Mathematrix

<div align="right">- Sreenivasa Rao Ainapurapu.</div>

We are glad that you liked the tips given in previous editions. Thanks for the letters and feedback. This time also we will discuss about some tips to do some complex calculations in easy way, hints for brain sharpening, problem solving techniques and many more.

> Note : You should teach these techniques to kids only after they learn ordinary methods. Then only they can appreciate these tips and the concepts behind. It is always better to use normal methods to verify till you are comfortable.

I know that you know the importance of 142857. Let us try to compare our answers. **First answer :** When you divide 1 by 7, then the 6 decimal places are nothing but 142857. If you still divide, you get the same 6 digits

$$142857 \times 2 = 285714$$
$$142857 \times 3 = 428571$$
$$142857 \times 4 = 571428$$
$$142857 \times 5 = 714285$$
$$142857 \times 6 = 857142$$
$$142857 \times 7 = 999999$$

again and again. These are called recurring numbers. 142857 are the 6 decimal places of fraction 22/7.

Second answer : 142857 is a cyclic number. If you multiply this number with 2, 3, 4, 5 and 6, what did you notice? The same numbers are coming in a particular order. View the picture above. If you multiply by 2, you get 285714. Which means in 142857, 14 is been moved to the end. If you multiply by 5, you get 714285. Which means in 142857, 14285 is been moved to the end. As shown in above picture, when you multiply 142857 by 3, it starts with 4 and the rest of the numbers follows in clock wise direction. If you multiply 142857 by 7, you get 999999. Looks interesting. Isn't it?

Our brain is having extraordinary capabilities. If you have a machine made of iron and you do not use it for sometime, what happens? It gets rust and may not be useful later. Similarly if you keep your brain idle, you feel as if you are forgetting things. If you polish it, it becomes more energetic. If you ask for a formula learnt during childhood days, some people might
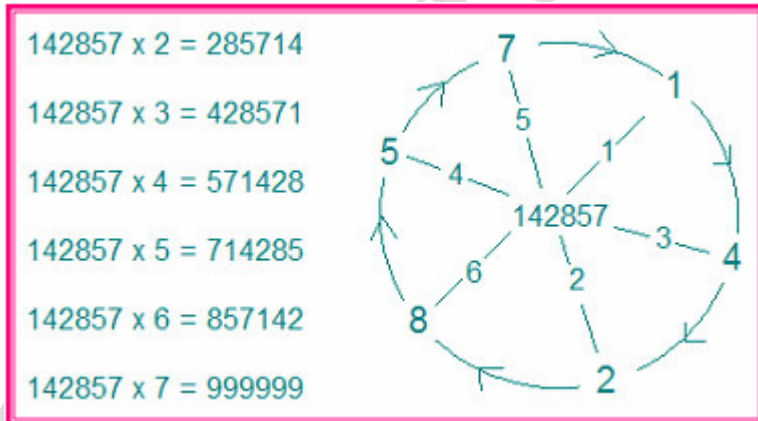
answer, some might answer with difficulty, some may not even remember. Why is it so? If we arrange books or video cassettes in a shelf in an organized way, you can select a given item without much difficulty. But if we create a heap, selecting an item from that heap is going to be difficult. In the same way, by practice, we can arrange the conversation took place or the scene we experienced in our brain, wh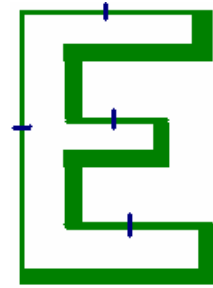ich shows there is no question of forgetting. This is not that easy as one tells, but not impossible either if you practice. What do you think the adjacent shown picture is? Did you figure out an 'E'? Yes, our brain could understand it by filling in the missing parts. See the below figure and the marked lines. By imaging those lines, brain could successfully understand it. Thus it is clear that brain can ignore certain information or enhance some information depending on the context. Basically it did some tailoring work. Can you figure out the picture A on left side? What is it? Those are neither Chinese characters nor Japanese characters. Those are not histograms either. See the below picture B to find out what the picture A is about. If you imagine a rectangle around the picture A, a word "LIFE" is evolved. Did you notice?

Picture A

Read the characters and equation in the below picture C. What is special about it? You might have read as "CAB" for the first. "The average of 12 and 14 is

Picture B

13" is the second one. Am I right? But, if you notice keenly, B and 13 are written in the same way. But brain read it as B in the first case and 13 in the second case.

$$CAB$$
$$(12+14)/2=13$$
Picture C

Strange! Brain can many times misinterpret others words, which leads to serious atmosphere. Beware!

This time let us learn about multiplication. For example, What do we get by multiplying 97 by 96. By ordinary method, we first multiply 97 by 9 and

then by 6 to find the result. Another way is to multiply (100 – 3) by 96, which is 9600 – (3 x 96), which is equal to 9600 – 288 = 9312.

Another way to do the calculations:

Write the number one below the other as shown in the picture D. Find the powers of 10 (namely 10, 100, 1000 etc., which acts as base.) closest to the numbers (say A and B). Find the difference between the number and base (say C and D) and write it adjacent to the number. The product of the differences (C x D) is to be written in appropriate places depending on the base we selected. For example if base is 10 then the product should occupy units' place, if base is 100 then the product should occupy units' and tens' place, if base is 1000 then the product should occupy units', tens' and hundreds' place.

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97 x 96 = ?                    991 x 989 = ?


97  -3 (100 Base)              991   - 9  (1000 Base)
96  -4 (100 Base)              989   -11  (1000 Base)
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[97-4][12]                     [991 - 11][9 x 11]
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97 x 96 = 9312                 991 x 989 = 980099
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Picture D

Then one of the numbers for which we are calculating product is to be added to the difference written opposite to the second number (i.e., A + D).Which is then written in front of the earlier calculated product. So the product of A and B is [A + D][C x D].

In the picture D above, see the second multiplication. Even though the product of 9 and 11 is 99, because the base is 1000, three places should be filled. 99 occupies only units and tens place. So hundredth place is to be filled by 0.

In the similar way, if you want to multiply 112 by 104, answer can be found immediately either by writing the numbers as shown in picture E or by memorizing the product and sum. No need to have a paper and pen. Keep practicing. Now it is your turn to use it and get used to the simple rule.

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112 x 104 = ?


112  +12
104  +4
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[112 + 4][48]
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112 x 104 = 11648
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Picture E