

Correlation of Pre-Algebra to the NCTM Standards

STANDARD 1 Number and Operations

Instructional programs from prekindergarten through grade 12 should enable all students to:

- ◆ understand numbers, ways of representing numbers, relationships among numbers, and number systems;
- ◆ understand meanings of operations and how they relate to one another;
- ◆ compute fluently and make reasonable estimates.

Pre-Algebra

Understand numbers: pages 2–17, 32–51, 60–77, 78, 84–115, 152–165, 180–203, 210–225, 308.

Understand meanings: pages 217, 38–45, 110–115, 144–145, 198–203, 212–225, 362–363.

Compute fluently: pages 21, 36–53, 49, 61, 93, 100–115, 125, 167, 199, 223, 267, 297, 321, 353.

STANDARD 2 Algebra

Instructional programs from prekindergarten through grade 12 should enable all students to:

- ◆ understand patterns, relations, and functions;
- ◆ represent and analyze mathematical situations and structures using algebraic symbols;
- ◆ use mathematical models to represent and understand quantitative relationships;
- ◆ analyze change in various contexts.

Pre-Algebra

Understand patterns: pages 296–307, 308, 344–345.

Represent and analyze: pages 24–25, 122–145, 166–173, 210–231, 282–307.

Use mathematical models: *Application* exercises at the end of each chapter help students to model mathematical situations. See pages 26, 54, 78, 116, 146, 174, 204, 232, 270, 308, 338, 364.

Analyze change: pages 300–303, 308.

STANDARD 3 Geometry

Instructional programs from prekindergarten through grade 12 should enable all students to:

- ◆ analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships;
- ◆ specify locations and describe spatial relationships using coordinate geometry and other representational systems;
- ◆ apply transformations and use symmetry to analyze mathematical situations;
- ◆ use visualization, spatial reasoning, and geometric modeling to solve problems.

Pre-Algebra

Analyze characteristics: pages 226–231, 232, 238–269, 270, 314–337, 338.

Specify locations: pages 286–297, 300–303.

Apply transformations: page 338.

Use visualization: pages 216–231, 232, 260–263, 268–269, 300–303, 322–325, 328–329, 338, 344–349.

See **Problem Solving** exercises on pages 217, 219, 241, 245, 253, 255, 263, 269, 325, and 333. See also **Application** exercises on pages 232 and 270.

STANDARD 4 Measurement

Instructional programs from prekindergarten through grade 12 should enable all students to:

- ◆ understand measurable attributes of objects and the units, systems, and processes of measurement;
- ◆ apply appropriate techniques, tools, and formulas to determine measurements.

Pre-Algebra

Understand measurable attributes: pages 54, 270.

Apply appropriate techniques, tools, and formulas: pages 216–219, 250–269, 314–315.

STANDARD 5 Data Analysis and Probability

Instructional programs from prekindergarten through grade 12 should enable all students to:

- ◆ formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them;
- ◆ select and use appropriate statistical methods to analyze data;
- ◆ develop and evaluate inferences and predictions that are based on data;
- ◆ understand and apply basic concepts of probability.

Pre-Algebra

Formulate questions: pages 344–364.

Select and use: pages 344–359.

Develop and evaluate: pages 360–361.

Understand and apply: pages 360–361.

STANDARD 6 Problem Solving

Instructional programs from prekindergarten through grade 12 should enable all students to:

- ◆ build new mathematical knowledge through problem solving;
- ◆ solve problems that arise in mathematics and in other contexts;
- ◆ apply and adapt a variety of appropriate strategies to solve problems;
- ◆ monitor and reflect on the process of mathematical problem solving.

Pre-Algebra

Problem Solving exercises throughout provide students opportunities to apply *problem-solving strategies*. See examples on pages 5, 17, 41, 51, 65, 75, 115, 129, 135, 165, 193, 217, 219, 245, 255, 303, 325, 333, 351, 357.

In addition, see *Application* exercises at the end of each chapter on pages 26, 54, 78, 116, 146, 174, 204, 232, 270, 308, 338, 364.

STANDARD 7 Reasoning and Proof

Instructional programs from prekindergarten through grade 12 should enable all students to:

- ◆ recognize reasoning and proof as fundamental aspects of mathematics;
- ◆ make and investigate mathematical conjectures;
- ◆ develop and evaluate mathematical arguments and proofs;
- ◆ select and use various types of reasoning and methods of proof.

Pre-Algebra

Reasoning skills/processes, conjectures, and argumentation are applied throughout in exercises at the end of each lesson, in *Problem Solving* and *Application* exercises at the end of each lesson, in *Problem Solving* and *Application* exercises listed above, and in *Chapter Reviews*.

STANDARD 8 Communication

Instructional programs from prekindergarten through grade 12 should enable all students to:

- ◆ organize and consolidate their mathematical thinking through communication;
- ◆ communicate their mathematical thinking coherently and clearly to peers, teachers, and others;
- ◆ analyze and evaluate the mathematical thinking and strategies of others;
- ◆ use the language of mathematics to express mathematical ideas precisely.

Pre-Algebra

Helps students develop *mathematical communication skills* in a number of ways:

— Oral explanation and discussion: *Problem Solving* exercises provide opportunity for oral language

— *Learning Styles: Auditory/Verbal* sidebars in Teacher's Edition (examples on pages 53, 61, 70, 88, 106, 113)

— Graphical representations: 224–225, 276–307, 308, 344–345, 346–347

— Definitions of topic-relevant terms are included on the first page of each lesson throughout

— Notation is directly addressed on pages 22–25 and scientific notation is addressed on pages 76–77

STANDARD 9 Connections

Instructional programs from prekindergarten through grade 12 should enable all students to:

- ◆ recognize and use connections among mathematical ideas;
- ◆ understand how mathematical ideas interconnect and build on one another to produce a coherent whole;
- ◆ recognize and apply mathematics in contexts outside of mathematics.

Pre-Algebra

Relationships among diverse mathematical concepts such as arithmetic, linear equations, percentages, exponents, polynomials, data, fractions, inequalities, irrational numbers, geometry, and quadratic equations are explored throughout, and principles are presented as an integrated whole. In addition, the *role of mathematics in other disciplines* is explored in chapter openers on pages 1, 31, 59, 83, 121, 151, 179, 209, 237, 275, 313, 343, as well as the *Problem Solving* exercises on pages 5, 9, 13, 17, 37, 41, 45, 47, 51, 63, 65, 71, 75, 85, 89, 95, 99, 109, 115, 129, 135, 143, 145, 153, 157, 165, 171, 183, 187, 193, 197, 201, 203, 217, 219, 241, 245, 253, 255, 263, 269, 283, 285, 289, 303, 325, 333, 351, 353, 357; in *Try This* activities on pages 9, 16, 19, 33, 35, 49, 64, 67, 77, 93, 99, 115, 125, 135, 161, 173, 189, 203, 241, 245, 297, 303, 321, 345, 361; in *Writing About Mathematics* activities on pages 9, 23, 25, 39, 63, 65, 74, 77, 89, 103, 111, 114, 125, 138, 141, 161, 164, 193, 201, 211, 229, 257, 269, 294, 307, 315, 320, 327, 337, 347, 352; in *Technology Connections* on pages 7, 39, 69, 107, 141, 155, 196, 229, 248, 287, 323, 349; in *Algebra in Your Life* activities on pages 17, 43, 77, 103, 131, 163, 185, 213, 259, 281, 327, 360; and in *Estimation Activities* on pages 21, 49, 61, 101, 125, 167, 199, 223, 267, 297, 321, 353.

STANDARD 10 Representation

Instructional programs from prekindergarten through grade 12 should enable all students to:

- ◆ create and use representations to organize, record, and communicate mathematical ideas;
- ◆ select, apply, and translate among mathematical representations to solve problems;
- ◆ use representations to model and interpret physical, social, and mathematical phenomena.

Pre-Algebra

Many different types of *representations* are used throughout the text in order to *maximize student understanding of concepts and relationships*. See the following examples:

Drawings: pages 40, 84, 92, 158–161, 216–221, 226, 232, 325, 333.

Charts/Tables: pages 35, 65, 156, 231, 348–349.

Graphs: pages 73, 202, 224–225, 276–282, 284, 286–304, 306–308, 334–338, 344–347.

Manipulative exercises: Teacher's Edition pages 85, 87, 97, 111, 133, 157, 164.