



ADVANCED Mathematical Concepts

Precalculus
with Applications

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STANDARDS		PAGE REFERENCES
Standard 1: Number and Operation		
Students in Grade 10 deepen their understanding of real numbers by applying properties of rational numbers and exponents and by identifying exact and approximate roots without simplification. Students use positive and negative numbers, absolute value, fractions, decimals, percentages, and scientific notation. Students use the proper order of operations and perform operations with rational numbers. Students apply number sense to everyday situations and judge reasonableness of answers.		
Goal 1.1: Understand and use numbers.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.1.1.1	Apply properties of rational numbers. (347.01.b)	Student Edition: <i>Graphing Calculator Exploration 86</i>
10.M.1.1.2	Use positive and negative numbers, absolute value, fractions, decimals, percentages, and scientific notation, including application in real world situations. (347.01.a)	Student Edition: 64 ex 2, 65 #3, 179 #51, 273 #6, 282 #62, 606 #46, 695 ex 1, 700 #19, 701 #68, 727 ex 2
10.M.1.1.3	Apply properties of exponents. (347.01.c)	Student Edition: 273 #6, 282 #62, 695-702, 717 #1-#5, 727 ex 2, 750 #11-#20 Teacher Wraparound Edition: A 703; AIN 698; EC 702; FTC 699; ICE 696, 697, 698, 699; TT 696, 697

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10.M.1.1.4	Identify exact and approximate roots without simplification.	Student Edition: 273 #6, 282 #62, 695-702, 717 #1-#5, 727 ex 2, 750 #11-#20 Teacher Wraparound Edition: A 703; AIN 698; EC 702; FTC 699; ICE 696, 697, 698, 699; TT 696, 697
10.M.1.1.5	Solve problems using number theory concepts (factors, multiples, primes). (347.01.d)	Student Edition: 77 #23, 196 #48, 221 #45, 232-233 ex 4, 805 #44, 813 #40, 814 #45, 826 #10, 828 #28, 983 #6
10.M.1.1.6	Use appropriate vocabulary.	Student Edition: 17 #3, 18 #29, 23 #4, 37 #32, 41 #2, 48 #3, 50 #27, 110 #24, 118 #22, 133 #4
Goal 1.2: Perform computations accurately.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.1.2.1	Use the order of operations and perform operations with rational numbers. (347.02.a)	Student Edition: 12 #57, 56 #32, 64 ex 2, 65 #6, 72 #45
Goal 1.3: Estimate and judge reasonableness of results.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.1.3.1	Apply number sense to everyday situations and judge reasonableness of results. (347.03.a)	Student Edition: 272 ex 2, 744 #6c, 745 #14c, 747 #21d, 974 #45
10.M.1.3.2	Identify that error accumulates in a computation when there is rounding. (349.05.b)	This can be found in Glencoe's <i>Geometry</i> © 2005 on page 19 #52-#55.
Standard 2: Concepts and Principles of Measurement		
Students in Grade 10, given relative formulas, determine length, distance, area, surface area, capacity, and weight, with appropriate unit labels. Students formulate and use proportions, ratios, and scaling. Students apply concepts of rates and direct and indirect measurements. Students evaluate given measurement formulas for two- and three-dimensional objects.		
Goal 2.1: Understand and use U.S. customary and metric measurements.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.2.1.1	Given the formulas, find the circumference, perimeter, or area of triangles, circles, and quadrilaterals, the volume of spheres, non-oblique prisms, cylinders, and cones, and the surface area of spheres, non-oblique prisms, cylinders, and right square-based pyramids. (349.01.a)	Student Edition: 168 #46, 178 #35, 187 #44, 192-193 ex 5, 226 #13, 229, 303 #22, 318 #42, 358 #51, 510 #38, 612, 701 #68

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10.M.2.1.2	Solve problems involving circumference, perimeter, or area of triangles, circles, and rectangles.	Student Edition: 168 #46, 178 #35, 187 #44, 192-193 ex 5, 226 #13, 229, 303 #22, 318 #42, 358 #51, 510 #38, 612, 701 #68
Goal 2.2: Apply the concepts of rates, ratios, and proportions.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.2.2.1	Use rates, ratios, proportions, map scales, and scale factors (one- and two-dimensional) in problem-solving situations. (349.03.a)	Student Edition: 189-196, 200 #56-#58, 248 #35, 283 #72, 284-290, 298 #54, 677 #56, 692 ex 1 Teacher Wraparound Edition: A 196; EC 196
10.M.2.2.2	Apply concepts of rates and direct and indirect measurements.	Student Edition: 77 #28, 104 #50, 168 #46, 178 #35, 179 #51, 187 #44, 192-193 ex 5, 194 #12, 227 #44, 303 #24, 314-315, 693 #3 Teacher Wraparound Edition: ICE 192, 315
10.M.2.2.3	Construct equivalent units, comparable units, and conversions. (349.02.a)	Student Edition: 353 ex 3, 354 ex 6, 355 #8-#9 Teacher Wraparound Edition: AIN 354; ICE 353; MTL 352
Goal 2.3: Apply dimensional analysis.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.2.3.1	Use customary and metric units and their relationship to one another and to real world applications involving length, area, capacity, weight, time, and temperature. (349.04.a)	Student Edition: 168 #46, 187 #44, 192-193 ex 5, 226 #13, 229, 318 #42, 358 #51, 510 #38, 612, 701 #68
Goal 2.4: Apply appropriate techniques and tools to determine measurements.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.2.4.1	Determine and use appropriate units. (349.01.a)	Student Edition: 23 #11, 24 #35, 28 ex 3 Teacher Wraparound Edition: A 25
10.M.2.4.2	Approximate error in measurement situations.	Student Edition: 927-928

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Standard 3: Concepts and Language of Algebra and Functions		
Students in Grade 10 use appropriate procedures for manipulating and simplifying algebraic expressions involving variables, integers, rational numbers, and for solving multi-step, first-degree equations and inequalities. Students understand the concept and applications of functions and mathematical models. Given graphs, charts, ordered pairs, mappings, or equations, students determine whether a relation is a function. Students evaluate functions written in functional notation and, given a function, students identify domain and range.		
Goal 3.1: Use algebraic symbolism as a tool to represent mathematical relationships.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.3.1.1	Represent mathematical relationships using variables, expressions, linear equations and inequalities. (350.01.a)	Student Edition: 27-31, 32-37, 44 #15, 51 #32, 55 #8a, 56 #30, 59 #39-#46, 124 ex 2, 125 #3 Teacher Wraparound Edition: EC 37
Goal 3.2: Evaluate algebraic expressions.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.3.2.1	Use appropriate procedures for manipulating and simplifying algebraic expressions involving variables, integers, and rational numbers. (350.02.a)	Student Edition: 31 #55, 37 #40, 86 #64, 96 #42, 118 #28, 145 #53, 235 #33, 312 #60
Goal 3.3: Solve algebraic equations and inequalities.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.3.3.1	Use appropriate procedures to solve multi-step, first-degree equations and inequalities; such as $3(2x - 5) = 5x + 7$ or $3(2x - 5) > 5x + 7$. (350.03.a)	Student Edition: 37 #40, 86 #64, 96 #42, 118 #28, 125 #6, 235 #33, 499 #57, 542 #30
10.M.3.3.2	Differentiate between linear and non-linear equations and graphs.	Student Edition: 5-12, 741 Teacher Wraparound Edition: A 12; ICE 6, 8
Goal 3.4: Solve simple linear systems of equations.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.3.4.1	Use appropriate procedures to solve linear systems of equations involving two variables; such as $x + y = 7$ and $2x + 3y = 21$. (350.04.a)	Student Edition: 67-72, 73-77, 86 #55, 96 #36, 104, 355 Teacher Wraparound Edition: A 72, 77; AIN 75; EC 72, 76

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Goal 3.5: Understand the concept of functions.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.3.5.1	Given graphs, charts, ordered pairs, mappings, or equations, determine whether a relation is a function.	Student Edition: 6 ex 4, 8 #3, 9 #10-#11, 10 #32-#37, 31 #1, 119 #36 Teacher Wraparound Edition: A 12; ICE 6
10.M.3.5.2	Evaluate functions written in functional notation.	Student Edition: 7 ex 6, 8 ex 8, 9 #13-#14, 11 #41-#47, 19 #37, 25 #43, 31 #2, 58 #11-#17 Teacher Wraparound Edition: EC 11, 19; ICE 7, 8
10.M.3.5.3	Given a function, identify domain and range.	Student Edition: 5-11, 19 #34, 31 #1, 44 #18, 51 #36 Teacher Wraparound Edition: ICE 5, 6
Goal 3.6: Apply functions to a variety of problems.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.3.6.1	Model and solve real-world phenomena using multi-step, first degree, single variable equations and inequalities, linear equations, and two-variable linear systems of equations. (353.01.a)	Student Edition: 38-44, 258-264, 740-748 <i>Graphing Calculator Exploration</i> 265 Teacher Wraparound Edition: A 44, 264; AIN 40, 260; EC 44; FTC 39
10.M.3.6.2	Use graphs and sequences to represent and solve problems. (347.02.b)	Student Edition: 759-765, 766-773, 774-783, 793 #6, 806-814 Teacher Wraparound Edition: A 773; AIN 779; EC 764; F 766, 774; ICE 760, 761, 762, 766, 768, 770, 779; MTL 775

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Standard 4: Concepts and Principles of Geometry		
Students in Grade 10 recognize congruency and similarity of two-dimensional figures. Students identify and use similarity as it relates to size variations in two- and three- dimensional objects. Given the Pythagorean Theorem, students calculate missing side lengths of right triangles without simplifying radicals. Students represent linear relationships using tables, graphs, and mathematical symbols. Students interpret attributes of linear relationships such as slope, rate of change, and intercepts. Students use logic to make and evaluate mathematical arguments.		
Goal 4.1: Apply concepts of size, shape, and spatial relationships.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.4.1.1	Recognize and apply congruency and similarity of two-dimensional figures. (351.01.a)	Student Edition: 92, 93 #14, 483 #8, 717 #25 <i>Graphing Calculator Exploration</i> 284
10.M.4.1.2	Recognize and use similarity as it relates to size variations in two- and three-dimensional objects. (351.01.b)	Student Edition: 92 ex 4, 93 #14, 717 #25
Goal 4.2: Apply the geometry of right triangles.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.4.2.1	Given the Pythagorean Theorem, calculate missing side lengths of right triangles without simplifying radicals. (351.02.c)	Student Edition: 340 ex 1, 616 ex 2, 620 #11, 632 ex 1
Goal 4.3: Apply graphing in two dimensions.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.4.3.1	Identify attributes of the Cartesian Coordinate System, such as quadrants, origin, and axes. (351.03.a)	Student Edition: 20 ex 1, 32 ex 1, 121 #28-#33, 272 ex 2, 470-476, 480 #48-#51, 615-622, 640 #55, 652 #51, 688 #11-#13
10.M.4.3.2	Graph scatter plots and identify informal trend lines (e.g., eyeball fit lines).	Student Edition: 38-44, 51 #31, 60 #53, 61 #69, 151 #51, 258-263 Teacher Wraparound Edition: A 264; AIN 40; EC 44; FTC 39; ICE 39, 40, 259, 260
10.M.4.3.3	Identify positive and negative correlations.	Student Edition: 38, 51 #31, 60, 61 #69, 145 #49 Teacher Wraparound Edition: A 44; EC 44; FTC 39

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Goal 4.4: Represent and graph linear relationships.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.4.4.1	Create graphs and equations for linear relationships.	Student Edition: 5-12, 20-25, 31 #30, 32-37, 45-51 Teacher Wraparound Edition: A 25; AIN 23; EC 37; ICE 5, 6, 21, 22, 33, 34, 35, 46
10.M.4.4.2	Represent linear relationships using tables, graphs, and mathematical symbols.	Student Edition: 5-12, 20-25, 31 #30, 32-37, 45-51 Teacher Wraparound Edition: A 25; AIN 23; EC 37; ICE 5, 6, 21, 22, 33, 34, 35, 46
10.M.4.4.3	Interpret attributes of linear relationships such as slope, rate of change, and intercepts.	Student Edition: 20 ex 1, 21-25, 32 ex 1, 67-72, 121 #28-#33, 272 ex 2, 470-476, 480 #48-#51, 615-622, 640 #55, 652 #51, 688 #11-#13, 887 #2 Teacher Wraparound Edition: AIN 618; F 623; ICE 21, 22, 68
Goal 4.5: Use reasoning skills.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.4.5.1	Use logic to make and evaluate mathematical arguments. (348.02.b)	Student Edition: 185 #4, 239 #1, 308 #3, 363 #1, 410 #11-#12, 411 #32-#37, 421-422, 427 #1, 438 ex 1, 467 #3, 627 #4, 848 #3, 923 #4
Standard 5: Data Analysis, Probability, and Statistics		
Students in Grade 10 read, interpret, and use tables, charts, and graphs, including scatter plots, multiple broken line graphs, and box-and-whisker plots. Students interpret and use basic statistical concepts including mean, median, mode, range, and distribution of data, including outliers. Students make predictions and draw conclusions based on statistical measures and students make predictions based on randomness, chance, equally likely events, and probability. Students find probabilities based on dependent, independent, and compound events and students make predictions based on randomness, chance, equally likely events, and probability.		
Goal 5.1: Represent data with a variety of formats.		
Objective(s): By the end of Grade 10, the student will be able to:		
9.M.5.1.1	Analyze and interpret tables, charts, and graphs, including scatter plots, broken line graphs, and box-and-whisker plots. (352.01.a)	Student Edition: 889-896, 914 #1, 925 #20, 934 #11-#13, 937 #2, 939 #1 Teacher Wraparound Edition: EC 895, 916; MTL 889

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Goal 5.2: Collect, organize, and display data.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.5.2.1	Collect, organize, and display data in tables, charts, and graphs. (352.02.a)	Student Edition: 84 #49, 258-264, 270 #54-#55, 740-748, 889-896, 934 #11-#13 <i>Graphing Calculator Exploration</i> 265-266 <i>Internet Project</i> 937
Goal 5.3: Apply simple statistical measurements.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.5.3.1	Interpret and use basic statistical concepts, including mean, median, mode, range, and distribution of data, including outliers. (352.03.a)	Student Edition: 111 #33, 150 #43, 897-907, 908-917, 925 #23, 934 #14-#18, 935 #19-#22, 937 #41, 939 #9
10.M.5.3.2	Make predictions and draw conclusions based on statistical measures. (352.05.a)	Student Edition: 38-44, 51 #31, 60 #53, 61 #69, 145 #49, 151 #51, 258-264 Teacher Wraparound Edition: AIN 40, 260; EC 44
Goal 5.4: Understand basic concepts of probability.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.5.4.1	Find probabilities based on dependent, independent, and compound events.	Student Edition: 837-845, 883 #35-#36 Teacher Wraparound Edition: TT 838
10.M.5.4.2	Contrast experimental and theoretical probability. (352.04.a)	Student Edition: 878 #2, 886 ex 2, 977 Teacher Wraparound Edition: A 880; AIN 877
Goal 5.5: Make predictions or decisions based on data.		
Objective(s): By the end of Grade 10, the student will be able to:		
10.M.5.5.1	Make predictions based on randomness, chance, equally likely events, and probability. (352.04.c)	Student Edition: 852-858, 927 Teacher Wraparound Edition: AIN 854

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10.M.5.5.2	Use appropriate tools/technology to conduct simulations and employ graphical models to make predictions or decisions based on data. (352.05.a)	Student Edition: 38-44, 51 #31, 60 #53, 61 #69, 145 #49, 151 #51, 258-264 Teacher Wraparound Edition: AIN 40, 260; EC 44
10.M.5.5.3	Design, conduct, and interpret results of statistical experiments. (352.05.b)	Teacher Wraparound Edition: A 880; AIN 854, 877; FTC 876