Mathematical “Rules” -

Fun with Algorithms

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Mathematical Rules

What is 25 divided by 5 ?

http://video.google.com/videosearch?q=mathematics&hl=en&page=2&so=0&lr=

Mathematical Rules

What is 25 divided by 5 ?

Would you believe the answer is 14 ?

Let’s take a look.

Mathematical Rules

What is 25 divided by 5 ?

$$5\overline{)25}\quad 1$$

Mathematical Rules

What is 25 divided by 5 ?

First division step

$$\begin{array}{r} 1 \\ 5\overline{)25} \\ -5 \\ \hline 20 \end{array}$$

Mathematical Rules

What is 25 divided by 5 ?

Second division step

$$
\begin{array}{r}
14 \\
5\overline{)25} \\
-5 \\
\hline
20 \\
-20 \\
\hline
0
\end{array}
$$

Mathematical Rules

What is 25 divided by 5 ?

$$\begin{array}{r} 14 \\ \times\ 5 \\ \hline \end{array}$$

Verifying by multiplication

(Remember: the teacher always asks you to check your work!)

Mathematical Rules

What is 25 divided by 5 ?

Verifying by multiplication

$$\begin{array}{r} 14 \\ \times\ 5 \\ \hline 20 \\ +\ 5 \\ \hline 25 \end{array}$$

Mathematical Rules

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$$\begin{array}{r} 14 \\ 14 \\ 14 \\ 14 \\ +\ 14 \\ \hline \end{array}$$

Verifying by Addition

(another check - we're really being careful!)

Mathematical Rules

What is 25 divided by 5 ?

Verifying by Addition

$$
\begin{array}{r}
14 \\
14 \\
14 \\
14 \\
+\ 14 \\
\hline
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5 \\
\hline
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\end{array}
$$

Mathematical Rules

What's the message here?

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No algorithm, improperly applied, will give a correct answer.

We must be firmly grounded on concepts and understanding.

Did You Know that 1 = 2 ?

Seriously, this just can't be true, can it ?

Well, let's take a look at this claim.

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$a + b = b$	divide by $(a - b)$
$a + a = a$	since $a = b$
$2 = 1$	WOWEE ! !

Why Can't We Divide by Zero ?

We can divide by any other number.

So what makes zero so special ?

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In other words, any division problem can be changed into a multiplication problem.

Why Can't We Divide by Zero ?

An example:

$8 \div 4 = 2$ is a division

Why Can't We Divide by Zero ?

An example:

$8 \div 4 = 2$ is a division, and

$4 \bullet 2 = 8$ is the related multiplication

This works for all non-zero divisors.

Why Can't We Divide by Zero ?

Suppose you try the following, and let *n* be your answer.

$8 \div 0 = n$ for some value of *n*

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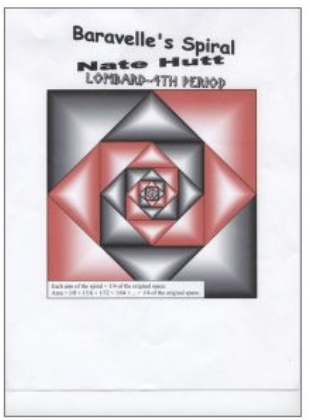

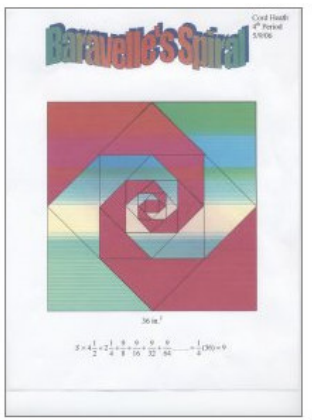

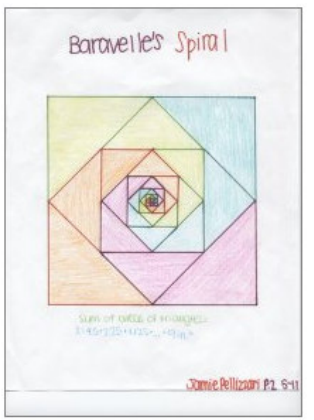

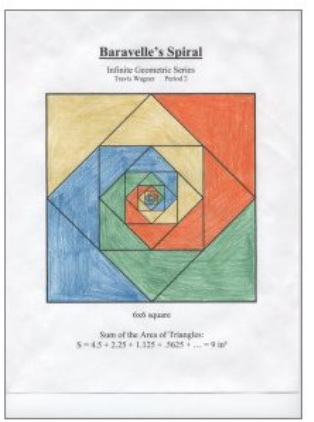

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