 #6, 745 #15, 747 #21 Teacher Wraparound Edition: ICE 743 |
| 2. Interpolate and extrapolate from data using regression equations. | Student Edition: 739 #7, 743 ex 4, 744 #6, 745 #15, 747 #21 Teacher Wraparound Edition: ICE 743 |
| 3. Identify how sample statistics reflect population parameters. | Student Edition: 927-932, 936 #29-#40 Teacher Wraparound Edition: A 932; AIN 929; EC 932; ICE 928, 929 |
| Objective 5.2: Apply basic concepts of probability. | |
| 1. Find sample spaces and probability distributions in simple cases. | Student Edition: 852-858, 867 #57, 875-880, 882 #20-#21, 885 #49 Teacher Wraparound Edition: EC 858; GCE 877; MTL 852 |
| 2. Differentiate between independent and dependent events and calculate the probability of each. | Student Edition: 837, 838 ex 1, 839 ex 2, 843 #6 Teacher Wraparound Edition: ICE 838, 839; TT 838 |
| 3. Calculate the conditional probability of an event. | Student Edition: 868-874, 884 #41-#43, 885 #51 Teacher Wraparound Edition: A 874; AIN 874; EX 873 |
| 4. Calculate the probability of a compound event . | Student Edition: 859-867, 884 #37-#40 Teacher Wraparound Edition: A 867; AIN 862; EC 867; ICE 862; MTL 860 |
| 5. Calculate and interpret the expected value (weighted average) of random variables in simple cases. | This standard can be met in Glencoe's <i>Algebra 2</i> © 2005 page 681. |