Precalculus

Prentice Hall

Precalculus:
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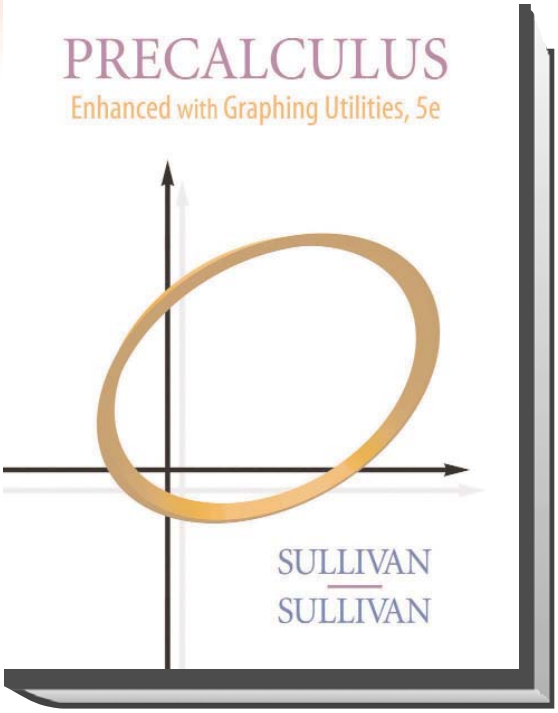

CORRELATED TO

Indiana Math Standards Final Draft from March 2009

Precalculus

PEARSON

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Precalculus Enhanced with Graphing Utilities, 5th Edition (Sullivan) © 2009
Correlated to:
Indiana's Academic Standards - Mathematics - Precalculus

Indiana's Academic Standards - Mathematics - Precalculus	Precalculus Enhanced with Graphing Utilities, 5th Edition (Sullivan) © 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: 12-25, 52-54, 90-99, 119-122, 181-190, 241-243**
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: 12-25, 52-54, 57-59, 67-70, 94-99, 119-122**
PC.1.3 Solve word problems that can be modeled using functions and equations.	**SE/TE: 112-117, 119-122**
PC.1.4 Recognize and describe continuity, end behavior, asymptotes, symmetry, and limits and connect these concepts to graphs of functions.	**SE/TE: 18-25, 52-54, 94-99, 119-122, 182-190, 241-243**
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: 65-70, 119-122**
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.	**SE/TE: 248-255, 344-347**
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.	**SE/TE: 258-268, 344-347**
PC.1.8 Apply transformations to functions and interpret the results of these transformations verbally, graphically, and numerically.	**SE/TE: 100-112, 119-122**
Standard 2 Conics	
PC.2.1 Derive equations for conic sections and use the equations that have been found.	**SE/TE: 642-648, 650, 653-658, 661-662, 664-672, 701-703**
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: 644, 646-647, 651-653, 657-659, 661-664, 670-671, 701-703**
Standard 3 Logarithmic and Exponential Functions	
PC.3.1 Compare and contrast $y = e$ with other exponential functions, symbolically and graphically.	**SE/TE: 276-283, 344-348**

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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.	**SE/TE: 288-297,306-313, 344-348**
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.	**SE/TE: 273-278, 280-284, 287-290, 293-297, 344-348**
PC.3.4 Solve problems that can be modeled using logarithmic and exponential functions. Interpret the solutions, and determine whether the solutions are reasonable.	**SE/TE: 313-348**
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: 510, 518, 555**
PC.4.2 Model and solve problems involving triangles using trigonometric ratios.	**SE/TE: 511-522, 555-559**
PC.4.3 Develop and use the laws of sines and cosines to solve problems.	**SE/TE: 523-542, 555-559**
PC.4.4 Define sine and cosine using the unit circle.	**SE/TE: 366-368, 378-381, 433-436**
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: 356-364, 433-436**
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: 366-381, 433-436**
PC.4.7 Make connections between right triangle ratios, trigonometric functions, and the coordinate function on the unit circle.	**SE/TE: 510, 518, 555**
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: 395-429, 433-436**
PC.4.9 Define, analyze and graph inverse trigonometric functions and find the values of inverse trigonometric functions.	**SE/TE: 412-418, 433-436, 441-453, 504-506**
PC.4.10 Solve problems that can be modeled using trigonometric functions, interpret the solutions, and determine whether the solutions are reasonable.	**SE/TE: 546-558**

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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: 459-488, 504-506**
PC.4.12 Solve trigonometric equations and interpret solutions graphically.	**SE/TE: 489-506**
Standard 5 Polar Coordinates and Complex Numbers	
PC.5.1 Define and use polar coordinates and relate polar coordinates to Cartesian coordinates.	**SE/TE: 562-571, 633-635**
PC.5.2 Represent equations given in Cartesian coordinates in terms of polar coordinates.	**SE/TE: 564-571, 633-635**
PC.5.3 Graph equations in the polar coordinate plane.	**SE/TE: 572-588, 633-635**
PC.5.4 Define complex numbers, convert complex numbers to polar form, and multiply complex numbers in polar form. PC.5.5 Prove and use De Moivre's Theorem.	**SE/TE: 589-596, 633-635**
Standard 6 Sequences and Series	
PC.6.1 Define arithmetic and geometric sequences and series.	**SE/TE: 817-832, 844-846**
PC.6.2 Derive and use formulas for finding the general term for arithmetic and geometric sequences.	**SE/TE: 817-832, 844-846**
PC 6.3 Develop, prove and use sum formulas for arithmetic series and for finite and infinite geometric series.	**SE/TE: 817-832, 844-846**
PC.6.4 Generate a sequence using recursion.	**SE/TE: 817-822, 844-846**
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: 193, 827-832, 844-846**
PC.6.6 Model and solve word problems involving applications of sequences and series, interpret the solutions and determine whether the solutions are reasonable.	**SE/TE: 821-823, 828-832, 844-846**
PC.6.7 Derive the binomial theorem by combinatorics.	**SE/TE: 837-846**
Standard 7 Vectors and Parametric Equations	
PC.7.1 Define vectors as objects having magnitude and direction and represent vectors geometrically.	**SE/TE: 597-608, 617-630, 633-635**
PC.7.2 Use parametric equations to represent situations involving motion in the plane.	**SE/TE: 687-699, 701-703**

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PC.7.3 Convert between a pair of parametric equations and an equation in x and y	**SE/TE: 685-686, 701-703**
PC.7.4 Analyze planar curves, including those given in parametric form.	**SE/TE: 687-699, 701-703**
PC.7.5 Model and solve problems using parametric equations.	**SE/TE: 692-699, 701-703**
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	**SE/TE: 130-142, 169-171**
PC.8.2 Calculate and interpret the correlation coefficient. Use the correlation coefficient and residuals to evaluate a "best-fit" line.	**SE/TE: 138-142, 169-171**
Process Standards	
Problem Solving	
• Build new mathematical knowledge through problem solving.	**SE/TE: 112-122, 514-522, 555-558**
• Solve problems that arise in mathematics and in other contexts.	**SE/TE: 112-122, 313-322, 329-342, 345-348, 514-522, 555-558**
• Apply and adapt a variety of appropriate strategies to solve problems.	**SE/TE: 112-122, 313-322, 329-342, 345-348, 514-522, 555-558**
• Monitor and reflect on the process of mathematical problem solving.	**SE/TE: 112-122, 313-322, 329-342, 345-348, 514-522, 555-558**
Reasoning and Proof	
• Recognize reasoning and proof as fundamental aspects of mathematics.	**SE/TE: 833-836, 844-846**
• Make and investigate mathematical conjectures.	**SE/TE: 833-836, 844-846**
• Develop and evaluate mathematical arguments and proofs.	**SE/TE: 534-535**
• Select and use various types of reasoning and methods of proof.	**SE/TE: 534-535**
Communication	
• Organize and consolidate their mathematical thinking through communication.	**SE/TE: 137-142, 168-169**
• Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	**SE/TE: 17 (#118-120), 90 (#81-84)**
• Analyze and evaluate the mathematical thinking and strategies of others.	**SE/TE: 17 (#118-120), 90 (#81-84)**
• Use the language of mathematics to express mathematical ideas precisely.	**SE/TE: 17 (#118-120), 90 (#81-84), 745-748**

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Connections	
• Recognize and use connections among mathematical ideas.	**SE/TE: 313-322, 329-342, 345-348, 514-522, 555-558**
• Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	**SE/TE: 313-322, 329-342, 345-348, 514-522, 555-558**
• Recognize and apply mathematics in contexts outside of mathematics.	**SE/TE: 313-322, 329-342, 345-348, 514-522, 555-558**
Representation	
• Create and use representations to organize, record, and communicate mathematical ideas.	**SE/TE: 746, 761-762**
• Select, apply, and translate among mathematical representations to solve problems.	**SE/TE: 313-322, 329-342, 345-348, 514-522, 555-558**
• Use representations to model and interpret physical, social, and mathematical phenomena.	**SE/TE: 130-142, 155-165, 169-171**
Estimation and Mental Computation	
• Know and apply appropriate methods for estimating the results of computations.	**SE/TE: 84, 156-163, 316-317**
• Use estimation to decide whether answers are reasonable.	**SE/TE: 84, 156-163, 316-317**
• Decide when estimation is an appropriate strategy for solving a problem.	**SE/TE: 84, 156-163, 316-317**
• Determine appropriate accuracy and precision of measurement in problem situations.	**SE/TE: 84, 156-163, 316-317**
• Use properties of numbers and operations to perform mental computation.	**SE/TE:**
• Recognize when the numbers involved in a computation allow for a mental computation strategy.	**SE/TE:**
Technology	
• Technology should be used as a tool in mathematics education to support and extend the mathematics curriculum.	**SE/TE: 62, 301, 303, 307-310, 376, 566-567**
• Technology can contribute to concept development, simulation, representation, communication, and problem solving.	**SE/TE: 62, 301, 303, 307-310, 376, 566-567**
• 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.	www.interactmath.com; www.mathxlforschool.com
o Graphing calculators should be used to enhance middle school and high school students' understanding and skills.	
o The focus must be on learning mathematics, using technology as a tool rather than as an end in itself.	

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