

Glencoe/McGraw-Hill

**Advanced Mathematical Concepts:
Precalculus with Applications ©2004
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correlated to

**South Carolina Mathematics Standards
for
Precalculus**

**GLENCOE/MCGRAW-HILL
ADVANCED MATHEMATICAL CONCEPTS:
PRECALCULUS WITH APPLICATIONS ©2004**

CORRELATED TO

**SOUTH CAROLINAMATHEMATICS STANDARDS FOR
PRECALCULUS**

OBJECTIVES	PAGE REFERENCES
I. Functions	
A. Characteristics and Representations of Functions	
1. Describe parent functions symbolically and graphically, including $y = x^n$, $y = \ln x$, $y = \log_a x$, $y = 1/x$, $y = e^x$, $y = a^x$, $y = \sin x$ and the other trigonometric functions.	SE: 137–145, 368–375, 378–386, 395–403, 704–711, 712–717, 718–725 TWE: 137–145, 368–375, 378–386, 395–403, 704–711, 712–717, 718–725
2. Using graphs, tables, and symbols, determine the domain and range for each of the functions studied.	SE: 5–6, 8–11, 396–397, 704–706, 716–717 TWE: 5–6, 8–11, 396–397, 704–706, 716–717
3. Know the definition of sine and cosine functions based on a right triangle and on a unit circle as a wrapping function.	SE: 291–298, 305–312 TWE: 291–298, 305–312
4. Evaluate all six trigonometric functions using the right triangle and wrapping function definitions.	SE: 291–298, 305–312 TWE: 291–298, 305–312
5. Describe symmetry of graphs of even and odd functions.	SE: 133, 163, 197 TWE: 133, 163, 197
6. Recognize and use connections among significant points of a function (roots, maximum points, and minimum points), the graph of a function, and the algebraic representation of a function.	SE: 171–179, 206–214, 228–230, 233–235, 236–242 TWE: 171–179, 206–214, 228–230, 233–235, 236–242
7. Investigate continuity, end behavior, vertical and horizontal asymptotes, and limits; connect these characteristics to the graph of a function.	SE: 159–168, 180–188, 705–706, 774–783, 941–948 TWE: 159–168, 180–188, 705–706, 774–783, 941–948

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B. Operations on Functions.	
1. Apply basic transformations, including a • $f(x)$, $f(x) + d$, $f(x - c)$, $f(b \cdot x)$, $ f(x) $, $f(x)$, to the parent functions.	SE: 137–145, 180–188, 670–678 TWE: 137–145, 180–188, 670–678
2. Perform operations including composition and decomposition on functions, find inverses, and describe these procedures and results verbally, numerically, algebraically, and graphically.	SE: 13–19, 152–158, 243–247, 305–312, 405–412, 718–726 TWE: 13–19, 152–158, 243–247, 305–312, 405–412, 718–726
3. Investigate identities graphically and verify them algebraically, including logarithmic properties, trigonometric identities, and exponential properties.	SE: 421–430, 431–436, 437–445, 446–455, 456–462, 694–703, 704–711, 718–725 TWE: 421–430, 431–436, 437–445, 446–455, 456–462, 694–703, 704–711, 718–725
II. Functions as Models	
A. Polynomial and Rational Functions	
1. Use quotients to describe the graphs of rational functions, describe limitations on the domains and ranges, and examine asymptotic behavior.	SE: 137–139, 180–188 TWE: 137–139, 180–188
2. Analyze various representations of polynomial and rational functions with respect to problem situations.	SE: 186–188, 189–196, 205–212, 213–221, 222–228, 229–235, 243–250 TWE: 186–188, 189–196, 205–212, 213–221, 222–228, 229–235, 243–250
3. Solve polynomial and rational equations and inequalities using graphs, tables, and algebraic methods by using paper-and- pencil computations, graphing calculators, computer algebra systems, and spreadsheets.	SE: 205–212, 213–221, 222–228, 229–231, 236–242, 243–250 TWE: 205–212, 213–221, 222–228, 229–231, 236–242, 243–250

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4. Analyze a situation modeled by a polynomial and rational function, formulate an equation or inequality, and solve the problem.	SE: 11, 180–185, 186–187, 196–199 TWE: 11, 180–185, 186–187, 196–199
B. Exponential and Logarithmic Functions	
1. Develop the definition of logarithms by exploring and describing the relationship between exponential functions and their inverses.	SE: 704–711, 718–725, 740–748 TWE: 704–711, 718–725, 740–748
2. Use the parent functions to investigate, describe, and predict the effects of parameter changes on the graphs of exponential and logarithmic functions, describe limitations on the domains and ranges, and examine asymptotic behavior.	SE: 704–711, 718–725 TWE: 704–711, 718–725
3. For given contexts, determine the reasonable domain and range values of exponential and logarithmic functions, as well as interpreting and determining the reasonableness of solutions to exponential and logarithmic equations and inequalities.	SE: 704–711, 718–725 TWE: 704–711, 718–725
4. Solve exponential and logarithmic equations and inequalities using graphs, tables, and algebraic methods by using paper-and-pencil computations, graphing calculators, computer algebra systems, and spreadsheets.	SE: 704–711, 718–725, 738–739, 740–748 TWE: 704–711, 718–725, 738–739, 740–748
5. Analyze a situation modeled by an exponential or logarithmic function, formulate an equation or inequality, and solve the problem.	SE: 704–711, 718–725, 740–748 TWE: 704–711, 718–725, 740–748

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6. Interpret rates of change as they apply to phenomena such as inflation, spread of disease, population growth, tax brackets, pollution, and so forth.	SE: 740–748 TWE: 740–748
7. Analyze graphical data gathered by technical equipment including combinations of graphs, periodic phenomena, and relative rates of change.	SE: 359–366, 456–461, 709–711, 715–725, 740–748 TWE: 359–366, 456–461, 709–711, 715–725, 740–748
C. Trigonometric Functions	
1. Use trigonometric functions to model real-life data.	SE: 299–304, 305–312, 313–319, 327–331, 359–366, 387–394 TWE: 299–304, 305–312, 313–319, 327–331, 359–366, 387–394
2. Apply sine and cosine functions to periodic phenomena.	SE: 387–394 TWE: 387–394
3. Solve applied problems using the law of sines and law of cosines.	SE: 313–319, 320–326, 327–331 TWE: 313–319, 320–326, 327–331
III. Advanced Mathematics Topics	
A. Sequences and Series	
1. Represent patterns using arithmetic and geometric sequences and series, including the use of sigma notation to represent series.	SE: 759–765, 766–773, 794–800 TWE: 759–765, 766–773, 794–800
2. Use arithmetic, geometric, and other sequences and series to solve real-life problems.	SE: 764–765, 770–773, 779–783, 790–793, 806–814, 815–821 TWE: 764–765, 770–773, 779–783, 790–793, 806–814, 815–821

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3. Apply informal concepts of successive approximation, upper and lower bounds, and limit in measurement situations: estimate lengths of curves, areas of curved regions, and volume of curved solids.	SE: 238–241, 774–783, 961–968 TWE: 238–241, 774–783, 961–968
4. Describe limits of sequences and apply their properties to investigate convergent and divergent series.	SE: 786–792 TWE: 786–792
5. Apply sequences and series to solve problems including sums, binomial expansion, the binomial theorem, combinations, and Pascal’s triangle.	SE: 801–805, 806–814 TWE: 801–805, 806–814
6. Prove statements about sequences and series using the principle of mathematical induction.	SE: 822–828 TWE: 822–828
B. Conic Sections, Parametric Representations, and Polar Representations	
1. Use conic sections to model motion, such as the graph of velocity vs. the position of a pendulum and motions of planets.	SE: 630, 637, 639–640, 646–647, 657–658 TWE: 630, 637, 639–640, 646–647, 657–658
2. Use properties of conic sections to describe physical phenomena such as the reflective properties of light and sound.	SE: 632, 639, 653–654, 660 TWE: 632, 639, 653–654, 660
3. Convert between parametric and rectangular forms of functions and equations to graph them.	SE: 662–669 TWE: 662–669
4. Use parametric functions to simulate problems involving motion.	SE: 666–667 TWE: 666–667

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5. Convert between polar and rectangular forms of functions and graph them.	SE: 568–573, 574–579 TWE: 568–573, 574–579
C. Vectors	
1. Use the concept of vectors to model situations defined by magnitude and direction.	SE: 485–492, 493–499, 500–503, 504–511, 512–519 TWE: 485–492, 493–499, 500–503, 504–511, 512–519
2. Use vectors to represent situations that involve both magnitude and direction, such as force, displacement, velocity, and acceleration.	SE: 487, 489, 491–492, 495, 497–499, 501, 508, 510, 513–519 TWE: 487, 489, 491–492, 495, 497–499, 501, 508, 510, 513–519
3. Draw a pair of perpendicular vectors to find a distance graphically.	SE: 505–511 TWE: 505–511

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