Thinking Mathematically

A Newsletter for New Hampshire Adult Educators • Issue 4 • December 2005

From the Editor…

Greetings from Ouagadougou! Although it is in the 90s during the day here, we still feel the holiday spirit surrounding us as we are visited by carolers, invited for holiday parties, and approached by guys selling inflatable Santas on the road side. All that's missing is the snow.

This issue of *Thinking Mathematically* focuses on number sense. Number sense is the ability to "play" with numbers and to easily understand the size of numbers, the relationship between numbers, and the characteristics of numbers. Number sense comes more easily to some than to others, but all students can improve number sense by having the opportunity to play around with numbers in a non-threatening environment. And improving overall understanding of numbers will improve math performance across the board.

This issue contains several fun math activities that will help students improve their number sense. Some are games to play with others, and some are activities that can be done alone or with a partner.

I wish you all a wonderful Holiday season and best wishes for a peaceful and healthy 2006.

~Ruth

F o c u s : **Number Sense**

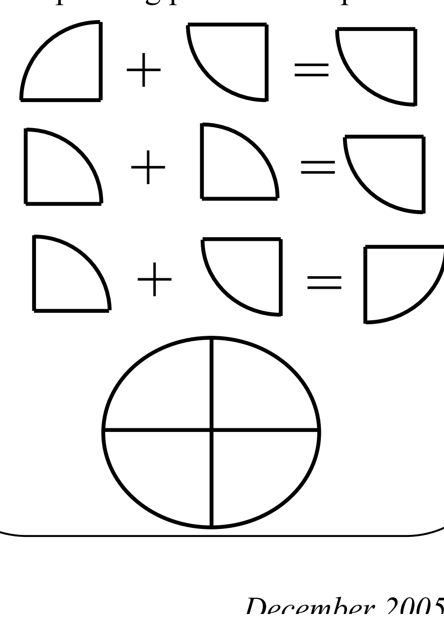
Mind Reading…

Write a three-digit number so the digits go in descending order, like 654. Reverse the digits (456) and subtract (654-456). Did you get 198?

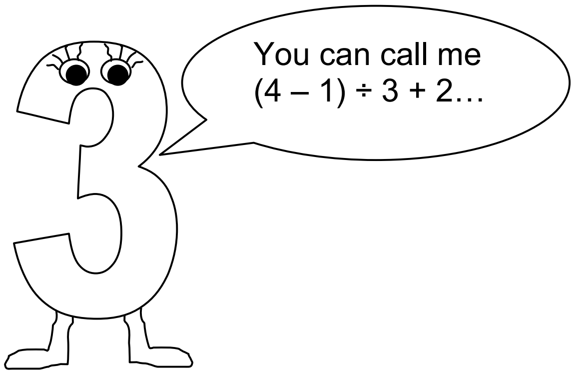
Try this with a four-digit number, like 9876. Reverse the digits and subtract. Did you get 3087?

Problem of the Month

Each of the four pie-shaped symbols stands for a number. The four numbers that they stand for are 0, 1, 2, and 3. Write the number that each symbol stands for in the corresponding piece of the "pie".



Naming Numbers



This activity is a fun way to practice **order of operations**. Explain to students that each number can be renamed as the sum, difference, product, or quotient of two or more other numbers. In addition to using +, –, ÷, and ×, we can use parentheses ( ) and exponents, such as 5^2.

For this activity, students try to rename each whole number from 1 to 15 using the numerals 1, 2, 3, and 4 exactly once and any operation. For example, 1 can be renamed as (1 + 4) ÷ (2 + 3).

Have students keep track of their results in a chart, keeping in mind the order of operations.

You may want to have a "class list" on the board where students can record their answers – this will allow students to "check" other answers, and they will see a variety of ways to get each answer.

Note that there are several possible answers for each number. Sample answers are shown on page 5.

Nonconsecutive Number Boxes

This activity is from the wonderful book "Family Math – The Middle School Years" (Virginia Thompson and Karen Mayfield-Ingram, Lawrence Hall of Science, 1998). It reinforces the concept of "consecutive numbers" and shows students that using manipulatives helps simplify the problem.

Materials

- Number grids (like those below, but enlarged)
- Number squares 1 – 10, big enough to fit in the grid squares

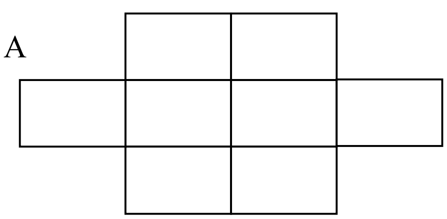
Directions

Arrange the numbers 1, 2, 3, 4, 5, 6, 7, and 8 in grid A so no two consecutive numbers are in squares with a common side or corner (vertex).

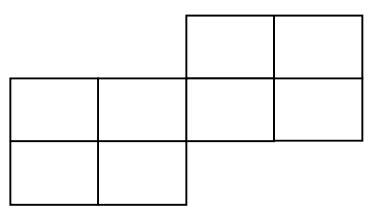
Do the same for grid B.

Use 1 – 10 for grid C and follow the same rules.

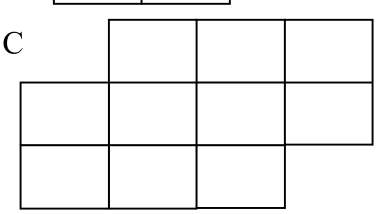
A



B



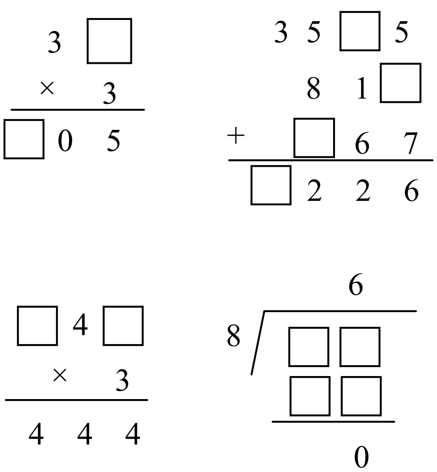
C

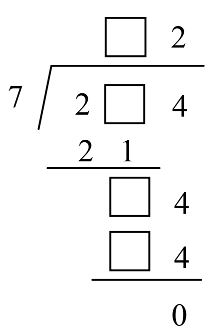


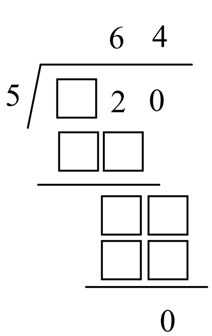
1	2	3	4	5	6	7	8	9	10

Find the Digits

These problems, from *Family Math*, really help to reinforce number facts and the understanding of the algorithms. Enlarge the problems and provide students with number tiles if possible.



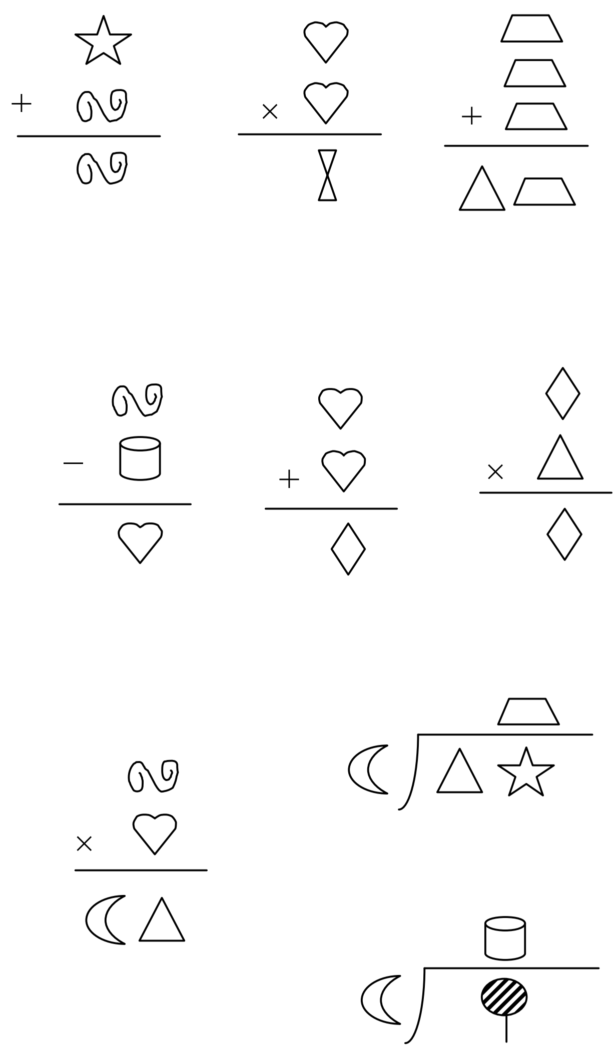




Decode the Symbols

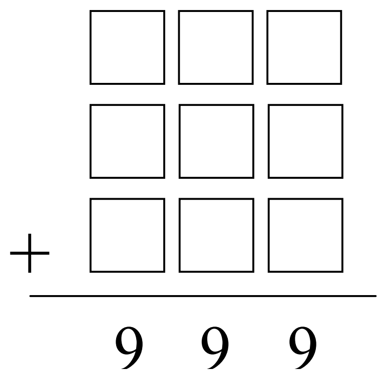
Each symbol represents a digit (0 – 9). Using what you know about our number system, figure out the value of each symbol. (*Activity by Dorothy Hess, from workshop handout from Albina S. Cannavaciolo.*)

0	1	2	3	4	5	6	7	8	9



Fay's Nines

Place the nine number tiles (1-9) into the squares so that the grand total is 999. (There are many solutions – try to find at least five.)



(Source: Curriculum Corporation, 1995)

The Thirty-one Game

This is a card game for two people. You need 24 cards, ace through six of each of the four suits. If you don't have a deck of cards, you can make a set of 24 cards with four of them numbered 1, four numbered 2, and so on.

Lay the 24 cards face up. Decide who goes first. The first player turns any card face down and says that number aloud. The second player turns over any other card, adding that number to the first one. Continue taking turns turning a card face down and keeping a running total. Whoever reaches the sum of exactly 31 wins. If neither player hits 31 or if no one goes over 31, then no one wins that round.

There's a winning strategy to this game. Which of you goes first in one important factor , and which cards to turn over is the other. You can change the game by changing the goal total to 30 or 22 or 50 or whatever number you like.
(Source: *Math for Smarty Pants by Marilyn Burns*)

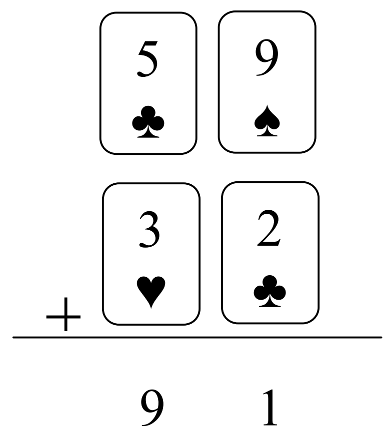
Close to 100

This is another card game. You need a deck of cards with the tens and face cards removed, and paper and pencils for keeping score.

Shuffle the cards and deal out six to each player. Players choose four of their cards and form two 2-digit numbers with them that have a sum as close to 100 as possible. The player's score is the difference between their sum and 100 (so if you get a sum of 91, your score would be 100 – 91 = **9**).

Play seven hands. The player with the lowest score wins. (*source: Family Math*)

Example:

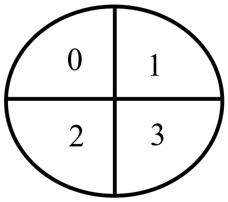


ALGEBRA TEACHERS:
Do you ever graph lines with your students? Check out this wonderful on-line graphing calculator. You enter the equations for the lines you want to graph, and it graphs them each in a different color.

http://www.univie.ac.at/futuremedia/moe/fplotter/fplotter.html

Answers

Problem of the Month, p. 1



Naming Numbers, p. 2

Possible answers:
1 = (4 – 3) × (2 – 1)
2 = (4 – 3) + (2 – 1)
3 = (4 – 3) ÷ 1 + 2
4 = (4 – 2) + (3 – 1)
5 = (4 + 1) × (3 – 2)
6 = 4 – 2 + 3 + 1
7 = (4 + 3) × (2 – 1)
8 = 4 + 2 + (3 – 1)
9 = 4 × 3 – 2 – 1
10 = 4 × 2 + 3 – 1
11 = 4 × 3 – (2 – 1)
12 = 4 × 2 + 3 + 1
13 = 4 × 3 + (2 – 1)
14 = 4 × 3 + 2 + 1
15 = 4 × 3 + 2 + 1

Nonconsecutive Number Boxes, p. 2
Possible answers:

A

	3	5	
7	1	8	2
	4	6	

B

		4	2
3	1	8	6
7	5		

C

	5	8	2
7	1	10	4
9	3	6	

Find the Digits, p. 3.

$$3\boxed{5} \times 3 = \boxed{1}05$$

$$35\boxed{4}5 + 81\boxed{4} + \boxed{8}67 = \boxed{5}226$$

$$\boxed{1}4\boxed{8} \times 3 = 444$$

$$\boxed{4}\boxed{8} \div 8 = 6 \quad (\boxed{4}\boxed{8},\ 0)$$

$$2\boxed{0}4 \div 7 = \boxed{3}2 \quad (21,\ \boxed{1}4,\ \boxed{1}4,\ 0)$$

$$\boxed{3}20 \div 5 = 64 \quad (\boxed{3}\boxed{0},\ \boxed{2}\boxed{0},\ \boxed{2}\boxed{0},\ 0)$$

Decode the Symbols, p. 3

0	1	2	3	4	5	6	7	8	9