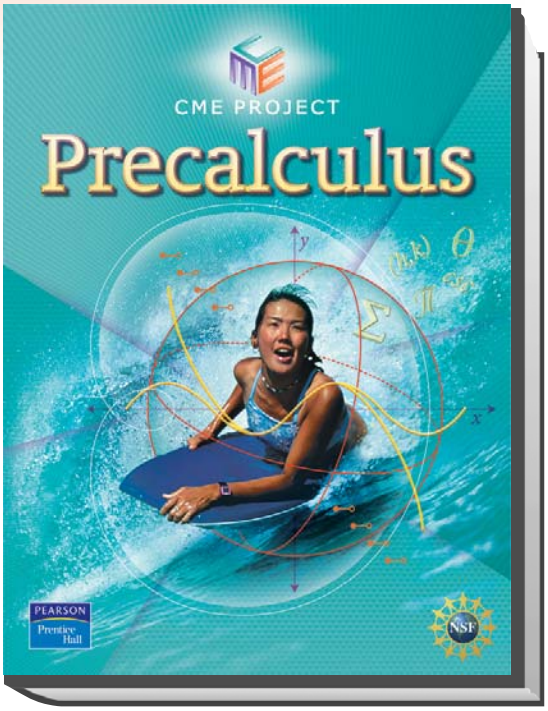
Precalculus

Prentice Hall

CME Project Precalculus © 2009



CORRELATED TO

Indiana Math Standards Final Draft from March 2009

Precalculus

PEARSON

TEACH & LEARN • ASSESS & INFORM • DEVELOP & LEAD

CME Project, Precalculus © 2009
Correlated to:
Indiana's Academic Standards Final Draft March 2009 - Mathematics - Precalculus

Indiana's Academic Standards - Mathematics - Precalculus	CME Project, Precalculus © 2009
PRE-CALCULUS	
Standard 1 Relations and Functions	
PC.1.1 Use paper and pencil methods and technology to graph polynomial, absolute value, rational, algebraic, exponential, logarithmic, trigonometric, inverse trigonometric and piecewise-defined functions, use these graphs to solve problems, and translate among verbal, tabular, graphical, and symbolic representations of functions using technology as appropriate.	**SE/TE: 13-15, 31, 38-40, 44-46, 51, 57, 60-64, 68-69, 72, 80, 107-108, 117, 167-168, 180-182, 205-207, 239-240, 242, 250, 270, 371, 419-422, 435-436, 642-644, 653-654, 664-665, 675, 677-679**
PC.1.2 Identify domain, range, intercepts, zeros, asymptotes, and points of discontinuity of functions represented symbolically or graphically, using technology as appropriate.	**SE/TE: 31, 33, 38, 45-46, 53, 171, 206-207, 209-214, 255, 270, 343**
PC.1.3 Solve word problems that can be modeled using functions and equations.	**SE/TE: 68-72, 80, 180, 197, 239, 271, 344, 364-365, 427-429, 436, 512-513, 642-644, 653-654, 675, 677-679, 683-687**
PC.1.4 Recognize and describe continuity, end behavior, asymptotes, symmetry, and limits and connect these concepts to graphs of functions.	**SE/TE: 34, 38-40, 170-174, 206-207, 209-214, 239-240, 242, 248-250, 270, 643-648, 653-654, 657-660, 663-666, 675, 677-679, 683-687, 690-692**
PC.1.5 Find, interpret, and graph the sum, difference, product, and quotient (when it exists) of two functions, indicating the relevant domain and range of the resulting function.	**SE/TE: 189-191, 206-207, 209-214, 254**
PC.1.6 Find the composition of two functions, and determine the domain and the range of the composite function. Conversely, given a function, find two other functions the composition of which is the given one.	**This topic is covered in the CME Algebra 2 text.** **Related material:** **SE/TE: 43-46, 80, 171, 206-207, 209-214, 254-256, 260-262, 270-271, 343**
PC.1.7 Define and find inverse functions, their domains and ranges, and verify whether two given functions are inverses of each other, symbolically and graphically.	**This topic is covered in the CME Algebra 2 text.** **Related material:** **SE/TE: 43-46, 80, 254-256, 260-262, 271**
PC.1.8 Apply transformations to functions and interpret the results of these transformations verbally, graphically, and numerically.	**SE/TE: 15, 57, 60-65, 68-72, 80, 226-232**
Standard 2 Conics	
PC.2.1 Derive equations for conic sections and use the equations that have been found.	**SE/TE: 445-446, 457, 459-460, 475-480, 484-488, 526-527, 530**
PC.2.2 Graph conic sections with axes of symmetry parallel to the coordinate axes by hand, by completing the square, and find the foci, center, asymptotes, eccentricity, axes, and vertices (as appropriate).	**SE/TE: 446, 457, 460, 465, 475-477, 479-480, 484-486, 492-494, 530**

SE = Student Edition TE = Teacher's Edition

Indiana's Academic Standards - Mathematics - Precalculus	CME Project, Precalculus © 2009
Standard 3 Logarithmic and Exponential Functions	
PC.3.1 Compare and contrast $y = e$ with other exponential functions, symbolically and graphically.	**This topic is covered in the CME Algebra 2 text.** **Related material:** **SE/TE: 239-240**
PC.3.2 Define the logarithmic function g(x) = $\log_a x$ as the inverse of the exponential function $f(x) = a^x$. Apply the inverse relationship between exponential and logarithmic functions and the laws of logarithms to solve problems.	**This topic is covered in the CME Algebra 2 text.** **Related material:** **SE/TE: 254-256, 260-262, 271**
PC.3.3 Analyze, describe, and sketch graphs of logarithmic and exponential functions by examining intercepts, zeros, domain and range, and asymptotic and end behavior.	**This topic is covered in the CME Algebra 2 text.** **Related material:** **SE/TE: 239-240, 250, 258, 260-262, 271, 690**
PC.3.4 Solve problems that can be modeled using logarithmic and exponential functions. Interpret the solutions, and determine whether the solutions are reasonable.	**This topic is covered in the CME Algebra 2 text.** **Related material:** **SE/TE: 239, 242-244, 258-259, 271, 419-423, 427-429, 436, 683-687, 700**
Standard 4 Trigonometry	
PC.4.1 Define and use the trigonometric ratios *cotangent, secant,* and *cosecant* in terms of angles of right triangles.	**SE/TE: 50-51, 80**
PC.4.2 Model and solve problems involving triangles using trigonometric ratios.	**This topic is covered in the CME Algebra 2 text.**
PC.4.3 Develop and use the laws of sines and cosines to solve problems.	**This topic is covered in the CME Algebra 2 text.**
PC.4.4 Define sine and cosine using the unit circle.	**SE/TE: 5, 9, 13-15, 80**
PC.4.5 Develop and use radian measures of angles, measure angles in degrees and radians, and convert between degree and radian measures.	**SE/TE: 5, 7-9, 18, 80**
PC.4.6 Deduce geometrically and use the value of the sine, cosine, and tangent functions at, 0 $\pi/6$, $\pi/4$, $\pi/3$ and $\pi/2$, radians and their multiples.	**SE/TE: 5, 9, 18-19, 24-25, 35-36, 38-40**
PC.4.7 Make connections between right triangle ratios, trigonometric functions, and the coordinate function on the unit circle.	**SE/TE: 13-15, 18, 20-21, 33-34, 38-40, 50-51, 80**
PC.4.8 Analyze and graph trigonometric functions, including the translation of these trigonometric functions. Describe their characteristics (spread, amplitude, zeros, symmetry, phase, shift, vertical shift, frequency).	**SE/TE: 13-15, 24-25, 31, 34, 38-40, 50-51, 57, 60-64, 68-72, 80, 117**

Indiana's Academic Standards - Mathematics - Precalculus	CME Project, Precalculus © 2009
PC.4.9 Define, analyze and graph inverse trigonometric functions and find the values of inverse trigonometric functions.	**SE/TE: 31, 43-46, 80**
PC.4.10 Solve problems that can be modeled using trigonometric functions, interpret the solutions, and determine whether the solutions are reasonable.	**SE/TE: 68-72, 80**
PC.4.11 Derive the fundamental Pythagorean trigonometric identities, sum and difference identities, half-angle and double-angle identities and the secant, cosecant, and cotangent functions and use these identities to verify other identities and simplify trigonometric expressions.	**SE/TE: 21, 50-51, 107-108, 110-113, 116-119, 159**
PC.4.12 Solve trigonometric equations and interpret solutions graphically.	**SE/TE: 18-21, 35, 80, 107-108**
Standard 5 Polar Coordinates and Complex Numbers	
PC.5.1 Define and use polar coordinates and relate polar coordinates to Cartesian coordinates.	**SE/TE: 92-93**
PC.5.2 Represent equations given in Cartesian coordinates in terms of polar coordinates.	
PC.5.3 Graph equations in the polar coordinate plane.	
PC.5.4 Define complex numbers, convert complex numbers to polar form, and multiply complex numbers in polar form.	**SE/TE: 85, 87-90, 92-94, 97-101, 128-129, 133-134, 139-141, 160**
PC.5.5 Prove and use De Moivre's Theorem.	**SE/TE: 125-126, 128-129, 132-134, 160**
Standard 6 Sequences and Series	
PC.6.1 Define arithmetic and geometric sequences and series.	**This topic is covered in the CME Algebra 2 text.** **Related material:** **SE/TE: 412-414**
PC.6.2 Derive and use formulas for finding the general term for arithmetic and geometric sequences.	**This topic is covered in the CME Algebra 2 text.** **Related material:** **SE/TE: 409, 419-423, 427-429**
PC 6.3 Develop, prove and use sum formulas for arithmetic series and for finite and infinite geometric series.	**This topic is covered in the CME Algebra 2 text.** **Related material:** **SE/TE: 663-667, 675, 683, 690-691**
PC.6.4 Generate a sequence using recursion.	**SE/TE: 343-344, 347-348, 352-353, 357-360, 389, 409-410, 412-414, 419-423, 427-429, 435-436**
PC.6.5 Describe the concept of the limit of a sequence and a limit of a function. Decide whether simple sequences converge or diverge, and recognize an infinite series as the limit of a sequence of partial sums.	**SE/TE: 171-173, 207, 209-214, 239, 242-244, 647-648, 654, 657, 659-660, 663-667, 675, 677-679, 683-687, 690-692, 699-700** **Sequences and series are covered in CME Algebra 2.**

Indiana's Academic Standards - Mathematics - Precalculus	CME Project, Precalculus © 2009
PC.6.6 Model and solve word problems involving applications of sequences and series, interpret the solutions and determine whether the solutions are reasonable.	**This topic is covered in the CME Algebra 2 text.** **Related material:** **SE/TE: 344, 427-429, 436**
PC.6.7 Derive the binomial theorem by combinatorics.	**SE/TE: 325-326, 328-329, 331-332, 336**
Standard 7 Vectors and Parametric Equations	
PC.7.1 Define vectors as objects having magnitude and direction and represent vectors geometrically.	**SE/TE: 501, 503-506, 509-513, 517-520**
PC.7.2 Use parametric equations to represent situations involving motion in the plane.	**SE/TE: 512-513**
PC.7.3 Convert between a pair of parametric equations and an equation in x and y	**SE/TE: 514**
PC.7.4 Analyze planar curves, including those given in parametric form.	**Related material:** **SE/TE: 509-513, 517-520**
PC.7.5 Model and solve problems using parametric equations.	**SE/TE: 512-513**
Standard 8 Data Analysis	
PC.8.1 Use linear models using the median fit and least squares regression methods. Decide which among several linear models gives a better fit. Interpret the slope in terms of the original context	**This topic is covered in the CME Algebra 2 text.**
PC.8.2 Calculate and interpret the correlation coefficient. Use the correlation coefficient and residuals to evaluate a "best-fit" line.	
Process Standards	
Problem Solving	
• Build new mathematical knowledge through problem solving.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 68-76, 92-96, 97-104, 145-153, 226-235, 248-251, 328-330, 343-344, 492-497, 683-689**
• Solve problems that arise in mathematics and in other contexts.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 31, 68-76, 107-108, 239, 277-278, 357-361, 427-431, 492-497, 554-561, 683-689**
• Apply and adapt a variety of appropriate strategies to solve problems.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 19-21, 94, 101, 175, 297-298, 346-348, 389, 452-454, 557, 647**
• Monitor and reflect on the process of mathematical problem solving.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 31, 107-108, 167-168, 205-207, 277-278, 295-296, 343-344, 441-442, 539, 633-635**

SE = Student Edition TE = Teacher's Edition

CME Project, Precalculus © 2009
Correlated to:
Indiana's Academic Standards Final Draft March 2009 - Mathematics - Precalculus

Indiana's Academic Standards - Mathematics - Precalculus	CME Project, Precalculus © 2009
Reasoning and Proof	
• Recognize reasoning and proof as fundamental aspects of mathematics.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 5-6, 88, 107-108, 116-121, 248-251, 277-278, 295-296, 357-362, 517-520, 642-649**
• Make and investigate mathematical conjectures.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 33, 248-251, 277-278, 357-361, 363-367, 520, 608-610, 684-686**
• Develop and evaluate mathematical arguments and proofs.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 65-66, 88, 111-115, 125, 248-251, 277-278, 316-318, 357-361, 363-367, 633-634**
• Select and use various types of reasoning and methods of proof.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 5-6, 88, 111-115, 116-121, 248-251, 277-278, 295-296, 363-367, 517-520, 642-649**
Communication	
• Organize and consolidate their mathematical thinking through communication.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 5, 65-66, 125, 167-168, 277-278, 316-318, 357-362, 493-497, 633-634, 642-649**
• Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 78-79, 155-158, 267-269, 335, 434, 526-529, 624-625, 696-698**
• Analyze and evaluate the mathematical thinking and strategies of others.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 18-19, 113, 172-173, 308, 398-399, 421-422, 451, 509-511, 555, 643-644**
• Use the language of mathematics to express mathematical ideas precisely.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 5, 65-66, 125, 167-168, 277-278, 316-318, 357-362, 493-497, 633-634, 642-649**
Connections	
• Recognize and use connections among mathematical ideas.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 5-6, 88, 111-115, 116-121, 248-251, 277-278, 295-296, 357-361, 363-367, 642-649**

SE = Student Edition TE = Teacher's Edition

Indiana's Academic Standards - Mathematics - Precalculus	CME Project, Precalculus © 2009
• Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 68-76, 92-96, 97-104, 145-153, 226-235, 248-251, 328-330, 343-344, 492-497, 683-689**
• Recognize and apply mathematics in contexts outside of mathematics.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 239, 243-247, 277, 352-355, 427-431, 512-513, 539-540, 554-561, 591-595**
Representation	
• Create and use representations to organize, record, and communicate mathematical ideas.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 60-67, 97-104, 139-144, 167-168, 209-213, 248-253, 346-351, 427-431, 468-474, 663-670**
• Select, apply, and translate among mathematical representations to solve problems.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 68-76, 92-96, 97-104, 145-153, 226-235, 248-251, 328-330, 343-344, 492-497, 683-689**
• Use representations to model and interpret physical, social, and mathematical phenomena.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 97-104, 209-213, 239, 248-253, 346-351, 352-355, 427-431, 468-474, 539-540, 663-670**
Estimation and Mental Computation	
• Know and apply appropriate methods for estimating the results of computations.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 20-21, 127, 168, 181-182, 187, 239, 243-244, 637-638, 642-648, 684-685**
• Use estimation to decide whether answers are reasonable.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 21, 172-173, 175, 177, 181-184, 239-240, 243-244, 255-256, 645-648, 683-685**
• Decide when estimation is an appropriate strategy for solving a problem.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 20-21, 168, 172-173, 181-184, 197, 239, 633-634**
• Determine appropriate accuracy and precision of measurement in problem situations.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 9, 89, 143, 170-173, 197, 239-240, 243-244, 634, 637-638, 684-685**
• Use properties of numbers and operations to perform mental computation.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 85, 291, 298-299, 328-329, 539, 548-549**

SE = Student Edition TE = Teacher's Edition

Indiana's Academic Standards - Mathematics - Precalculus	CME Project, Precalculus © 2009
• Recognize when the numbers involved in a computation allow for a mental computation strategy.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 85, 279-280, 291, 298-299, 328-329, 539, 548-549**
Technology	
• Technology should be used as a tool in mathematics education to support and extend the mathematics curriculum.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 24, 57, 181-187, 193, 197-202, 419-420, 470-472, 493, 608-615, 677-682**
• Technology can contribute to concept development, simulation, representation, communication, and problem solving.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 24, 57, 181-187, 193, 197-202, 419-420, 470-472, 493, 608-615, 677-682**
• The challenge is to ensure that technology supports-but is not a substitute for- the development of skills with basic operations, quantitative reasoning, and problem-solving skills.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 117, 181-183, 200, 357-358, 395, 419-420, 486, 659**
o Graphing calculators should be used to enhance middle school and high school students' understanding and skills.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 8-9, 34, 181, 193, 243, 331, 487, 549, 608-611, 684-685**
o The focus must be on learning mathematics, using technology as a tool rather than as an end in itself.	**This standard is addressed throughout the text. Sample citations follow:** **SE/TE: 117, 181-183, 200, 357-358, 395, 419-420, 486, 659**