

Multiplication and Division Tricks

This document reviews different methods for solving multiplication or division problems. Specifically, this handout reviews tricks for remembering the multiples of 7, 8, 9, and 12 as well as a method for deducing if a number is divisible by or shared a common factor with another number.

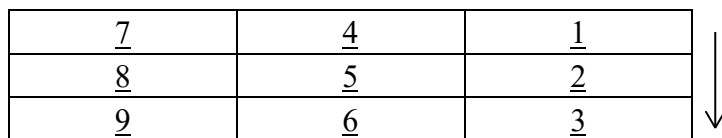
Multiplication by 7

This trick creates a hands-on graphic to aid learning and remembering the multiples of 7.

Step 1

Create a 3 by 3 box and fill it in backwards with the numbers 1 through 9. Start numbering in the top right-hand corner and move down then to the left.

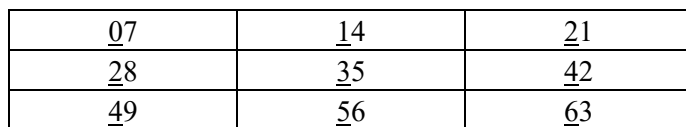
<u>7</u>	<u>4</u>	<u>1</u>
<u>8</u>	<u>5</u>	<u>2</u>
<u>9</u>	<u>6</u>	<u>3</u>



Step 2

Place a multiple of two (0, 2, 4) in each of the boxes in the leftmost column. Counting up from the added number in the leftmost column, go across each row adding the next number in front of the existing number.

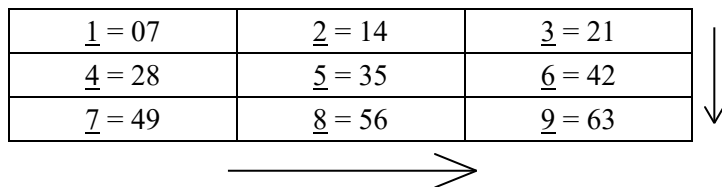
<u>0</u> 7	<u>1</u> 4	<u>2</u> 1
<u>2</u> 8	<u>3</u> 5	<u>4</u> 2
<u>4</u> 9	<u>5</u> 6	<u>6</u> 3



Step 3

The boxes are ordered from left to right and up to down. The top left box contains 1 x 7, and the bottom right box has 9 x 7.

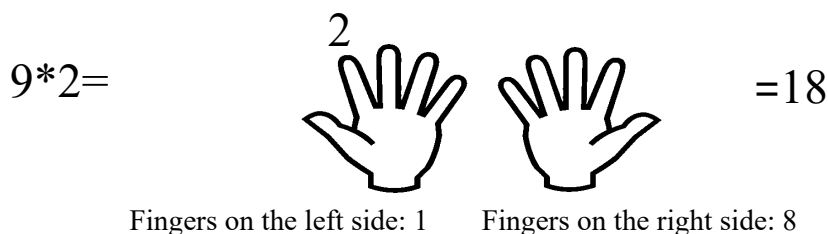
<u>1</u> = 07	<u>2</u> = 14	<u>3</u> = 21
<u>4</u> = 28	<u>5</u> = 35	<u>6</u> = 42
<u>7</u> = 49	<u>8</u> = 56	<u>9</u> = 63



Multiplication by 9 – Method One

The hand method is a useful, hands-on method for remembering the multiples of 9. It works up to 9*10.

1. Hold up ten fingers with your palms facing you.
2. Starting with your left thumb, count the number of fingers that is equal to the multiplier. (For 9*2, the multiplier is 2.)
3. Hold down the finger you stop on.
4. The number of fingers to the left of that finger is the tens place of the solution.
5. The number of fingers to the right of that finger is the ones place of the solution.



Multiplication by 8

This tabular multiplication trick helps you learn and remember the multiples of 8. The table method can be altered to also give multiples of 9 or 12. It works for all factors, like 8×32 .

Step 1

Starting at the top left of the page, count from 0 to 8, placing the numbers in a column and writing down multiples of 4 twice. (0, 1, 2, 3, 4, 4, 5...)

Note: Multiples of four include (4, 8, 12, 16, 20...) and can be found by adding 4 repeatedly.

Step 2

Starting at the top right corner, count down from 8 by even numbers. After you hit 0, start over at 8 and continue. (8, 6, 4...)

Step 3

Find the multiple of 8 you need. The first number is $8 \times 1 = 08$. If the pattern is repeated, any multiple of 8 can be found.

8	×	1	=	08
		2	=	16
		3	=	24
		4	=	32
		5	=	40
		6	=	48
		7	=	56
		8	=	64
		9	=	72
		10	=	80

Multiplication by 12

This tabular multiplication trick helps you learn and remember the multiples of 12. The table method can be altered to also give multiples of 8 or 9. It works for all factors, like 12×32 .

Step 1

Starting at the top left of the page, count from 0 to 14 or higher, placing the numbers in a column. Skip numbers that start with 5 or 1, (i.e. 5, 11, 15, 21...)

Note: The only exception to the skipping is number 1, (i.e. keep 0, 1, 2...)

Step 2

Starting at the top right corner, count from 0 to 8 by even numbers. After you hit 8, start over at 0 and continue. (0, 2, 4...)

Step 3

Find the multiple of 12 you need. The first number is $12 \times 0 = 00$. If the pattern is repeated enough, any multiple of 12 can be found.

12	×	0	=	00
		1	=	12
		2	=	24
		3	=	36
		4	=	48
		5	=	60
		6	=	72
		7	=	84
		8	=	96
		9	=	108
		10	=	120
		11	=	132
		12	=	144

Multiplication by 9 – Method Two

This tabular multiplication trick helps you learn and remember the multiples of 9. The table method can be altered to also give multiples of 8 and 12. It works for all factors, like 9×32 .

Step 1

Starting at the top left of the page, count from 0 to 15 or higher, placing the numbers in a column and writing down multiples of 9 twice. (...7, 8, 9, 9, 10 ...)

Note: Multiples of 9 can be found by writing twice any number that already occurs above. For example, 180 and 189 both get written because 18 shows up earlier.

Step 2

Starting at the top right corner, count down from 9 to 0. After you hit 0, start over at 9 and continue. (9, 8, 7...)

Step 3

Find the multiple of 9 you need. The first number is $1 \times 9 = 09$. If the pattern is repeated enough, any multiple of 9 can be found.

$9 \times 1 =$	09	
$2 =$	18	
$3 =$	27	
$4 =$	36	
$5 =$	45	
$6 =$	54	
$7 =$	63	
$8 =$	72	
$9 =$	81	
$10 =$	90	
$11 =$	99	
$12 =$	108	

Division Decision table

This decision table can help find if a number is divisible by other, smaller numbers.

A number is divisible by...	If the....	Example:
2	Last digit is even	168, since the last digit is even
3	Sum of the digits is divisible by 3	168, since $1+6+8=15$ and 15 is divisible by 3
4	Number formed by the last two digits is divisible by 4	316, since 16 is divisible by 4
5	Last digit is 5 or 0	195 or 200, since the last digits are 5 and 0 respectively
6	Number is divisible by both 2 and 3	168, since it is divisible by both 2 and 3 as shown above
8	Number formed by the last three digits is divisible by 8	7120, since 120 is divisible by 8.
9	Sum of the digits is divisible by 9	549, since $5+4+9=18$ and 18 is divisible by 9