Problem Long Division

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Input: 2 n-digit nonnegative integers x & y

Output: floored quotient from x/y + remainder of rational number R/x

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Let x be our dividend
Let y be our divisor
Let R be our remainder
Let x = 12345
Let y = 2
Understand we are working in columns, so there will be a current or working column

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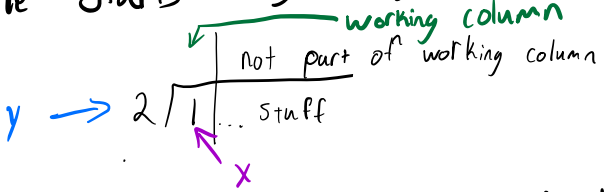
Set up long division table

n columns == to n digits of y + R

$y\overline{)x} = 2\overline{)12345}$

our working column will start in our leftmost column

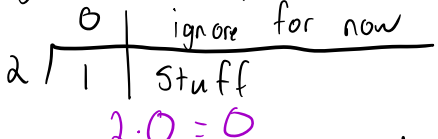
our example starts as follows:



evaluate how many times our divisor divides the dividend contained in the working column

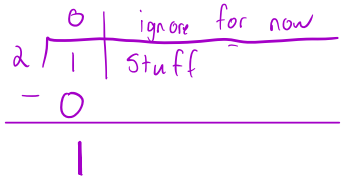
$2 \div 1 = 0$ times

Place integer on top in left most column

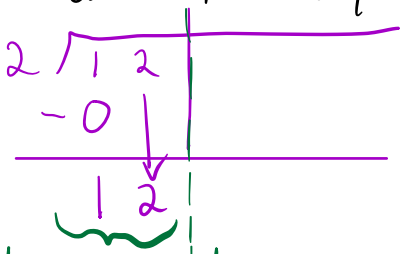


$2 \cdot 0 = 0$

multiply the quotient by the divisor and place the product 1 row down take difference of the current dividend



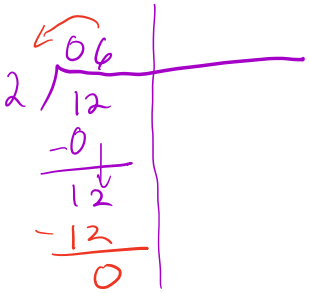
Shift working colum to the right one place value
Bring new value down to complete new dividend



divided contained in working column

Check how many times our divisor divides our dividend and repeat previous steps n times.

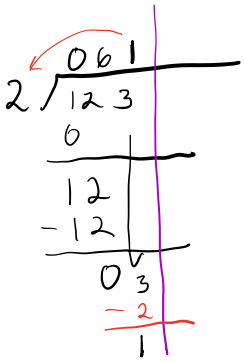
working column



$2 \div 12 = 6$

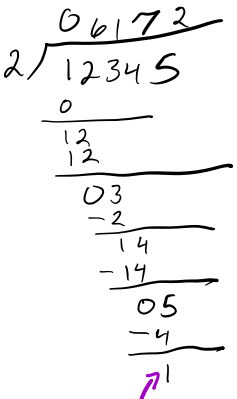
$6 \times 2 = 12$

$2 \div 3 = 1$



$2 \cdot 1 = 2$

...

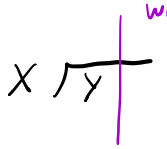


This leaves us with our (Remainder = R

Place R as a fraction over X(divisor) $\frac{R}{X}$ ... in our case $\frac{1}{2}$

$X/y = 2 \div 12345 = 06172\frac{1}{2}$

Algorithm Summary:



y has n digits

n+1 columns

final column is remainder fraction

divide dividend in working column by divisor

keep track of remainders and shift working column to the right after each iteration.

leave remainders in 1 place value higher then current working column