What is the greatest trick in mathematics?

100+ Answers

Duc Quyen, studied elementary Mathematics
Answered Nov 18, 2016 · Upvoted by Michael Jørgensen, PhD in mathematics

Here are one interesting mathematics trick that Professor Arthur Benjamin performed:

First, you choose two positive numbers, let's say you choose 9 and 2 (but don't let me know these numbers yet!!). You write number 9 in the first line and number 2 in the second line. Then you start adding up two consecutive numbers to get the number in the next line. That is:

Number in line 3 = number in line 1+ number in line 2

Number in line 4 = number in line 2+ number in line 3 ....

You keep doing that until you reach line 10, as shown in the table below:

1	9
2	2
3	$9+2=11$
4	$2+11=13$
5	$11+13=24$
6	$13+24=37$
7	$24+37=61$
8	$37+61=98$
9	$61+98=159$
10	$98+159=257$

1	x
2	y
3	$x+y$
4	$x+2y$
5	$2x+3y$
6	$3x+5y$
7	$5x+8y$
8	$8x+13y$
9	$13x+21y$
10	$21x+34y$

After you finish all the calculation, you tell me you chose number 9 and number 2 (but don't show me the table of your calculation).

Four seconds later, I can confidently tell you that:

1. If you divide the number in line 10 by the number in line 9 (257 divided by 159), *the first three digits* of of the answer will be 1.61

You take out your calculator, do the division and to your surprise, I'm right!

2. The sum of all the numbers in line 1 through line 10 is 671.

You take out your calculator again, do the addition and, I'm right again!

How did I do it? Did I go through all the calculation in my head within 3 seconds? Probably not.

$\frac{a}{b} < \frac{a+c}{b+d} < \frac{c}{d}$

So $\frac{21x}{13x} < \frac{21x+34y}{13x+21y} < \frac{34y}{21y}$

$\frac{21x}{13x} = 21/13 = 1.615...$

$\frac{34y}{21y} = 34/21 = 1.619...$

In other word, the result of the division will always be greater than 1.615 and smaller than 1.619, that's why the first 3 digits of the result is 1.61 !!! Always 1.61 !!!

The sum of numbers in line 1 through line 10 is 55x + 88y = 11(5x + 8y)

11(5x + 8y) = 11(45 + 16) = 11 times 61

And we all know how to quickly multiply a two-digit number with 11, don't we? Simply add 6+1 = 7 then insert the number 7 between the original 61 and we get the result 671.

Keep in mind that (5x + 8y) is also line 7, so if you showed me the table, I wouldn't have to calculate (5x + 8y) myself and would be able to come up with the result even quicker! But don't show me the table, that would make you think I actually have to do all the calculation in my head within a few seconds!

The principles in this trick apply to all positive numbers x and y, no matter how small (1, 2, 3 ...) or large (1 thousand, 1 million, ...) or if they're fractions ($1/2, 3/7, \ldots$). However, if you choose 2 large numbers or fractions, you'd have a hard time calculating 11(5x + 8y) in your head!

So go out there and impress your friends, but tell them to choose small numbers only.

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Rishabh Bhargava
Nov 18, 2016 · 9 upvotes

The first point is quite obviously true, and is part of the fact that the fibonacci series always approaches phi.

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João Colaço
Nov 28, 2016 · 2 upvotes

Made 2 algorithms in PHP to test and reproduce everything in here with a For loop, (two input values: 9 and 2)

Code: [PHP] PHP Fibonnaci Test formula | You can test here: Test PHP code online

Benchmark PHP 7.0:...(more)

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Mike Burns: Great work, I wish I could understand anything in that code

Bill Mallett
Nov 20, 2016 · 1 upvote

Is the answer actually the golden ratio 1.61803398875

I recall Euler developed a similar method to check the accuracy in the addition of a long column of numbers. He used this when he was a very young child when working on his fathers business books.

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Kuppi Dubai: I think, yes it approaches the Golden Ratio. Would be interesting t...

Felix Tritschler
Nov 27, 2016 · 4 upvotes

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Bill Springston
Dec 12, 2016 · 1 upvote

...I found it interesting that the Fibonacci Sequence (Series) appears in so many places both in math and nature. I challenged my students to find interesting and unique situations in which the series sneaks up on the unsuspecting investigator. I am now retired and "tricks" like this prove to me th...(more)

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More Comments

Vishesh Subhanker, works at Underwriters Laboratories
Answered Feb 26, 2015 · Upvoted by Krishna Murthy B, M.Tech Computer Science & Mathematics, Indian Institute of Technology, Bombay (2018) and Pranay Raj, studying MSc. Mathematics at BITS-Pilani

In elementary school in the late 1700's, a class was asked to find the sum of the numbers from 1 to 100. The question was assigned as "busy work" by the teacher, but one of them found the answer rather quickly by discovering a pattern. His observation was as follows:

> 1 + 2 + 3 + 4 + ... + 98 + 99 + 100

He noticed that if he was to split the numbers into two groups (1 to 50 and 51 to 100), he could add them together vertically to get a sum of 101.

> 1 + 2 + 3 + 4 + 5 + ... + 48 + 49 + 50
>
> 100 + 99 + 98 + 97 + 96 + ... + 53 + 52 + 51
>
> > 1 + 100 = 101
> >
> > 2 + 99 = 101
> >
> > 3 + 98 = 101
> >
> > .
> >
> > .
> >
> > .
> >
> > 48 + 53 = 101
> >
> > 49 + 52 = 101
> >
> > 50 + 51 = 101

He realized then that his final total would be 50(101) = 5050.

He was none other than "**Carl Friedrich Gauss**"

Thanks to him we now have a formula S=n(n+1)/2

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Is this answer still relevant and up to date? Yes No

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Sarthak Garg
No offense but well I just heard a SLIGHTLY different version from my Maths teacher ...

1 more comments from Aniket Yadav

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Yechiel Kay, Amateur mathematician
Updated Sep 25, 2016 · Upvoted by Pepito Moropo, B.S. / M.S. Mathematics and Sharangdhar Bodas, M.Sc.,B.Ed. Mathematics & Physical Sciences, University of Mumbai

Originally Answered: What are some great mathematics tricks you know of?

This trick was taught to me by my father when I was a kid. I don't know how it works, only that it does. If someone here knows the mechanism of how it works please let me know.

My father found this trick in a book of letters by the Lubavitcher Rebbe (Igros Kodesh vol. 8 page 266), who in turn was quoting a 15th century Talmudic work called the Kol Bo.

The Kol-Bo brings it as a trick Yeshiva students used to in order to amuse themselves (this was before the days when cat gifs were but a mouse-click away), as a way "to find a person's age through logic [without being told explicitly]", though the trick can work for any number.

Here's how it goes:

You ask someone to choose a number between 1 and 100. You then ask them to divide the number into 3 and give you the remainder (e.g. if the number was 10, 9 divides neatly into three and then the remainder is 1). You then ask them to divide their original number into 5 and give you the remainder of that, and then do the same with 7.

You should now have 3 numbers, the remainders of dividing the original number into 3, 5 and 7; let's call them x3, x5 and x7 respectively. Multiply these numbers as follows: x3 should be multiplied by 70, x5 by 21 and x7 by 15. Add them all up and if it adds up to more than 100 (technically, 105) subtract 105 until you get the right number.

An example: Let's take the number 32.

x3 = (32 % 3) = 2
x5 = (32 % 5) = 2
x7 = (32 % 7) = 4

so now let's multiply them:

x3 * 70 = 140
x5 * 21 = 42
x7 * 15 = 60

Adding them up we get:

140 + 42 + 60 = 242

Subtracting 105 we get 137, still more than 105, so we subtract 105 again and get 32, our original number!

This trick can work for numbers larger than 100 as well but you have to know in which group of 100 (technically 105) the original number is in. In the case of larger numbers you might have to ADD 105 instead of subtracting in order to get to the right number.

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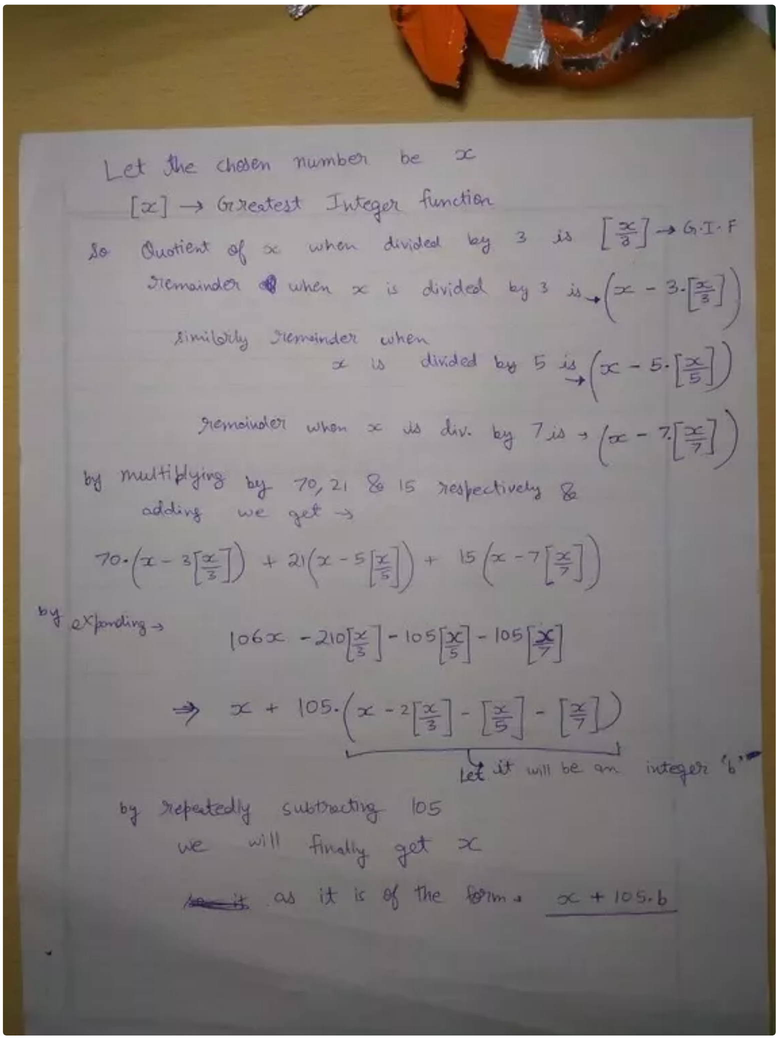
Again, if anyone knows how this trick works please post in the comments.

Edit: thanks Gerwin Dox for explaining in the comments and Abhishek Khare for offering the following explanation:



Gerwin Dox
This is a direct consequence of the Chinese Remainder Theorem....

Prashant Raj, You can't get bored of Maths
Answered Jan 24, 2016

$$\sqrt{12+\sqrt{12+\sqrt{12+\ldots}}} = ?$$

What is the value of above expression?

You can evaluate it within 3 seconds without converting this expression into quadratic form. How ?

Just break the number 12 into n*(n+1) form.

12 = 3*4

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Similarly, for 72, the the answer will be 9; for 20 the answer will be 5, and so on.

If the answer is an integer, then number will always break into n*(n+1) form, and such numbers are called **pronic numbers.** A pronic number is a number which is the product of two consecutive integers.

$$\sqrt{72 - \sqrt{72 - \sqrt{72 - \ldots}}} = ?$$

If instead of '+' you have '-' (above image), then

72 = 8*9

The answer is n, instead of n+1. So the above expression evaluates to 8.

If instead of + you have * (multiplication), then the answer is the number itself

$$\sqrt{72 \sqrt{72 \sqrt{72 \ldots}}} = 72$$

Thanks for A2A...

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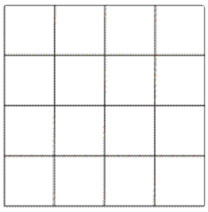
Jinang Shah, worked at Pradeep Singhi & Associates (2013-2016)
Updated Apr 11, 2015 · Upvoted by Gananath Misra, Integrated Masters of Science in Applied Mathematics and Abhimanyu Saharan, Post grad in applied mathematics

Originally Answered: What are some mathematical tricks?

How many squares are there?



Usually, we get some puzzle like this. I would like to share trick that can solve this kind of puzzle so easily.
In perfect 4*4 square, to find out the number of squares,
4^2=16
3^2=9
2^2=4
1^1=1
Total number of squares would be 16+9+4+1=30.

Same ways, the answer for squares in 7*7 is,
49+36+25+16+9+4+1=140.

This works perfectly fine when there are same number of rows and columns.

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For Example,

if there is a rectangle, which has 5 rows and 4 columns and still we have to find the total number of square in it. It would not be possible with the above method.

For this, there is a simple trick,

Rows- 5 Column-4

STEP 1) Multiply the number of rows into number of column
In this case 5*4 = 20
STEP 2) Reduce 1 from number of rows and column
In this case 4*3 = 12
STEP 3) Follow STEP 2 until either of row or column count comes to 1.
In this case 3*2 = 6, 2*1 =2

As we see above the column count has come to 1 so reducing it to zero wont make any sense.

Total = 20 + 12 + 6 + 2 = 40

PS:- Will post the mathematical reason behind it soon.

I have also written an another answer on how to fill up this square with numbers such that total of each row and column is same.
Jinang Shah's answer to What are some great mathematics tricks you know of?

Jinang Shah
Jaydeep Vekariya the operator ^ is used for exponential form as Aditya Srivastava has ...

1 more comments from Navneet Viswanadha

Soumajit Das, B.sc. Physics & Mathematics, Serampore College
Answered Nov 13

Originally Answered: What are some of the best maths tricks?

Maths tricks! Wow that's good to play with.

Although what I am going to share would have helped you more had I posted this answer early this year but anyway since there are still a few days left for the year to bid us adieu I hope this trick will not disappoint you much. So are you ready for a mind blowing trick?

Here I go.

First have a look at the calendar of the year 2017.

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Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

May

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

June

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

July

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

August

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

September

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

October

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

November

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

December

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Federal Holidays 2017

Jan 1	New Year's Day	Feb 20	Presidents' Day	Sep 4	Labor Day	Nov 11	Veterans Day
Jan 2	New Year's Day (observed)	May 29	Memorial Day	Oct 9	Columbus Day	Nov 23	Thanksgiving Day
Jan 16	Martin Luther King Day	Jul 4	Independence Day	Nov 10	Veterans Day (observed)	Dec 25	Christmas Day

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What if I share a trick that will make you get this calendar at your fingertips?

Yes I am going to share a trick that will enable you to get any day of the year 2017 without the help of this calendar. So keep reading to know and follow the steps given below.

Step 1.

First assign each of the month of the year with a certain number as follows.

January - 6

February - 2

March - 2

April - 5

May - 0

June - 3

July - 5

August - 1

September - 4

October - 6

November - 2

December - 4

Step 2.

Take any date of any month of 2017 ; for example 1 January. Add the ‘ number’ of that month to date; e.g. 1+6(**Number for January)=7**

Step 3.

Divide this ‘sum’ by 7; e.g. (as above) 7/7, take the **remainder.** So here the remainder is 0.

Step 4.

Sunday-0 , Monday - 1, Tuesday - 2, Wednesday - 3, Thursday - 4, Friday - 5, Saturday - 6.

As per our example, in Step 3 our number was 0 (the remainder of 7/7) which indicates Sunday. So **1st January 2017 was a Sunday.**

More examples.

26 January 2017

1. Add 6 to 26 =(32)
2. Divide 32 by 7; the remainder is 4
3. "4" from the Table (in step 4) is Thursday which is actually true.

15 August 2017

1. Add 1 (number assigned to August as per table 1) to 15; 1+15=16
2. Divide 16 by 7; the remainder is 2
3. "2" from the Table is Tuesday.

Check the calendar and see the magic.

25 December 2017

1. Add 4 (number assigned to December) to 25; =4+25=29
2. Divide 29 by 7; the remainder is 1
3. "1" from the Table is Monday. And *voila! It is correct*.

So you see how just a simple 3 steps calculation can find any day of the year 2017 without the calendar.

Now how will you remember the first table? Here's a trick too.

Notice that:

1. January and October have the same number which is "6"
2. February, March and November have the same number i.e. 2
3. April and July have the same number 5
4. September and December have the same number which is 4

So you need to remember only 7 digits as follows **6250314**

Or, if you break the above number into 3 parts: we have **625 0 314**

You may use

1. **625 is the square of 25**
2. 0 as something related to Indians (as believed to be discovered here).
3. π=3.1415.. (the first three digits of π is 314)

Now do you find it easy to crack!

So what are you waiting for! Go out and surprise your friends by telling them their birthdays in the year 2017.

However this is just a mathematical trick and is not the replacement of calendars. Just thought of sharing for the sake of the question.

Cheers!

Information courtesy: Science Reporter magazine. Issue: January 2017.

;) ;)

Het Shah, B. E. Computer Engineering, L J Institute of Engineering and Technology
Updated Jan 8

Originally Answered: What are some awesome mathematics tricks?

Trick to square two digits number

Note- This trick applies to the numbers which are greater than 31. I mean numbers whose square is in 4 digits.

Take an example, square of 42.

Step-1 Write down the square of both digits.

4*4 and 2*2

16 04 (don't write only 4, it's 04)

Step-2 Do twice of multiplication of two digits.

Here, (4*2)=8

Twice of 8

16.

Step-3 Add 2nd number with 1st on the 10s places.

1604

+0160

$Sum = 1764.$

Note :- Always put 0 in the unit's place of the second number.

Let's take an another example.

Square of 89

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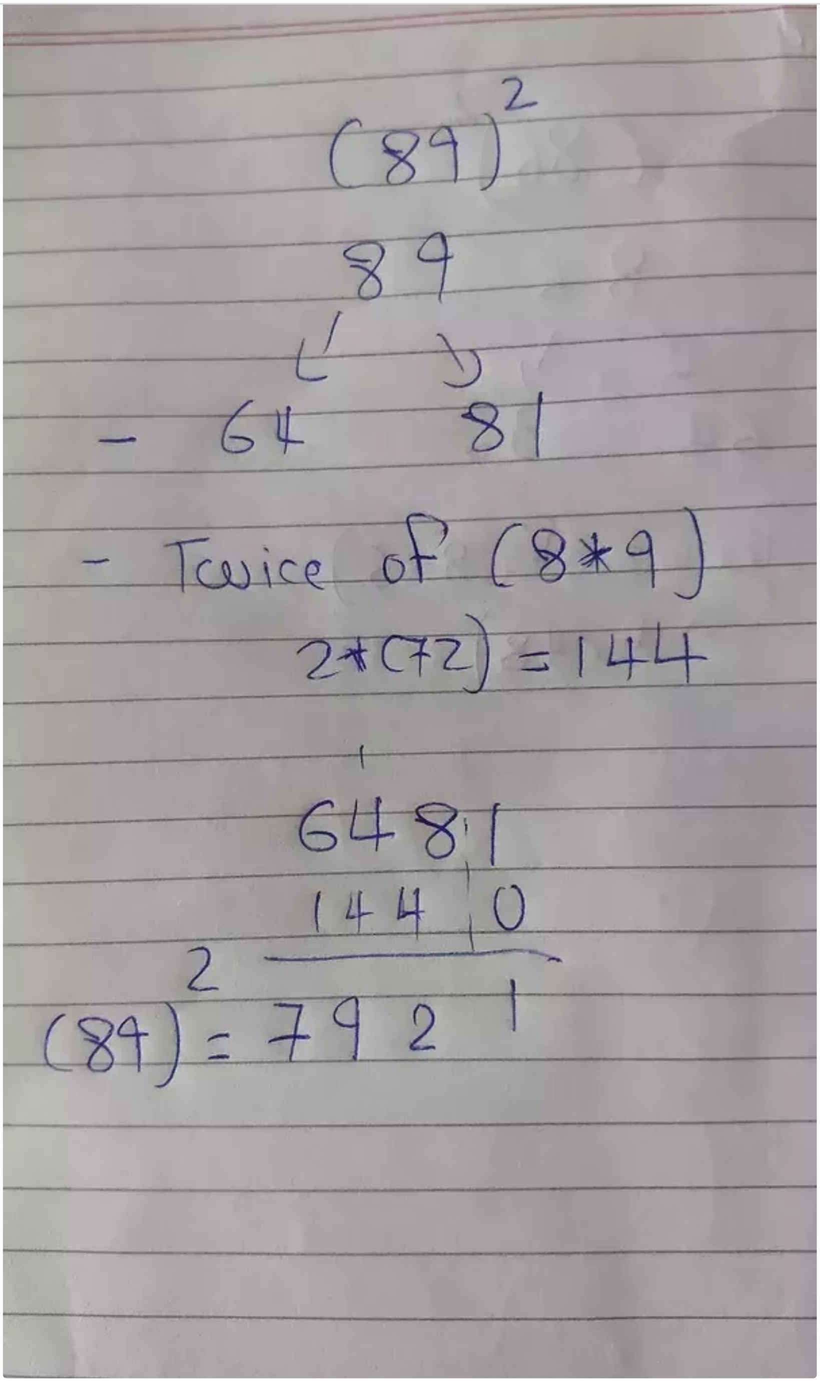

And last one, Square of 56.

Thank you!

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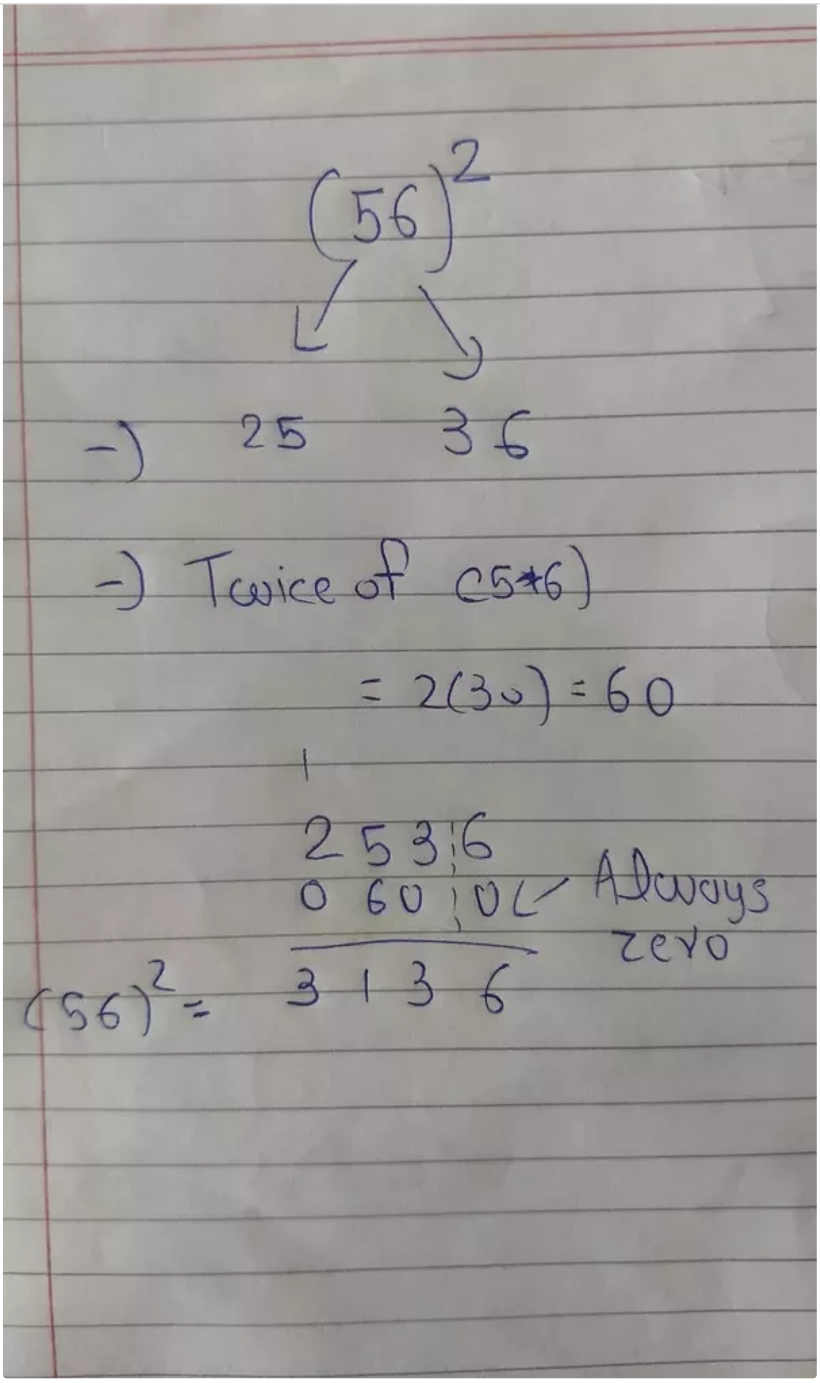

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