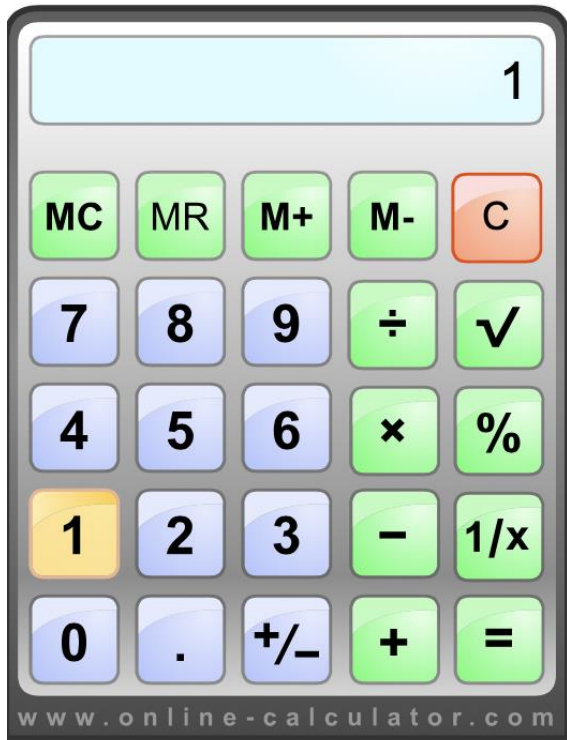


One Third

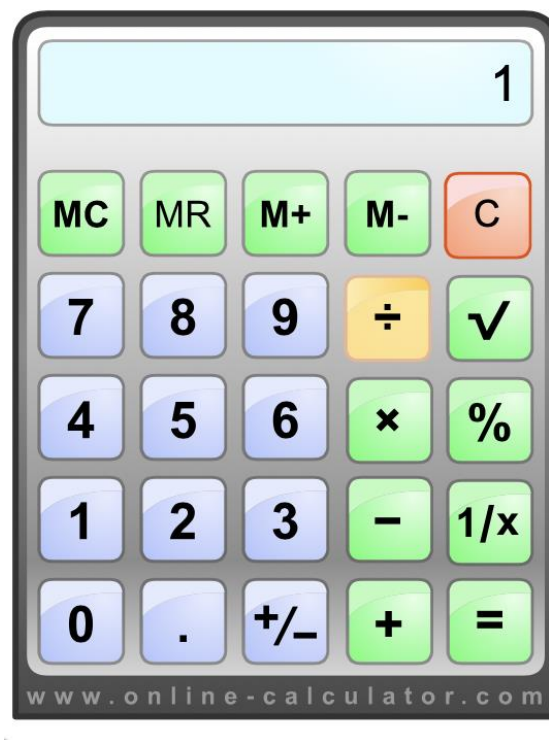
A lesson for young users of calculators

Introduction

Before this lesson is taught, children should know that in order to compute $1/3$, you divide 1 by 3, and that a calculator shows the answer as 0.33333333.



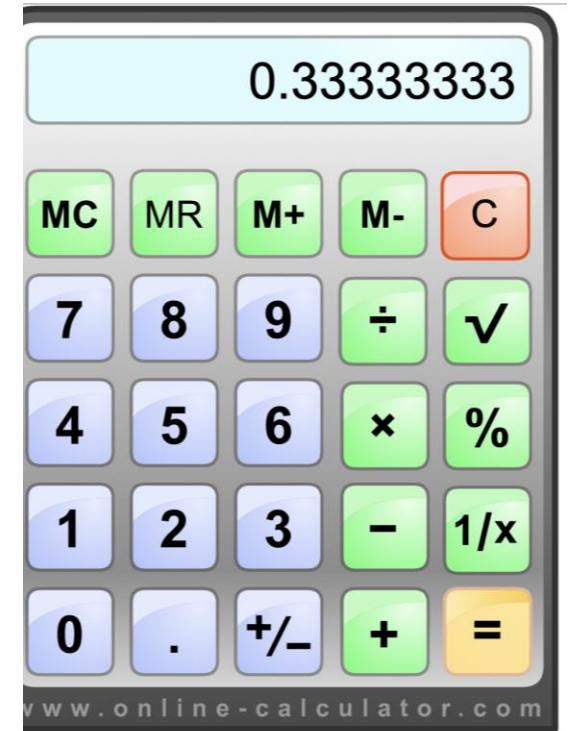
[1]



[÷]



[3]



[=]

The question is, *why* does the calculator show 0.33333333 when you divide 1 by 3?

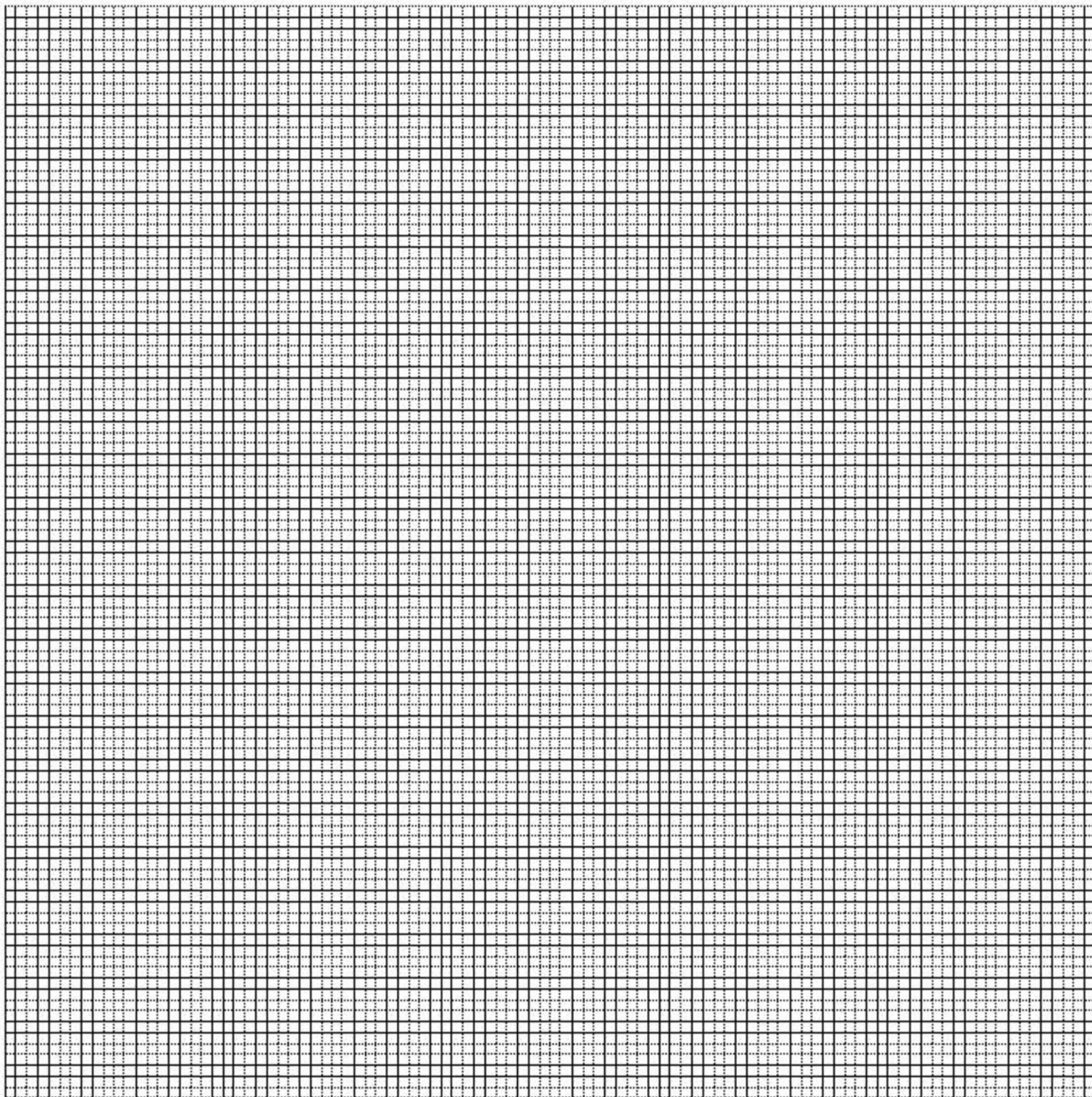
Of course the answer is because

$$1/3 = 3/10 + 3/100 + 3/1000 + \dots$$

But this is not the answer we have in mind.

We want to show how to divide a piece of paper among 3 children by cutting it into 10 strips.

Some children will see the analogy to 1/3 shown on the calculator, and others will not.



Activity

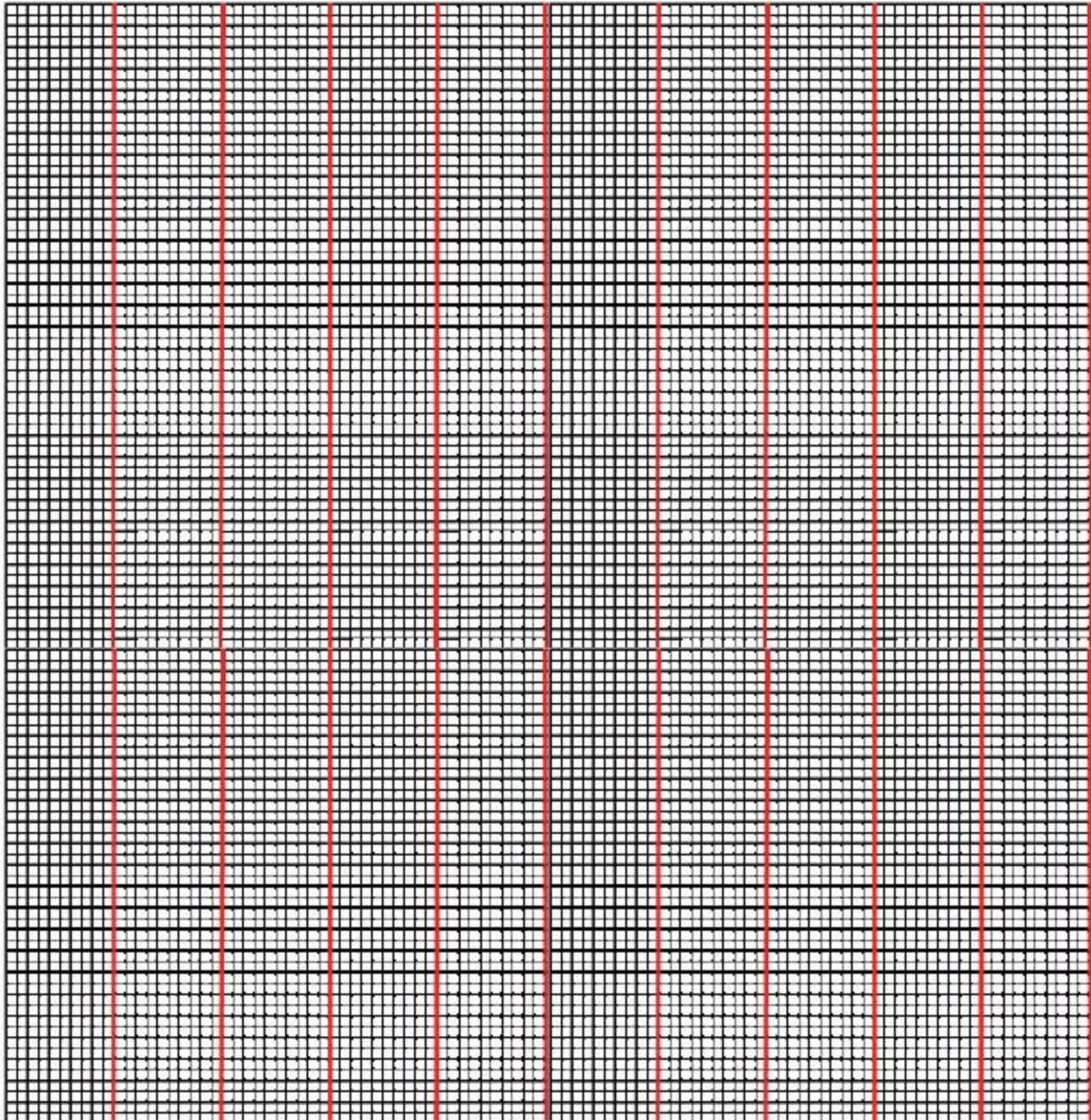
Children work in groups of three. Each group needs one square decimeter (10 cm by 10 cm) of paper divided into square millimeters (as on the left). (Other units are fine, as long as the division is by powers of 10.)

Each group needs a pair of scissors and glue.

Each child also gets a sheet of paper to glue his/her strips onto.

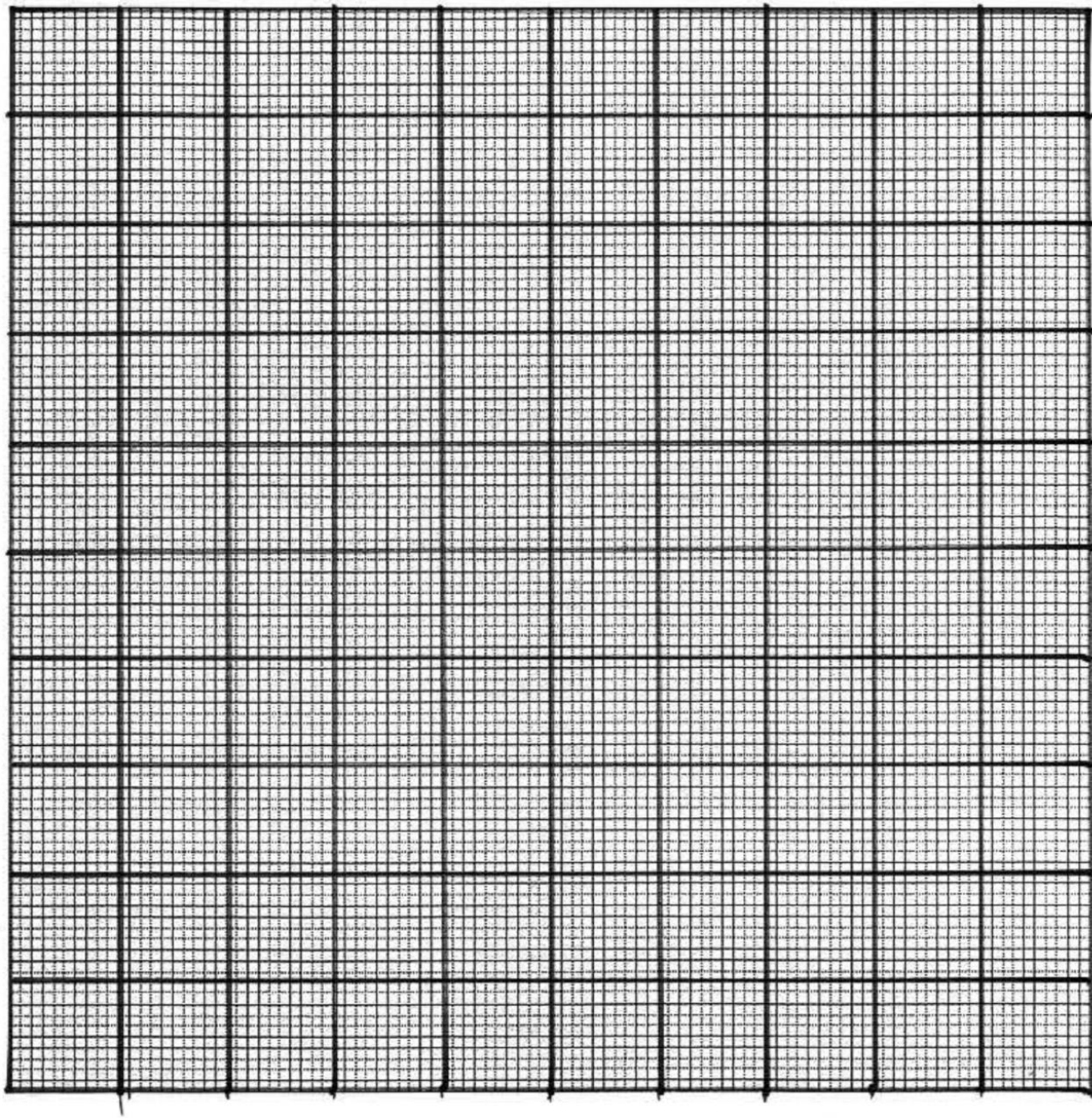
Supplies

Scissors, paper, glue, calculator



Step 1.

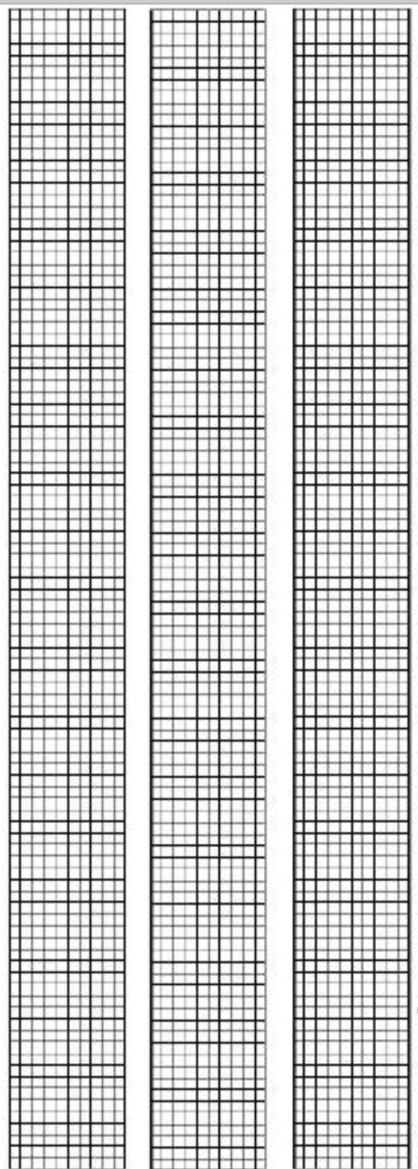
Divide the square into 10 equal strips, as on the left. (The teacher may help.)



Step 2.

You may find it helpful to divide each strip into ten small squares, for later cutting. (Or you may begin the activity with giving each group of three the paper with divisions marked as they are here.)

Before you continue, cut the paper into 10 strips.



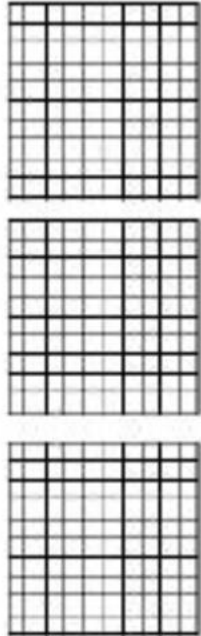
Each child gets

Step 3.

Each child gets 3 strips, and one strip is left over.

Glue your 3 strips onto your sheet.

Each child gets

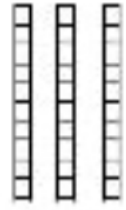


Step 4.

Cut the remaining strip into 10 equal squares. (The teacher may help here, or the children can do it themselves.) Each child gets three, and one square is left over.

Glue your three squares onto your sheet.

Each child gets



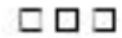
Step 5.

Cut the remaining square into 10 thin little strips.

Each child gets 3, and one thin strip is left over.

Glue your three strips onto your sheet.

Each child gets



Step 6.

Cut the remaining strip into 10 little squares.

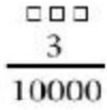
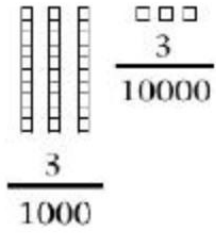
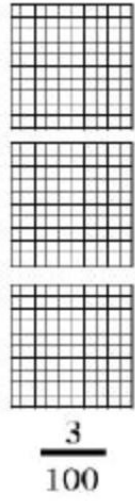
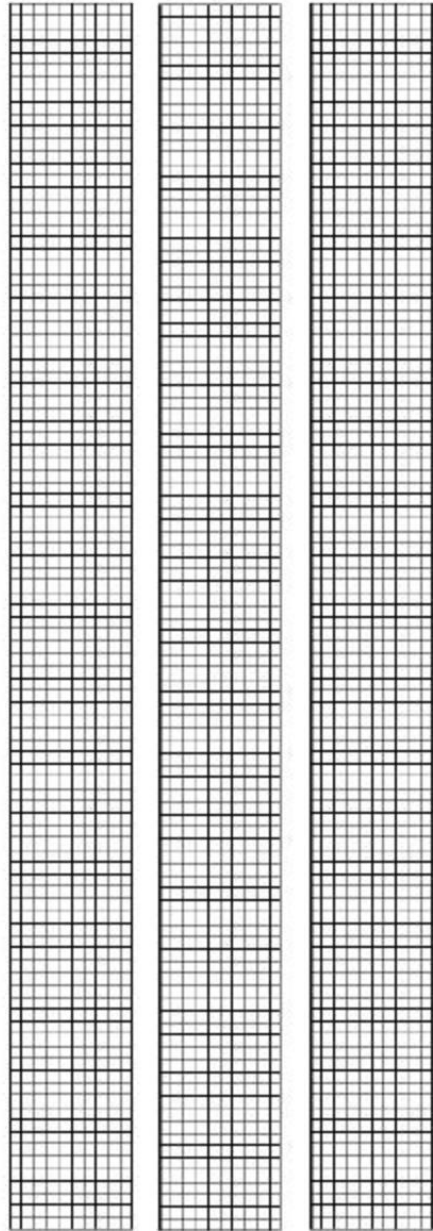
Each child gets 3 of them, and one square is left over.

Glue your 3 tiny squares onto your sheet.

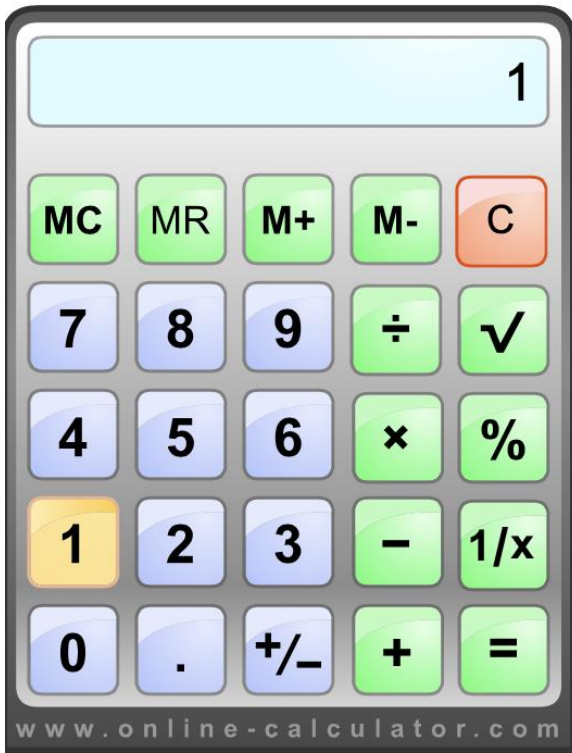
The remaining square is too little to cut, so we just leave it.

Now let's look at your whole picture.

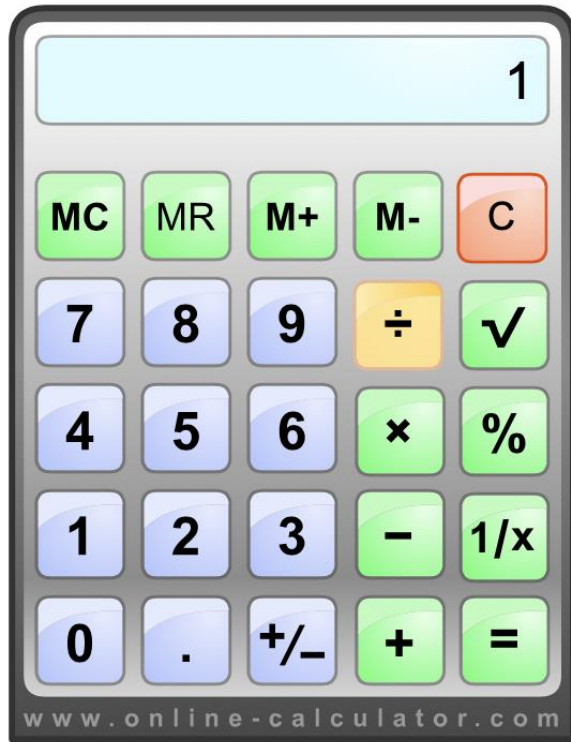
Each child has



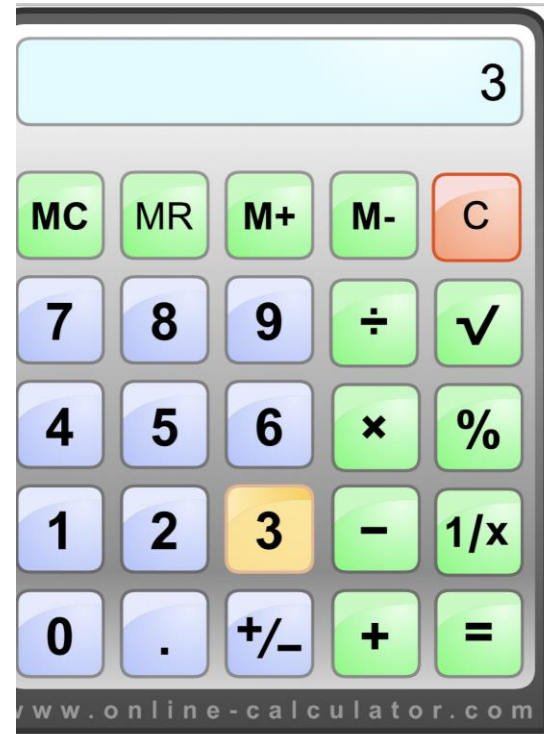
$$\frac{3}{10} + \frac{3}{100} + \frac{3}{1000} + \frac{3}{10000}$$



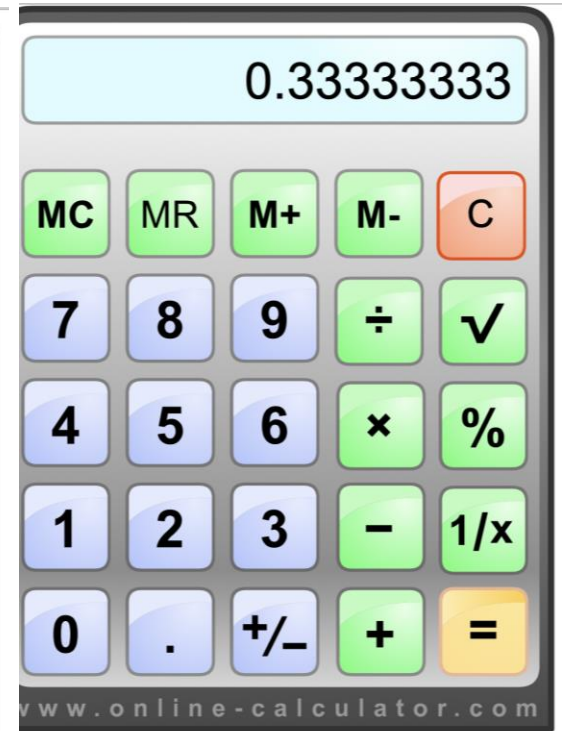
[1]



[÷]

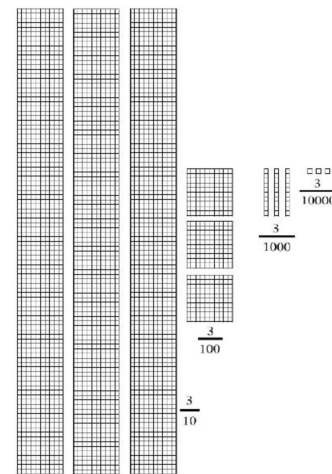


[3]



[=]

Now show children $1/3$ on the calculator and ask them if they know what the connection is. This may lead to an interesting discussion, but if they do not see it, do not explain it.



$$\frac{1}{3} = \frac{3}{10} + \frac{3}{100} + \frac{3}{1000} + \frac{3}{10000} + \dots$$

$$\frac{1}{3} = 0.333\dots$$

No End.....