

Finding Everyday Opportunities To Think Algebraically

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This workshop is based on *Algebraic Thinking in Adult Education*, a report written by Myrna Manly and Lynda Ginsburg in September 2010. The paper is a part of the National Institute for Literacy's Basic Skills Collection and can be found at

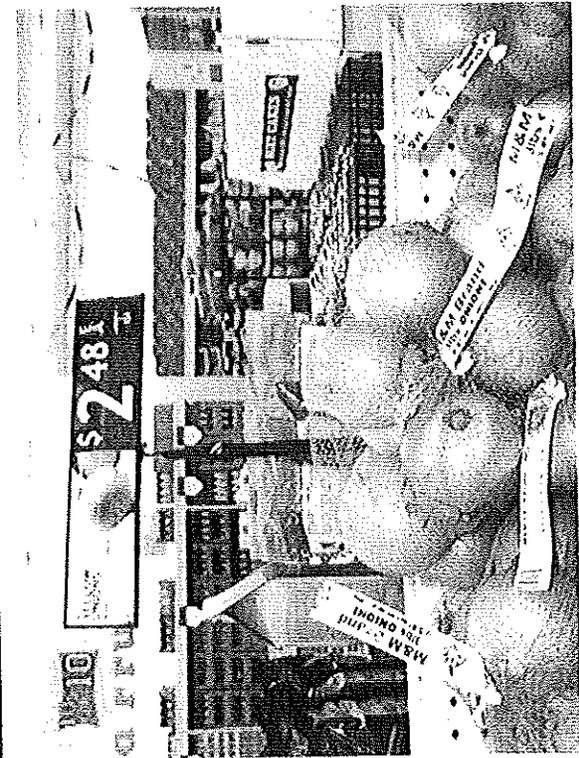
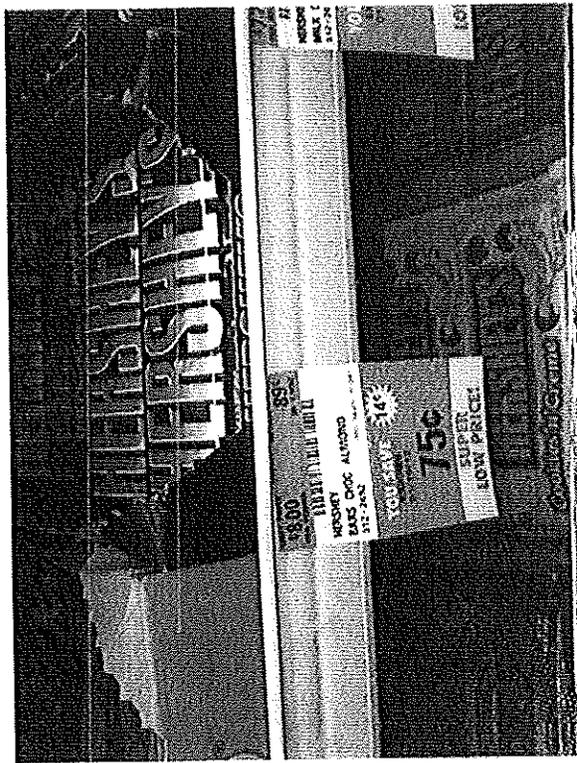
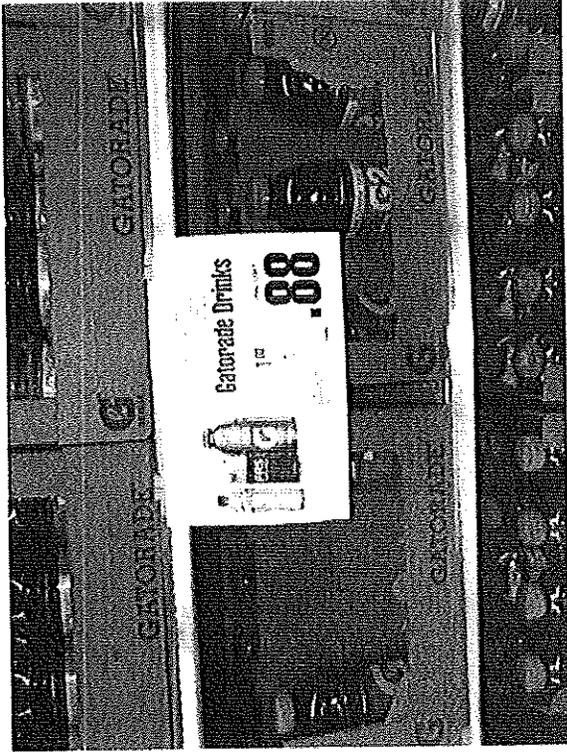
http://lincs.ed.gov/publications/pdf/algebra_paper_2010V.pdf

This workshop was developed with funds from the National Institute for Literacy by Myrna Manly and Lynda Ginsburg.

***LINCS* → Literacy Information
and Communication System**

Properties of Real Numbers

Property	Addition	Multiplication
Commutative	<p>The order in which two numbers are added does not affect the sum</p> $a+b = b+a$	<p>The order in which two numbers are multiplied does not affect the product</p> $a \cdot b = b \cdot a$
Associative	<p>The grouping of numbers in addition does not affect the sum</p> $a+(b+c) = (a+b)+c$	<p>The grouping of numbers in multiplication does not affect the product</p> $a(bc) = (ab)c$
Identity	<p>0 is the additive identity. No number loses its identity after addition with 0</p> $a+0 = 0+a = a$	<p>1 is the multiplicative identity. No number loses its identity when it is multiplied by 1</p> $a \cdot 1 = 1 \cdot a = a$
Inverse	<p>The sum of a number and its additive inverse is 0</p> <p>$-a$ is the additive inverse of a (also called the opposite of a)</p> $a+(-a) = (-a)+a = 0$	<p>The product of a number and its multiplicative inverse is 1</p> <p>$1/a$ is the multiplicative inverse of a (also called the reciprocal of a)</p> $a(1/a) = (1/a)a = 1$
Distributive	<p>Multiplication distributes over addition</p> $a(b+c) = ab+ac$	





FOUR SQUARE

X	4	3	2	1	0	-1	-2	-3	-4
4									
3									
2									
1									
0									
-1									
-2									
-3									
-4									

DIRECTIONS:

FILL IN THE MULTIPLICATION TABLE CELLS IN THE FOLLOWING ORDER:

1. Start at the top left and work across the first row through the ZERO column, multiplying the number from the column header by the number from the row header (4).
2. Notice the pattern that has been established in the first half of the row and follow it to complete the row.
3. Repeat steps 1 and 2 for the rows headed by 3, 2, 1, and zero.
4. Notice the patterns that have been established in the columns headed by 4, 3, 2, 1, and 0 and follow them to complete those columns.
5. Fill in the bottom right quadrant by *continuing the patterns* that have been established in the rows and/or columns in steps 1, 2, 3, and 4.

REFLECT ON THE OVERALL PATTERN OF YOUR COMPLETED TABLE. WHAT CONCLUSIONS CAN YOU DRAW?

Investigating Magic Numbers with Algebra

Write any number

Add 8

Double the sum

Subtract 6

Divide by 2

Subtract your original number

Write the number of the month in which you were born

Multiple by 2

Add 5

Multiply by 50

Add your age

Subtract 365

[mentally add 115]

Think of a number

Double it

Add 12

Add 5

Subtract 3

Divide by 2

Subtract your original number

I can guess your color

Write the number of the month in which you were born

Add 32

Add the difference between 12 and the number of your birth month

Divide by 2

Add 3

Find the letter of the alphabet that matches your number

Adapted from: Figure This, www.figurethis.org

Super Facts: Tricks and Puzzles, Derrydale Publishing