

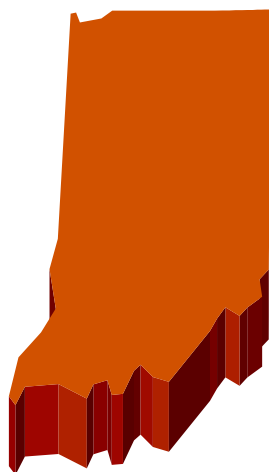
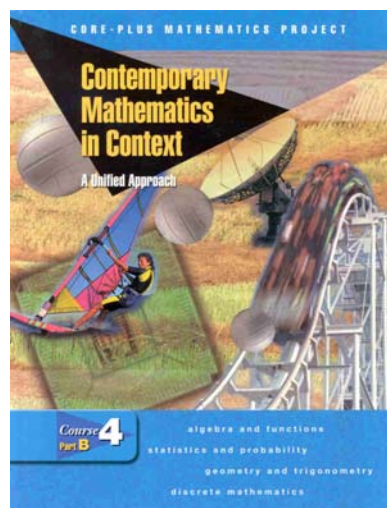
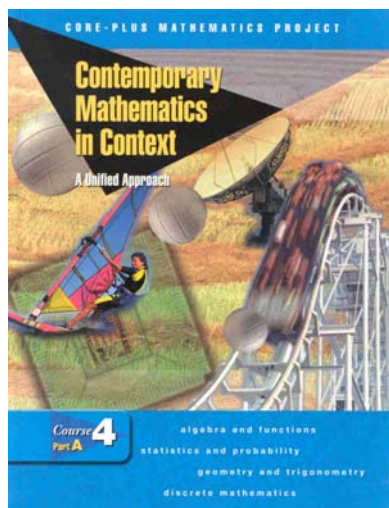
# Glencoe/McGraw-Hill

Contemporary Mathematics in Context, Course 4A ©2003

ISBN#: 0-07-827549-0

Contemporary Mathematics in Context, Course 4B ©2003

ISBN #: 0-07-827550-4



alignment to

## Indiana Academic Mathematics Standards Pre-Calculus

This correlation of Glencoe/McGraw-Hill Contemporary Mathematics in Context contains page references to both Volume A and Volume B

Course 4, Volume A: 1-357

Course 4, Volume B: 358-690

**GLENCOE/MCGRAW-HILL  
CONTEMPORARY MATHEMATICS IN CONTEXT ©2003  
COURSE 4A AND COURSE 4B**

**ALIGNMENT TO**

**INDIANA  
ACADEMIC MATHEMATICS STANDARDS FOR PRE-CALCULUS**

<b>OBJECTIVES</b>	<b>PAGE REFERENCES</b>
<b>Relations and Functions</b>	
Students use polynomial, rational, and algebraic functions to write functions and draw graphs to solve word problems, to find composite and inverse functions, and to analyze functions and graphs. They analyze and graph circles, ellipses, parabolas, and hyperbolas.	
<ul style="list-style-type: none"> <li>• Recognize and graph various types of functions, including polynomial, rational, algebraic, and absolute value functions. Use paper and pencil methods and graphing calculators.</li> </ul>	PE: 22–27, 34–35, 36–37, 152–154, 160–162, 163–164, 174–176, 360–373, 374–376, 389–390, 442–443, 461–463, 474  TG: T22–T28, T37–T38, T39–T43, T194–T196, T203–T205, T206–T207, T221–T225, T417–T431, T433–T435, T448, T514–T515, T539–T542, T575
<ul style="list-style-type: none"> <li>• Find domain, range, intercepts, zeros, poles, asymptotes, and points of discontinuity of functions. Use paper and pencil methods and graphing calculators.</li> </ul>	PE: 142–147, 159–161, 360–365, 373, 385–390, 408–425, 437–438, 442–443, 461–463, 553–554  TG: T182–T187, T201–T204, T417–T422, T431, T445–T449, T467–T488, T508–T510, T514–T515, T538–T543, T659–T660
<ul style="list-style-type: none"> <li>• Model and solve word problems using functions and equations.</li> </ul>	This objective is addressed throughout. See, for example:  PE: 23–28, 41–43, 69, 81–84, 173–174, 210–212, 271–274, 373–381, 428–431, 440–444, 472, 486–488, 508–510, 680–687  TG: T22–T29, T47–T52, T83, T102–T106, T218–T221, T259–T262, T323–T328, T431–T440, T490–T494, T513–T517, T554, T572–T577, T606–T608, T797–T820

**GLENCOE/MCGRAW-HILL  
CONTEMPORARY MATHEMATICS IN CONTEXT ©2003  
COURSE 4A AND COURSE 4B**

**ALIGNMENT TO  
INDIANA  
ACADEMIC MATHEMATICS STANDARDS FOR PRE-CALCULUS**

<b>OBJECTIVES</b>	<b>PAGE REFERENCES</b>
<ul style="list-style-type: none"> <li>• Define, find, and check inverse functions.</li> </ul>	PE: 142–145, 146, 147–149, 150–151, 152–153, 154, 155–157, 158–160, 161–164, 175, 210, 425, 481–483  TG: T182–T184, T185, T186–T189, T190–T192, T193–T194, T195–T196, T197–T199, T200–T202, T204–T207, T221–T225, T259, T488, T564–T565
<ul style="list-style-type: none"> <li>• Describe the symmetry of the graph of a function.</li> </ul>	PE: 36–41, 362, 481–483, 558  TG: T43–T47, T192–T194, T419, T564–T565  (See Course 3, Unit 6, and Course 2, Unit 4.)
<ul style="list-style-type: none"> <li>• Decide if functions are even or odd.</li> </ul>	PE: 473–474  TG: T556–T557
<ul style="list-style-type: none"> <li>• Apply transformations to functions.</li> </ul>	PE: 21, 44, 103, 108–126, 154, 180–185, 406–416, 448–451  TG: T20, T52–T53, T134, T139–T162, T195–T196, T230–T238, T464–T479, T523–T528  (See Course 3, Unit 6)
<ul style="list-style-type: none"> <li>• Understand curves defined parametrically and draw their graphs.</li> </ul>	PE: 109–115, 116–126, 127–135, 528–530  TG: T141–T148, T149–T162, T163–T171, T633–T636
<ul style="list-style-type: none"> <li>• Compare relative magnitudes of functions and their rates of change.</li> </ul>	PE: 2–6, 7–19, 22–29, 30–35, 36–45, 46–51, 369, 371, 477  TG: T4–T8, T9–T18, T21–T30, T31–T38, T39–T54, T55–T60, T426, T428–T429, T560–T561

**GLENCOE/MCGRAW-HILL  
CONTEMPORARY MATHEMATICS IN CONTEXT ©2003  
COURSE 4A AND COURSE 4B**

**ALIGNMENT TO**

**INDIANA  
ACADEMIC MATHEMATICS STANDARDS FOR PRE-CALCULUS**

<b>OBJECTIVES</b>	<b>PAGE REFERENCES</b>
<ul style="list-style-type: none"> <li>Write the equations of conic sections in standard form (completing the square and using translations as necessary), in order to find the type of conic section and to find its geometric properties (foci, asymptotes, eccentricity, etc.).</li> </ul>	PE: 528–534, 540–542, 574  TG: T633–T641, T646–T648, T684–T685
<b>Logarithmic and Exponential Functions</b>	
Students solve word problems involving logarithmic and exponential functions. They draw and analyze graphs, and find inverse functions.	
<ul style="list-style-type: none"> <li>Solve word problems involving applications of logarithmic and exponential functions.</li> </ul>	PE: 24–25, 158–163, 164–168, 169–174, 177, 437–440, 440–444, 445–446, 451–455  TG: T24–T25, T200–T207, T208–T213, T214–T220, T227, T508–T512, T513–T518, T518–T519, T528–T533
<ul style="list-style-type: none"> <li>Find the domain, range, intercepts, and asymptotes of logarithmic and exponential functions.</li> </ul>	PE: 158–163, 175–176, 437–440, 445–446, 451–454  TG: T200–T207, T221–T225, T508–T512, T518–T519, T528–T533
<ul style="list-style-type: none"> <li>Draw and analyze graphs of logarithmic and exponential functions.</li> </ul>	PE: 26, 158–163, 175–176, 437–440, 445–446, 451–454  TG: T26, T200–T207, T221–T225, T508–T512, T518–T519, T528–T533  (See Course 1, Unit 6 and Course 3, Unit 6)
<ul style="list-style-type: none"> <li>Define, find, and check inverse functions of logarithmic and exponential functions.</li> </ul>	PE: 142–146, 147–149, 150–151, 152–155, 158–160, 161–164, 446, 453  TG: T182–T185, T186–T189, T190–T192, T193–T199, T200–T202, T204–T207, T519, T531

**GLENCOE/MCGRAW-HILL  
CONTEMPORARY MATHEMATICS IN CONTEXT ©2003  
COURSE 4A AND COURSE 4B**

**ALIGNMENT TO  
INDIANA  
ACADEMIC MATHEMATICS STANDARDS FOR PRE-CALCULUS**

<b>Trigonometry in Triangles</b>	
Students define trigonometric functions using right triangles. They solve word problems and apply the laws of sines and cosines.	
<ul style="list-style-type: none"> <li>Solve word problems involving right and oblique triangles.</li> </ul>	PE: 88–90, 91–94, 95–98, 102, 104–107, 459–463, 470–471, 473, 477, 668  TG: T111–T112, T114–T121, T122–T127, T131, T136–T138, T537–T544, T551–T552, T556, T560, T783
<ul style="list-style-type: none"> <li>Apply the laws of sines and cosines to solving problems.</li> </ul>	PE: 92–93, 104–107, 468–469  TG: T116–T118, T136–T138, T550  (See Course 3, Unit 1 and Unit 4)
<ul style="list-style-type: none"> <li>Find the area of a triangle given two sides and the angle between them.</li> </ul>	PE: 475–476, 668  TG: T559, T783
<b>Trigonometric Functions</b>	
Students define trigonometric functions using the unit circle and use degrees and radians. They draw and analyze graphs, find inverse functions, and solve word problems.	
<ul style="list-style-type: none"> <li>Define sine and cosine using the unit circle.</li> </ul>	PE: 459–463  TG: T537–T543  (See Course 2, Unit 6)
<ul style="list-style-type: none"> <li>Convert between degree and radian measures.</li> </ul>	PE: 120–122, 123–126, 463  TG: T153–T157, T158–T162, T543
<ul style="list-style-type: none"> <li>Learn exact sine, cosine, and tangent values for <math>0</math>, <math>\frac{\pi}{2}</math>, <math>\frac{\pi}{3}</math>, <math>\frac{\pi}{4}</math>, <math>\frac{\pi}{6}</math>, and multiples of <math>\pi</math>. Use those values to find other trigonometric values.</li> </ul>	PE: 459–463, 464–467, 468, 470, 471, 473, 475–479, 480–491, 510–512  TG: T537–T544, T544–T548, T548–T550, T551–T552, T552–T553, T555–T556, T558–T561, T562–T582, T608–T613

**GLENCOE/MCGRAW-HILL  
CONTEMPORARY MATHEMATICS IN CONTEXT ©2003  
COURSE 4A AND COURSE 4B**

**ALIGNMENT TO**

**INDIANA  
ACADEMIC MATHEMATICS STANDARDS FOR PRE-CALCULUS**

<ul style="list-style-type: none"> <li>Solve word problems involving applications of trigonometric functions.</li> </ul>	PE: 26, 41–42, 464, 472, 480–484, 486–488, 510–512  TG: T26–T27, T47–T50, T544, T554, T562–T568, T571–T575, T608–T613
<ul style="list-style-type: none"> <li>Define and graph trigonometric functions (i.e., sine, cosine, tangent, cosecant, secant, cotangent).</li> </ul>	PE: 26, 39, 41–42, 458–463, 480–484  TG: T26–T27, T45, T47–T50, T536–T543, T562–T568  (See Course 3, Unit 6)
<ul style="list-style-type: none"> <li>Find domain, range, intercepts, periods, amplitudes, and asymptotes of trigonometric functions.</li> </ul>	PE: 458–463, 480–484, 486–489  TG: T536–T543, T562–T568, T571–T578,  (See Course 3, Unit 6)
<ul style="list-style-type: none"> <li>Draw and analyze graphs of translations of trigonometric functions, including period, amplitude, and phase shift.</li> </ul>	PE: 26, 41–42, 475, 486–493, 509–510  TG: T26–T27, T47–T50, T558–T559, T571–T582, T606–T609  (See also Course 3, Unit 6)
<ul style="list-style-type: none"> <li>Define and graph inverse trigonometric functions.</li> </ul>	PE: 482, 489  TG: T564, T578
<ul style="list-style-type: none"> <li>Find values of trigonometric and inverse trigonometric functions.</li> </ul>	PE: 97, 100–105, 132, 136, 458–463, 480–484, 485, 486–493, 510–512  TG: T127, T129–T138, T169, T172, T536–T543, T562–T568, T569–T570, T571–T582, T608–T613
<ul style="list-style-type: none"> <li>Know that the tangent of the angle that a line makes with the <math>x</math>-axis is equal to the slope of the line.</li> </ul>	PE: 95–98, 458–460  TG: T123–T127, T537–T538

**GLENCOE/MCGRAW-HILL  
CONTEMPORARY MATHEMATICS IN CONTEXT ©2003  
COURSE 4A AND COURSE 4B**

**ALIGNMENT TO**

**INDIANA  
ACADEMIC MATHEMATICS STANDARDS FOR PRE-CALCULUS**

<ul style="list-style-type: none"> <li>Make connections between right triangle ratios, trigonometric functions, and circular functions.</li> </ul>	PE: 458–464, 470–471, 475 TG: T537–T545, T551–T552, T558–T559 (See Course 2, Unit 6 and Course 3, Unit 6)
--	---

<b>Trigonometric Identities and Equations</b>	
Students prove trigonometric identities, solve trigonometric equations, and solve word problems.	
<ul style="list-style-type: none"> <li>Know the basic trigonometric identity <math>\cos^2x + \sin^2x = 1</math> and prove that it is equivalent to the Pythagorean Theorem.</li> </ul>	PE: 464–467 TG: T544–T547
<ul style="list-style-type: none"> <li>Use basic trigonometric identities to verify other identities and simplify expressions.</li> </ul>	PE: 464–466, 467–471, 472–477, 480–484, 485, 486–493 TG: T544–T547, T548–T553, T554–T561, T562–T568, T569–T571, T572–T582
<ul style="list-style-type: none"> <li>Understand and use the addition formulas for sines, cosines, and tangents.</li> </ul>	PE: 239, 467–471, 472–477, 480–484, 485, 486–493 TG: T288, T548–T553, T554–T561, T562–T568, T569–T571, T572–T582
<ul style="list-style-type: none"> <li>Understand and use the half-angle and double-angle formulas for sines, cosines, and tangents.</li> </ul>	PE: 477 TG: T561
<ul style="list-style-type: none"> <li>Solve trigonometric equations.</li> </ul>	PE: 480–484, 485, 486–491, 508–512 TG: T562–T568, T569–T571, T572–T582, T605–T613
<ul style="list-style-type: none"> <li>Solve word problems involving applications of trigonometric equations.</li> </ul>	PE: 26, 483–484, 486–488, 502, 508–510 TG: T26–T27, T565–T569, T571–T575, T605–T608, T597

**GLENCOE/MCGRAW-HILL  
CONTEMPORARY MATHEMATICS IN CONTEXT ©2003  
COURSE 4A AND COURSE 4B**

**ALIGNMENT TO**

**INDIANA  
ACADEMIC MATHEMATICS STANDARDS FOR PRE-CALCULUS**

<b>Polar Coordinates and Complex Numbers</b>	
Students define polar coordinates and complex numbers and understand their connection with trigonometric functions	
<ul style="list-style-type: none"> <li>• Define polar coordinates and relate polar coordinates to Cartesian coordinates.</li> </ul>	PE: 94–98, 102, 494–496, 497, 498–500, 501–505, 508–511  TG: T122–T127, T132, T583–T587, T588–T589, T590–T593, T594–T604, T605–T611
<ul style="list-style-type: none"> <li>• Represent equations given in rectangular coordinates in terms of polar coordinates.</li> </ul>	PE: 494–497, 498–500, 501–505, 508–511  TG: T583–T588, T589–T594, T594–T604, T605–T611
<ul style="list-style-type: none"> <li>• Graph equations in the polar coordinate plane.</li> </ul>	Opportunity to address this objective:  PE: 94–98, 494–497, 498–500, 501–505  TG: T122–T127, T584–T589, T590–T594, T595–T603
<ul style="list-style-type: none"> <li>• Define complex numbers, convert complex numbers to trigonometric form, and multiply complex numbers in trigonometric form.</li> </ul>	PE: 391–399, 400–401, 494–498, 593  TG: T449–T458, T458–T460, T583–T590, T710–T711
<ul style="list-style-type: none"> <li>• State, prove, and use De Moivre’s Theorem.</li> </ul>	PE: 498–500, 501–505, 511  TG: T590–T593, T594–T604, T611

**GLENCOE/MCGRAW-HILL  
CONTEMPORARY MATHEMATICS IN CONTEXT ©2003  
COURSE 4A AND COURSE 4B**

**ALIGNMENT TO**

**INDIANA  
ACADEMIC MATHEMATICS STANDARDS FOR PRE-CALCULUS**

<b>Sequences and Series</b>	
Students define and use arithmetic and geometric sequences and series, understand the concept of a limit, and solve word problems.	
<ul style="list-style-type: none"> <li>• Understand and use summation notation.</li> </ul>	PE: 263, 265–267, 274, 454  TG: T311, T315–T316, T326, T532
<ul style="list-style-type: none"> <li>• Find sums of infinite geometric series.</li> </ul>	PE: 266, 273–274, 648–653, 654–656, 666–670  TG: T318, T326, T755–T762, T763–T769, T781–T787
<ul style="list-style-type: none"> <li>• Prove the sum formulas for arithmetic series and for finite and infinite geometric series.</li> </ul>	PE: 263, 265–267, 273–274  TG: T311, T315–T316, T326
<ul style="list-style-type: none"> <li>• Use recursion to describe a sequence.</li> </ul>	PE: 19, 258–263, 264–267, 273–274, 648–653, 654–656, 666–670  TG: T18–T19, T306–T312, T313–T322, T326–T328, T755–T762, T763–T769, T781–T787
<ul style="list-style-type: none"> <li>• Understand and use the concept of limit of a sequence or function as the independent variable approaches infinity or a number. Decide whether simple sequences converge or diverge.</li> </ul>	PE: 32–36, 47, 60–63, 258–263, 264–269, 648–653, 654–656, 666–670  TG: T34–T43, T55, T72–T75, T306–T312, T313–T322, T755–T762, T763–T769, T781–T787  (See Course 3, Unit 7)
<ul style="list-style-type: none"> <li>• Solve word problems involving applications of sequences and series.</li> </ul>	PE: 19, 258–263, 264–269, 273–274, 648–653, 654–656, 666–670  TG: T18–T19, T306–T312, T313–T322, T326–T328, T755–T762, T763–T769, T781–T787

**GLENCOE/MCGRAW-HILL  
CONTEMPORARY MATHEMATICS IN CONTEXT ©2003  
COURSE 4A AND COURSE 4B**

**ALIGNMENT TO**

**INDIANA  
ACADEMIC MATHEMATICS STANDARDS FOR PRE-CALCULUS**

OBJECTIVES	PAGE REFERENCES
<b>Data Analysis</b>	
Students model data with linear and non-linear functions.	
<ul style="list-style-type: none"> <li>• Find linear models using the median fit and least squares regression methods. Decide which model gives a better fit.</li> </ul>	PE: 181–183, 185–187, 194–195, 198–201, 202–207, 212  TG: T231–T235, T237–T240, T246–T247, T248–T251, T251–T258, T261–T262  (See Course 1, Unit 3 and Course 2, Unit 3)
<ul style="list-style-type: none"> <li>• Calculate and interpret the correlation coefficient. Use the correlation coefficient and residuals to evaluate a “best-fit” line.</li> </ul>	PE: 185–187, 194–195  TG: T237–T240, T246–T247  (See Course 1, Unit 3 and Course 2, Unit 3)
<ul style="list-style-type: none"> <li>• Find a quadratic, exponential, logarithmic, power, or sinusoidal function to model a data set and explain the parameters of the model.</li> </ul>	PE: 23–27, 115–127, 128–135, 142–147, 151, 159–160, 173–174, 176–177, 181–183, 185–189, 190–192, 194–195, 198–201, 202–205  TG: T22–T29, T147–T163, T163–T171, T182–T187, T191–T192, T201–T203, T218–T221, T225–T228, T231–T235, T237–T242, T242–T245, T246–T247, T248–T251, T251–T254  (See Course 1, Unit 3, Course 2, Unit 4 and Unit 6, and course 3, Unit 6)

**GLENCOE/MCGRAW-HILL  
CONTEMPORARY MATHEMATICS IN CONTEXT ©2003  
COURSE 4A AND COURSE 4B**

**ALIGNMENT TO  
INDIANA  
ACADEMIC MATHEMATICS STANDARDS FOR PRE-CALCULUS**

OBJECTIVES	PAGE REFERENCES
<b>Mathematical Reasoning and Problem Solving</b>	
Students use a variety of strategies to solve problems	
<ul style="list-style-type: none"> <li>Use a variety of problem-solving strategies, such as drawing a diagram, guess-and-check, solving a simpler problem, examining simpler problems, and working backwards.</li> </ul>	<p>This objective is addressed throughout. See, for example:</p> <p>PE: 32–39, 62–69, 88–90, 158–164, 206–209, 272–274, 372–381, 453, 489–491, 508–510, 590, 680–687</p> <p>TG: T34–T46, T73–T83, T109–T113, T200–T208, T253–T258, T334–T328, T430–T440, T530–T531, T577–T582, T605–T610, T705–T706, T797–T821</p>
<ul style="list-style-type: none"> <li>Decide whether a solution is reasonable in the context of the original situation.</li> </ul>	<p>This objective is addressed throughout. See, for example:</p> <p>PE: 2-11, 115–119, 180–195, 202–205, 217–221, 241–244, 276–282, 440–444, 486–488, 508–510, 523–524, 611–618, 680–687</p> <p>TG: T4–T14, T147–T153, T230–T247, T251–T254, T270–T273, T290–T293, T335–T343, T512–T518, T571–T577, T605–T610, T629–T630, T722–T726, T797–T821</p>
Students develop and evaluate mathematical arguments and proofs	
<ul style="list-style-type: none"> <li>Decide if a given algebraic statement is true always, sometimes, or never (statements involving rational or radical expressions, trigonometric, logarithmic or exponential functions).</li> </ul>	<p>This objective is addressed throughout. See, for example:</p> <p>PE: 157, 164–168, 209, 213, 436–439, 440–443, 444–447, 448–450, 453, 455, 463, 464–467, 468–471, 472–479, 481</p> <p>TG: T199, T207–T213, T258, T262–T264, T507–T511, T512–T516, T517–T522, T523–T527, T530–T531, T533–T534, T542–T544, T544–T548, T548–T553, T554–T561, T563–T564</p>

**GLENCOE/MCGRAW-HILL  
CONTEMPORARY MATHEMATICS IN CONTEXT ©2003  
COURSE 4A AND COURSE 4B**

**ALIGNMENT TO**

**INDIANA  
ACADEMIC MATHEMATICS STANDARDS FOR PRE-CALCULUS**

<b>OBJECTIVES</b>	<b>PAGE REFERENCES</b>
<ul style="list-style-type: none"> <li>• Use the properties of number systems and order of operations to justify the steps of simplifying functions and solving equations.</li> </ul>	<p>This objective is addressed throughout. See, for example:</p> <p>PE: 158–163, 164–168, 175–176, 390–395, 440–450, 480–491, 661–663</p> <p>TG: T200–T207, T207–T213, T221–T227, T448–T455, T512–T527, T562–T582, T775–T780</p>
<ul style="list-style-type: none"> <li>• Understand that the logic of equation solving begins with the assumption that the variable is a number that satisfies the equation, and that the steps taken when solving equations create new equations that have, in most cases, the same solution set as the original. Understand that similar logic applies to solving systems of equations simultaneously.</li> </ul>	<p>This objective is addressed throughout. See, for example:</p> <p>PE: 366–368, 402, 440–444, 447–450, 481–484, 567</p> <p>TG: T423–T425, T461, T512–T518, T520–T527, T563–T569, T679–T680</p>
<ul style="list-style-type: none"> <li>• Define and use the mathematical induction method of proof.</li> </ul>	<p>PE: 258, 259–263, 264–270, 270–274</p> <p>TG: T306–T308, T308–T312, T313–T323, T323–T328</p>

GLENCOE/McGraw-Hill  
South Central Region  
6510 Jimmy Carter Boulevard  
Norcross, GA 30071  
770/613-0281  
800/731-2365