

PRE-ALGEBRA WARM-UPS

Number Sense and Operations



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INTRODUCTION

PCI Educational Publishing's *Pre-Algebra Warm-Ups* series has been designed as a supplement to any pre-algebra curriculum. Each of the five books contains 180 problems that reinforce key pre-algebra concepts and prepare students to take standardized assessments. Created for struggling students with low reading levels, the books can also be used with ESL students and adult learners. Each question has been written using standard mathematics vocabulary and the wording commonly found on high-stakes tests. However, the general reading level has been kept low through careful selection of reading vocabulary and use of simple sentence structures. Subject-related vocabulary words are printed in bold, drawing students' attention to the key terms required to comprehend each question.



The five books that comprise the *Pre-Algebra Warm-Ups* series cover all five strands of mathematics as identified by the National Council of Teachers of Mathematics (NCTM). Each book provides 180 open-ended questions (one for each day of the school year) that cover all of the objectives in each strand. The questions are varied in their approach of soliciting responses. Students are asked to make mathematical connections within the subject of mathematics or to the world outside. Communication is involved in questions when students are asked to explain their answers or to create a table, graph, or rule from the information provided. Many problems require spatial reasoning, the ability to use proportions, and both inductive and deductive reasoning. Problem-solving skills are practiced throughout using open-ended problems that ask students to represent various situations symbolically.

PRE-ALGEBRA WARM-UPS

Five Books

The titles of the five books in the series are:

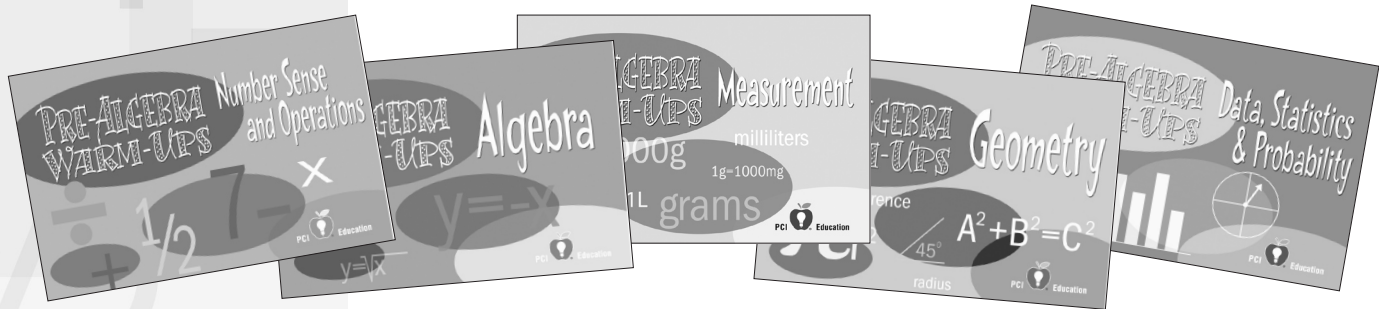
Pre-Algebra Warm-Ups: Number Sense and Operations

Pre-Algebra Warm-Ups: Algebra

Pre-Algebra Warm-Ups: Measurement

Pre-Algebra Warm-Ups: Geometry

Pre-Algebra Warm-Ups: Data, Statistics & Probability

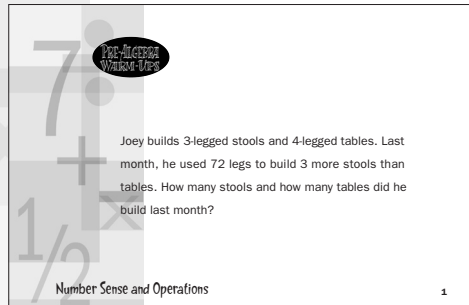


Number Sense and Operations



Two Sections

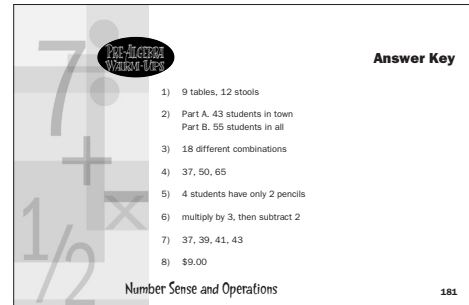
This book is divided into two sections. The first section contains 180 open-ended questions from the Number Sense and Operations strand. The second section of the book is the Answer Key, which includes answers to all of the questions.

A thumbnail of a page from the book. It features the 'Pre-Algebra Warm-Ups' logo at the top. The main text is a word problem: 'Joey builds 3-legged stools and 4-legged tables. Last month, he used 72 legs to build 3 more stools than tables. How many stools and how many tables did he build last month?'. At the bottom left, it says 'Number Sense and Operations' and at the bottom right, the page number '1'.

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Joey builds 3-legged stools and 4-legged tables. Last month, he used 72 legs to build 3 more stools than tables. How many stools and how many tables did he build last month?

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A thumbnail of a page from the book, which is the answer key. It features the 'Pre-Algebra Warm-Ups' logo at the top. The title 'Answer Key' is centered at the top. Below it is a list of eight numbered items. At the bottom left, it says 'Number Sense and Operations' and at the bottom right, the page number '181'.

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Answer Key

- 1) 9 tables, 12 stools
- 2) Part A. 43 students in town
Part B. 55 students in all
- 3) 18 different combinations
- 4) 37, 50, 65
- 5) 4 students have only 2 pencils
- 6) multiply by 3, then subtract 2
- 7) 37, 39, 41, 43
- 8) \$9.00

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OBJECTIVES

After completing *Pre-Algebra Warm-Ups: Number Sense and Operations*, students will be able to

- work with fractions, decimals, and percents to solve problems.
- compare and order fractions, decimals, and percents and find their approximate locations on a number line.
- understand the meaning for percents greater than 100 and less than 1.
- use ratios and proportions to represent quantitative relationships.
- show an understanding of large numbers, and recognize and use exponential and scientific notation.
- use factors, multiples, prime factorization, and prime numbers to solve problems.
- understand integers and represent and compare quantities with them.
- understand the meaning and effects of arithmetic operations with fractions, decimals, and integers.

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- use the associative and commutative properties of addition and multiplication and the distributive property of multiplication over addition to simplify computations with integers, fractions, and decimals.
- use the inverse relationships of addition and subtraction, multiplication and division, and squaring and finding square roots to simplify computations and solve problems.
- choose appropriate methods for computing with rational numbers from among mental computation, estimation, calculators, and paper and pencil, depending on the situation, and apply the selected methods.
- use algorithms for computing with fractions, decimals, and integers and develop fluency in their use.
- use strategies to estimate the answers of rational-number computations and judge the reasonableness of the results.
- explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios.



RESEARCH AND STANDARDS

The two keys to teaching pre-algebra to students with learning differences are reading level and repetition. The reading level must be kept low by using simple sentence structure (Sousa, 2001). Since math vocabulary is integral to mastering the subject matter, the words need to be identified in the text while meanings need to be assimilated (Torres-Velasquez and Rodriguez, 2005). Repetition is an essential activity to ensure the maintenance of the concepts and skills previously learned. Repetition is also essential to develop the ability to apply these skills in a variety of contexts. Problem solving at this level involves retrieving learned skills involving basic operations and knowing where and when to apply them (Bley and Thornton, 2001). It is only with continued and consistent exposure to the problem-solving process that students can begin to develop their skills in this particular area of mathematics. The more varied the contexts in which problems are presented to students, the more proficient and comfortable students become with problem-solving



situations. Ten to fifteen minutes of classroom time each day can be the difference between students passing standardized assessments or not.

The *Pre-Algebra Warm-Ups* series focuses on the needs of students with learning differences. The reading level has been kept below 5.0. Essential mathematics vocabulary is written in bold within the questions. Each volume includes 180 questions on one National Council of Teachers of Mathematics (NCTM) strand, providing many opportunities to practice and maintain the skills learned earlier in the school year.

Each volume covers all of the standards and objectives of the NCTM for the individual strand being covered.

Bley, N. and C. Thornton. (2001). *Teaching Mathematics to Students with Learning Disabilities*. Austin, TX: Pro-Ed, Inc.

Sousa, D. A. (2001). *How the Special Needs Brain Learns*. Thousand Oaks, CA: Corwin Press, Inc.

Torres-Velasquez, D. and D. Rodriguez. (2005). *Mathematics & Science Instruction for Culturally and Linguistically Diverse Students*. Paper delivered at Council for Exceptional Children Conference, Baltimore, MD.



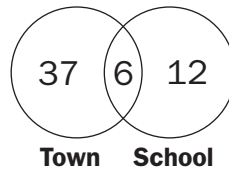
PRE-ALGEBRA
WARM-UPS

Joey builds 3-legged stools and 4-legged tables. Last month, he used 72 legs to build 3 more stools than tables. How many stools and how many tables did he build last month?

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Lauren and her friends helped at a bake sale for the school library. Students could choose to work 1 or 2 shifts in town or at school. After the fundraiser, Lauren prepared the Venn diagram below to show where the students worked.

Student's Working at the Fundraiser



Part A. Based on the Venn diagram, how many students worked shifts in town?

Part B. Based on the Venn diagram, how many students participated in the fundraiser?



Sal's Pizza offers the lunch special shown in the advertisement below.

| Sal's Pizza Lunch Special \$5.99 | | |
|---|---------------|---------------|
| <i>Choose One Entrée, One Salad & One Drink</i> | | |
| ENTREES | SALADS | DRINKS |
| Pizza | Tossed Green | Coffee |
| Sandwich | Cole Slaw | Iced Tea |
| Hot Plate | | Soft Drink |

How many combinations of one entrée, one salad, and one drink are possible for this lunch special?