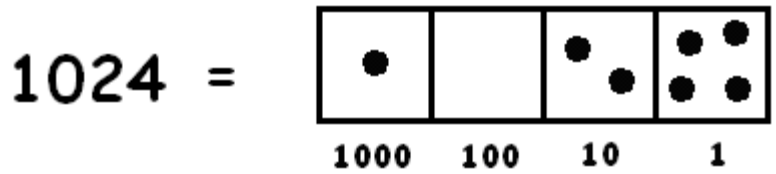
DECIMALS

Exploding and unexploding dots return to explain decimals!

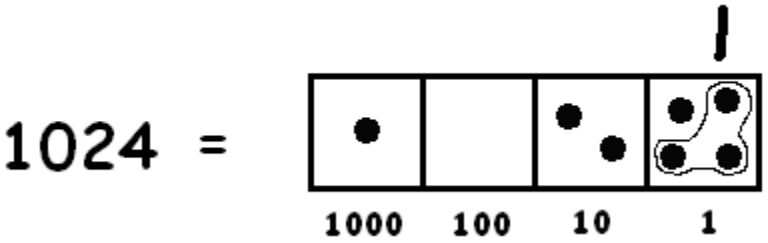
TOPICS COVERED: Decimals and their arithmetic.

A. GETTING STARTED

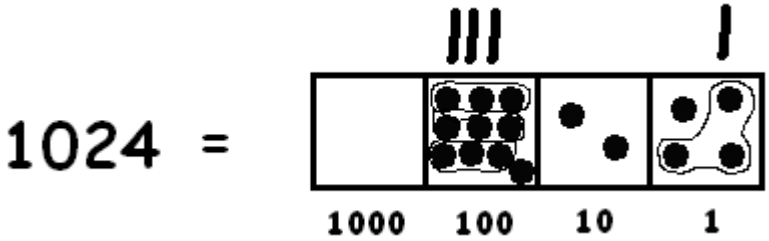
Recall from book 3 that a $1 \leftarrow 10$ machine consists of a row of boxes extending to the left, with the rightmost box representing units and each box thereafter representing 10 times the quantity of the box to its right. (Each cell of the machine thus represents a power of 10.)



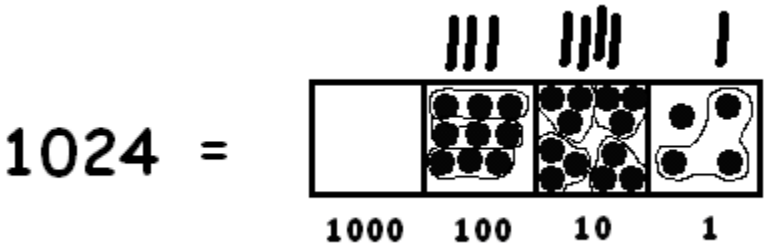
And recall from book 4 that we can perform division in a $1 \leftarrow 10$ machine by looking for groups of the desired pattern within the machine. For example, in the division problem $1024 \div 3$, we seek groups of three dots in the diagram above. One is evident:



To see more, we must "unexplode" a dot:



and again:



This leaves one obstinate dot remaining that can't be unexploded, or contended with in any clever way. We see:

$$1024 \div 3 = 341\ R\ 1$$

BUT … If we had additional boxes to the right we could unexplode this one obstinate dot and find further groups of three. But what would boxes further to the right represent? (It has become the convention to separate the boxes to the right with a point, called a decimal point.)

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