THE MATH TRANSLATOR

ELEMENTARY ALGEBRA
VIDEO LIBRARY OUTLINE

Professor
Melissa McNickle

VIDEO LIBRARY OVERVIEW

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CHAPTER 1 - FOUNDATIONS

1.1   Introduction to Whole Numbers
Topics:
A. Use place value with whole numbers (1 – 35 odd)
B. Identify multiples and apply divisibility (37 – 47 odd)
C. Find prime factorizations and least common multiples (LCM) (49 – 69 odd)
Suggested Homework Exercises: 1 – 69 odd

1.2   Use the Language of Algebra
Topics:
A. Simplify expressions using order of operations (83 – 125 odd)
B. Evaluate an expression (127 – 139 odd)
C. Identify and combine like terms (141 – 161 odd)
D. Translate an English phrase to an algebraic expression (163 – 177 odd)
Suggested Homework Exercises: 83 – 177 odd

1.3   Add and Subtract Integers
Topics:
A. Use negatives and opposites (185 – 193 odd)
B. Simplify expressions with absolute value (195 – 207 odd)
C. Add integers (209 – 217 odd)
D. Subtract integers (219 – 253 odd)
Suggested Homework Exercises: 185 – 253 odd

1.4   Multiply and Divide Integers
Topics:
A. Multiply and divide integers (265 – 277 odd)
B. Simplify expressions with integers (279 – 295 odd)
C. Evaluate variable expressions with integers (297 – 313 odd)
D. Translate English phrases to algebraic expressions (315 – 327 odd)
E. Use integers in applications (329 – 335 odd)
Suggested Homework Exercises: 265 – 335 odd

1.5   Visualize Fractions
Topics:
A. Simplify fractions (343 – 355 odd)
B. Multiply fractions (357 – 371 odd)
C. Divide fractions (373 – 391 odd)
D. Simplify expressions written with a fraction bar (393 – 411 odd)
E. Translate phrases to expressions with fractions (413, 415)
Suggested Homework Exercises: 343 – 415 odd

1.6   **Add and Subtract Fractions**
Topics:
A. Add or subtract fractions with a common denominator (425 – 447 odd)
B. Add or subtract fractions with different denominators (457 – 479 odd)
C. Use order of operations to simplify complex fractions (495 – 515 odd)
D. Evaluate variable expressions with fractions (517 – 525 odd)
Suggested Homework Exercises: 425 – 447 odd, 457 - 479 odd, 495 – 525 odd

1.7   **Decimals**
Topics:
A. Name and write decimals (531 – 545 odd)
B. Round decimals (547 – 559 odd)
C. Add and subtract decimals (561 - 577 odd)
D. Multiply and divide decimals (579 – 605 odd)
E. Convert decimals, fractions, and percents (607 – 647 odd)
Suggested Homework Exercises: 531 – 647 odd

1.8   **The Real Numbers**
Topics:
A. Simplify expressions with square roots (659 – 669 odd)
B. Identify integers, rational numbers, irrational numbers, and real
   numbers (671 – 689 odd)
C. Locate fractions on the number line (691 – 705 odd)
D. Locate decimals on the number line (707 – 717 odd)
Suggested Homework Exercises : 659 – 717 odd

1.9   **Properties of Real Numbers**
Topics:
A. Use the commutative and associative properties (723 – 749 odd)
B. Use the identity and inverse properties of addition and multiplication (751 – 757 odd)
C. Use the properties of zero (759 – 779 odd)
D. Simplify expressions using the distributive property (781 – 815 odd)
Suggested Homework Exercises : 723 – 815 odd

1.10   **Systems of Measurement**
Topics:
A. Perform unit conversions in the U.S. system (825 – 857 odd)
B. Perform unit conversions in the metric system(859 – 879 odd)
C. Convert between the U.S. and the metric systems of measurement (881 – 891 odd)
D. Convert between Fahrenheit and Celsius temperatures (893 – 907 odd)
Suggested Homework Exercises: 825 – 907 odd

CHAPTER 2 – SOLVING LINEAR EQUATIONS AND INEQUALITIES

2.1   **Solve Equations Using the Subtraction and Addition Properties of Equality**
Topics:
A. Verify a solution of an equation (1, 3)
B. Solve equations using the Subtraction and Addition Properties of
    Equality (5 – 49 odd)
C. Translate to an equation and solve (51 – 61 odd)
D. Translate and solve applications (63 – 71 odd)
Suggested Homework Exercises: 1 – 71 odd

2.2   **Solve Equations Using the Division and Multiplication Properties of Equality**
Topics:
A. Solve equations using the Division and Multiplication Properties of
    Equality (77 – 141 odd)
B. Translate to an equation and solve (143 – 161 odd)
C. Translate and solve applications (163 – 169 odd)
Suggested Homework Exercises: 77 – 169 odd

2.3   **Solve Equations with Variables and Constants on Both Sides**
Topics:
A. Solve an equation with constants on both sides (175 – 185 odd)
B. Solve an equation with variables on both sides (187 – 197 odd)
C. Solve an equation with variables and constants on both sides (199 – 225 odd)
Suggested Homework Exercises: 175 – 225 odd

2.4   **Use a General Strategy to Solve Linear Equations**
Topics:
A. Solve equations using a general strategy (233 – 291 odd)
B. Classify equations (293 – 311 odd)
Suggested Homework Exercises: 233 – 311 odd

2.5   **Solve Equations with Fractions or Decimals**
Topics:
A. Solve equations with fraction coefficients (319 – 353 odd)
B. Solve equations with decimal coefficients (355 – 369 odd)
Suggested Homework Exercises: 319 – 369 odd

2.6   **Solve a Formula for a Specific Variable**
Topics:
A. Use the Distance, Rate, and Time Formula (377 – 387 odd)
B. Solve a formula for a specific variable (389 – 425 odd)
Suggested Homework Exercises: 377 – 425 odd

2.7   Solve Linear Inequalities
Topics:
A. Graph inequalities on a number line (431 – 437 odd)
B. Solve inequalities using properties and simplification (439 – 491 odd)
C. Translate to an inequality and solve (493 – 503 odd)
Suggested Homework Exercises: 431 – 503 odd

CHAPTER 3 – MATH MODELS

3.1   Use a Problem-Solving Strategy
Topics:
A. Use a problem-solving strategy for word problems (1 – 13 odd)
B. Solve number problems (15 – 55 odd)
Suggested Homework Exercises: 1 – 55 odd

3.2   Solve Percent Applications
Topics:
A. Translate and solve basic percent equations (67 – 89 odd)
B. Solve percent applications (91 – 107 odd)
C. Find percent increase and percent decrease (109 – 119 odd)
D. Solve applications with discount or mark-up (133 – 153 odd)
Suggested Homework Exercises: 67 – 119 odd, 133 – 153 odd

3.3   Solve Mixture Applications (Part 1)
Topics:
A. Solve coin word problems (161 – 177 odd)
B. Solve ticket and stamp word problems (179 – 191 odd)
Suggested Homework Exercises: 161 – 191 odd

3.3   Solve Mixture Applications (Part 2)
Topics:
A. Solve mixture word problems (193 – 197 odd)
B. Use the mixture model to solve investment problems using simple
    interest (199 – 203 odd)
Suggested Homework Exercises: 193 – 203 odd

3.4   Solve Geometry Applications: Triangles, Rectangles, and the Pythagorean Theorem
Topics:
A. Solve applications using properties of triangles (211 – 233 odd)
B. Use the Pythagorean Theorem (235 – 249 odd)
C. Solve applications using rectangle properties (251 – 275 odd)
Suggested Homework Exercises: 211 – 275 odd

3.5   Solve Uniform Motion Applications
Topics:
A. Solve uniform motion applications (283 – 303 odd)
Suggested Homework Exercises: 283 – 303 odd

3.6   Solve Applications with Linear Inequalities
Topics:
A. Solve applications with linear inequalities (309 – 331 odd)
Suggested Homework Exercises: 309 – 331 odd

CHAPTER 4 – GRAPHS

4.1   Use the Rectangular Coordinate System
Topics:
A. Plot points in a rectangular coordinate system (1 – 11 odd)
B. Verify solutions to an equation in two variables (13 – 19 odd)
C. Complete a table of solutions to a linear equation (21 – 31 odd)
D. Find solutions to a linear equation in two variables (33 – 47 odd)
Suggested Homework Exercises: 1 – 47 odd

4.2   Graph Linear Equations in Two Variables
Topics:
A. Recognize the relationship between the solutions of an equation and its graph (55, 57)
B. Graph a linear equation by plotting points (59 – 101 odd)
C. Graph vertical and horizontal lines (103 – 133 odd)
Suggested Homework Exercises: 55 – 133 odd

4.3   Graph with Intercepts
Topics:
A. Identify the x and y-intercepts on a graph (139 – 149 odd)
B. Find the x and y-intercepts from an equation of a line (151 – 177 odd)
C. Graph a line using the intercepts (179 – 203 odd)
Suggested Homework Exercises: 139 – 203 odd

4.4   Understand Slope of a Line
Topics:
A. Use $m = \frac{rise}{run}$ to find the slope of a line from its graph (227 – 241 odd)
B. Find the slope of horizontal and vertical lines (243 – 249 odd)
C. Use the slope formula to find the slope of a line between two points (251 – 261 odd)
D. Graph a line given a point and the slope (263 – 277 odd)
E. Solve slope applications (279 – 283 odd)
Suggested Homework Exercises: 227 – 283 odd

4.5   Use the Slope-Intercept Form of an Equation of a Line (Part 1)
Topics:
A. Identify the slope-intercept form of a line (295 – 303 odd)
B. Recognize the relationship between the graph and the slope-intercept form
   of a line (289 – 293 odd)
C. Graph a line using its slope and y-intercept (305 – 319 odd)
D. Choose the most convenient method to graph a line (321 – 335 odd)
Suggested Homework Exercises: 289 – 335 odd

4.5   Use the Slope-Intercept Form of an Equation of a Line (Part 2)
Topics:
A. Graph and interpret applications of slope-intercept (337 – 343 odd)
B. Use slopes to identify parallel lines (345 – 369 odd)
C. Use slopes to identify perpendicular lines (371 – 381 odd)
Suggested Homework Exercises: 337 – 381 odd

4.6   Find the Equation of a Line (Part 1)
Topics:
A. Find the equation of a line given the slope and y-intercept (387 – 409 odd)
B. Find the equation of a line given the slope and a point (411 – 427 odd)
C. Find the equation of a line given two points (429 – 453 odd)
Suggested Homework Exercises: 387 – 453 odd

4.6   Find the Equation of a Line (Part 2)
Topics:
D. Find the equation of a line parallel to a given line (455 – 469 odd)
E. Find the equation of a line perpendicular to a given line (471 – 481 odd)
F. Mixed Practice (483 – 499 odd)
Suggested Homework Exercises: 455 – 499 odd

4.7   Graphs of Linear Inequalities
Topics:
A. Verify solutions to an inequality in two variables (505 – 509 odd)
B. Recognize the relationship between the solutions of an inequality
   and its graph (511 – 521 odd)
C. Graph linear inequalities (523 – 551 odd)
Suggested Homework Exercises: 505 – 551 odd

CHAPTER 5 – SYSTEMS OF LINEAR EQUATIONS

5.1   Solve Systems of Equations by Graphing
Topics:
A. Determine whether an ordered pair is a solution to a system of equations (1 – 7 odd)
B. Solve a system of equations by graphing (9 – 49 odd)
C. Determine the number of solutions of a linear system (51 – 61 odd)
Suggested Homework Exercises: 1 – 61 odd

5.2   Solve Systems of Equations by Substitution
Topics:
A. Solve systems of equations by substitution (71 – 105 odd)
B. Solve applications of systems of equations by substitution (107 – 121 odd)
Suggested Homework Exercises: 71 – 121 odd

5.3   Solve Systems of Equations by Elimination
Topics:
A. Solve a system of equations by elimination (127 – 165 odd)
B. Solve applications of systems of equations by elimination (167 – 173 odd)
C. Choose the most convenient method to solve a system of linear equations (175, 177)
Suggested Homework Exercises: 127 – 177 odd

5.4   Solve Applications with Systems of Equations (Part 1)
Topics:
A. Solve direct translation applications (183 – 205 odd)
B. Solve geometry applications (207 – 221 odd)
Suggested Homework Exercises: 183 – 221 odd

5.4   Solve Applications with Systems of Equations (Part 2)
Topics:
A. Solve uniform motion applications (223 – 233 odd)
Suggested Homework Exercises: 223 – 233 odd

5.5   Solve Mixture Applications with Systems of Equations
Topics:
A. Solve mixture applications (239 – 261 odd)
B. Solve interest applications (263 – 269 odd)
Suggested Homework Exercises: 239 – 269 odd

5.6 Graphing Systems of Linear Inequalities
Topics:
A. Determine whether an ordered pair is a solution of a system of linear inequalities (275 – 281 odd)
B. Solve a system of linear inequalities (283 – 313 odd)
C. Solve applications of systems of inequalities (315 – 321 odd)
Suggested Homework Exercises: 275 – 321 odd

CHAPTER 6 – SYSTEMS OF LINEAR EQUATIONS

6.1 Add and Subtract Polynomials
Topics:
A. Determine the degree of polynomials (1 – 7 odd)
B. Add and subtract polynomials (9 – 69 odd)
C. Evaluate a polynomial for a given value (71 – 77 odd)
Suggested Homework Exercises: 1 – 77 odd

6.2 Use Multiplication Properties of Exponents
Topics:
A. Simplify expressions with exponents (89 – 97 odd)
B. Simplify expressions using the Product Property (99 – 113 odd)
C. Simplify expressions using the Power Property (115, 117)
D. Simplify expressions using the Product to a Power Property (119, 121)
E. Simplify expressions by applying several properties (123 – 163 odd)
Suggested Homework Exercises: 89 – 163 odd

6.3 Multiply polynomials
Topics:
A. Multiply a polynomial by a monomial (173 – 235 odd)
B. Multiply a binomial by a binomial (237 – 265 odd)
C. Multiply a trinomial by a binomial (267 – 273 odd)
Suggested Homework Exercises: 173 – 273 odd

6.4 Special Products
Topics:
A. Square a binomial using the Binomial Squares Pattern (303 – 321 odd)
B. Multiply conjugates using the Product of Conjugates Pattern (323 – 345 odd)
C. Recognize and use the appropriate special product pattern (347, 349)
Suggested Homework Exercises: 303 – 349 odd

6.5 **Divide Monomials**
Topics:
A. Simplify expressions using the Quotient Property for Exponents (357 – 363 odd)
B. Simplify expressions with zero exponents (365 – 373 odd)
C. Simplify expressions using the Quotient to a Power Property (375, 377)
D. Simplify expressions by applying several properties (379 – 405 odd)
E. Divide monomials (407 – 421 odd)
Suggested Homework Exercises: 357 – 421 odd

6.6 **Divide Polynomials**
Topics:
A. Divide a polynomial by a monomial (443 – 473 odd)
B. Divide a polynomial by a binomial (475 – 495 odd)
Suggested Homework Exercises: 443 – 495 odd

6.7 **Integer Exponents and Scientific Notation**
Topics:
A. Use the definition of a negative exponent (501 – 527 odd)
B. Simplify expressions with integer exponents (529 – 549 odd)
C. Convert from decimal notation to scientific notation (551 – 557 odd)
D. Convert scientific notation to decimal form (559 – 565 odd)
E. Multiply and divide using scientific notation (567 – 573 odd)
Suggested Homework Exercises: 501 – 573 odd

CHAPTER 7 – FACTORING

7.1 **Greatest Common Factor and Factor by Grouping**
Topics:
A. Find the greatest common factor (GCF) of two or more expressions (1 – 17 odd)
B. Factor the greatest common factor from a polynomial (19 – 43 odd)
C. Factor by grouping (45 – 57 odd)
Suggested Homework Exercises: 1 – 57 odd

7.2 **Factor Trinomials of the Form $x^2 + bx + c$**
Topics:
A. Factor trinomials of the form $x^2 + bx + c$ (63 – 95 odd)
B. Factor trinomials of the form $x^2 + bxy + cy^2$ (97 – 127 odd)
Suggested Homework Exercises: 63 – 127 odd

7.3 **Factor Trinomials of the Form $ax^2 + bx + c$ (Part 1)**
Topics:
A. Factor trinomials of the form $ax^2 + bx + c$ with a GCF (135 – 149 odd)
B. Factor trinomials using Trial and Error (151 – 165 odd)
Suggested Homework Exercises: 135 – 165 odd

7.3   **Factor Trinomials of the Form $ax^2 + bx + c$ (Part 2)**
Topics:
C. Factor trinomials using the AC Method (167 – 207 odd)
Suggested Homework Exercises: 167 – 207 odd

7.4   **Factor Special Products (Part 1)**
Topics:
A. Factor perfect square trinomials (215 – 231 odd)
B. Factor difference of squares (233 – 247 odd)
Suggested Homework Exercises: 215 – 247 odd

7.4   **Factor Special Products (Part 2)**
Topics:
C. Factor sums and differences of cubes
Suggested Homework Exercises: 249 – 271 odd

7.5   **General Strategy for Factoring Polynomials**
Topics:
A. Recognize and use the appropriate method to factor a polynomial completely
Suggested Homework Exercises: 279 – 309 odd

7.6   **Quadratic Equations**
Topics:
A. Solve quadratic equations by using the Zero Product Property (315 – 323 odd)
B. Solve quadratic equations by factoring (325 – 341 odd)
C. Solve applications modeled by quadratic equations (343 – 357 odd)
Suggested Homework Exercises: 315 – 357 odd

CHAPTER 8 – RATIONAL EXPRESSIONS AND EQUATIONS

8.1   **Simplify Rational Expressions**
Topics:
A. Determine the values for which a rational expression is undefined (1, 3)
B. Evaluate rational expressions (5 – 15 odd)
C. Simplify rational expressions (17 – 55 odd)
D. Simplify rational expressions with opposite factors (57 – 67 odd)
Suggested Homework Exercises: 1 – 67 odd

8.2   **Multiply and Divide Rational Expressions**
Topics:
A. Multiply rational expressions (73 – 95 odd)
B. Divide rational expressions (97 – 123 odd)
Suggested Homework Exercises: 73 – 123 odd

8.3   **Add and Subtract Rational Expressions with a Common Denominator**
Topics:
A. Add rational expressions with a common denominator (129 – 143 odd)
B. Subtract rational expressions with a common denominator (145 – 155 odd)
C. Add and subtract rational expressions whose denominators are opposites (157 – 163 odd)
Suggested Homework Exercises: 129 – 163 odd

8.4   **Add and Subtract Rational Expressions with Unlike Denominators (Part 1)**
Topics:
A. Find the least common denominator (LCD) of rational expressions (169 – 175 odd)
B. Find equivalent rational expressions (177 – 183 odd)
Suggested Homework Exercises: 169 – 183 odd

8.4   **Add and Subtract Rational Expressions with Unlike Denominators (Part 2)**
Topics:
C. Add rational expressions with different denominators (185 – 207 odd)
D. Subtract rational expressions with different denominators (209 – 249 odd)
Suggested Homework Exercises: 185 – 249 odd

8.5   **Simplify Complex Rational Expressions**
Topics:
A. Simplify a complex rational expression by writing it as a division (255 – 269 odd)
B. Simplify a complex rational expression by using the LCD (271 – 297 odd)
Suggested Homework Exercises: 255 – 297 odd

8.6   **Solve Rational Equations**
Topics:
A. Solve rational equations (303 – 341 odd)
B. Solve a rational equation for a specific variable (343 – 359 odd)
Suggested Homework Exercises: 303 – 359 odd

8.7   **Solve Proportion and Similar Figure Applications**
Topics:
A. Solve proportions (365 – 405 odd)
B. Solve similar figure applications (407 – 417 odd)
Suggested Homework Exercises: 365 – 417 odd

8.8   **Solve Uniform Motion and Work Applications**
Topics:
A. Solve uniform motion applications (429 – 445 odd)
B. Solve work applications (447 – 457 odd)
Suggested Homework Exercises: 429 – 457 odd

8.9 **Use Direct and Inverse Variation**
Topics:
A. Solve direct variation problems (463 – 481 odd)
B. Solve inverse variation problems (483 – 507 odd)
Suggested Homework Exercises: 463 – 507 odd

CHAPTER 9 – ROOTS AND RADICALS

9.1 **Simplify and Use Square Roots**
Topics:
A. Simplify expressions with square roots (1 – 19 odd)
B. Estimate square roots (21, 23)
C. Approximate square roots (25, 27)
D. Simplify variable expressions with square roots (29 – 47 odd)
Suggested Homework Exercises: 1 – 47 odd

9.2 **Simplify Square Roots**
Topics:
A. Use the Product Property to simplify square roots (53 – 99 odd)
B. Use the Quotient Property to simplify square roots (101 – 139 odd)
Suggested Homework Exercises: 53 – 139 odd

9.3 **Add and Subtract Square Roots**
Topics:
A. Add and subtract like square roots (145 – 175 odd)
B. Add and subtract square roots that need simplification (177 – 227 odd)
Suggested Homework Exercises: 145 – 227 odd

9.4 **Multiply Square Roots**
Topics:
A. Multiply square roots (233 – 263 odd)
B. Use polynomial multiplication to multiply square roots (265 – 309 odd)
Suggested Homework Exercises: 233 – 309 odd

9.5 **Divide Square Roots**
Topics:
A. Divide square roots (317 – 343 odd)
B. Rationalize a one-term denominator (345 – 361 odd)
C. Rationalize a two-term denominator (363 – 383 odd)
Suggested Homework Exercises: 317 – 383 odd

9.6   Solve Equations with Square Roots
Topics:
A. Solve radical equations (389 – 429 odd)
B. Use square roots in applications (431 – 439 odd)
Suggested Homework Exercises: 389 – 439 odd

9.7   Higher Roots
Topics:
A. Simplify expressions with higher roots (443 – 461 odd)
B. Use the Product Property to simplify expressions with higher roots (463 – 477 odd)
C. Use the Quotient Property to simplify expressions with higher roots (479 – 489 odd)
D. Add and subtract higher roots (491 – 519 odd)
Suggested Homework Exercises: 443 – 519 odd

9.8   Rational Exponents
Topics:
A. Simplify expressions with $a^{1/n}$ (525 – 549 odd)
B. Simplify expressions with $a^{m/n}$ (551 – 565 odd)
C. Use the Laws of Exponents to simplify expressions with rational
    exponents (567 – 599 odd)
Suggested Homework Exercises: 525 – 599 odd

CHAPTER 10 – QUADRATIC EQUATIONS

10.1   Solve Quadratic Equations Using the Square Root Property
Topics:
A. Solve quadratic equations of the form $ax^2 = k$ (1 – 13 odd)
B. Solve quadratic equations of the form $a(x - h)^2 = k$ (15 – 51 odd)
Suggested Homework Exercises: 1 – 51 odd

10.2   Solve Quadratic Equations by Completing the Square
Topics:
A. Complete the square of a binomial expression (57 – 67 odd)
B. Solve quadratic equations of the form $x^2 + bx + c = 0$ by completing the
    square (69 – 87 odd)
C. Solve quadratic equations of the form $ax^2 + bx + c = 0$ by completing the
    square (89 – 93 odd)
Suggested Homework Exercises: 57 – 93 odd

10.3   Solve Quadratic Equations Using the Quadratic Formula
Topics:
A. Solve quadratic equations using the Quadratic Formula (99 – 129 odd)
B. Use the discriminant to determine the number of solutions of a quadratic equation (131, 133)
C. Identify the most appropriate method to use to solve a quadratic equation (135, 137)
Suggested Homework Exercises: 99 – 137 odd

10.4   Solve Applications Modeled by Quadratic Equations
Topics:
A. Solve applications modeled by Quadratic Equations (143 – 157 odd)
Suggested Homework Exercises: 143 – 157 odd

10.5   Graphing Quadratic Equations in Two Variables (Part 1)
Topics:
A. Recognize the graph of a quadratic equation in two variables (163 – 167 odd)
B. Identify the properties of a quadratic equation (169 – 177 odd)
Suggested Homework Exercises: 163 – 177 odd

10.5   Graphing Quadratic Equations in Two Variables (Part 2)
Topics:
C. Graph quadratic equations in two variables (179 – 195 odd)
D. Solve maximum and minimum applications (197 – 207 odd)
Suggested Homework Exercises: 179 – 207 odd