

## Some Magic Math Tricks When Dividing by Seven

The decimal representation of fractions with a denominator of 7 is shown below:

$$\frac{1}{7} = 0.142857142857142857\dots$$

$$\frac{2}{7} = 0.285714285714285714\dots$$

$$\frac{3}{7} = 0.428571428571428571\dots$$

$$\frac{4}{7} = 0.571428571428571428\dots$$

$$\frac{5}{7} = 0.714285714285714285\dots$$

$$\frac{6}{7} = 0.857142857142857142\dots$$

If you look at the decimals, they all contain the sequence 142857142857... in the same order, but starting at a different spot. When I am asked to do something like  $\frac{2}{7}$ , I think of it as  $\frac{1}{7} \times 2$ . Now I know  $14 \times 2 = 28$ , so I know the sequence is going to start at the 2, and go 0.285714...

Similarly, if I am asked to do  $\frac{5}{7}$ , I think of it as  $\frac{1}{7} \times 5$ . Well, I know  $14 \times 5 = 70$ , so I start at the 7 and get 0.7142857...

Your 14 times table is useful to memorize, since it is involved:  $14 \times 2 = 28$ ,  $14 \times 3 = 42$ ,  $14 \times 4 = 56$ ,  $14 \times 5 = 70$ , and  $14 \times 6 = 84$ . The ten's digit of each of those answers will give you the starting number.

A way to remember the sequence 142857, is  $14 \times 2 = 28$ , and  $28 \times 2 = 56$ , then add one to get 57.

I always get a kick out of a class when I am working on a problem on the board and I get something like 38 divided by 7. I quickly look up to the heavens and in a second or two write out the answer of 5.42857142857... The look on their faces when they finish doing the question on their calculators, and then they look at my answer that was done in my head, is priceless. They think I'm some sort of genius when all I've done is a simple trick that anyone can do if they remember the sequence 14 28 57.

Now, for some homework, try the following:

(a)  $43 \div 7 =$

(b)  $79 \div 7 =$

(c)  $145 \div 7 =$

(d)  $18 \div 7 =$

(e)  $48 \div 7 =$

(f)  $60 \div 7 =$