

How to Solve MT Puzzles

This guide is a step-by-step explanation of how to solve MT Puzzles such as the ones on my web site at http://www.leonelearningsystems.com/mt_puzzles.htm. MT Puzzles were co-invented by Dr. Dor Abrahamson and Professor Karen C. Fuson. The puzzles on my site are an interactive adaptation of their paper-and-pencil version.

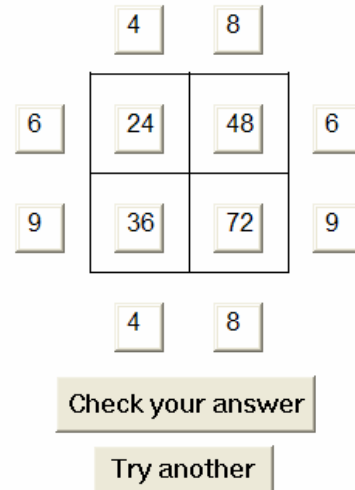
The pictures below show a multiplication table and a typical puzzle.

X	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

A 2x2 grid puzzle. The top-left cell contains the number 24, the top-right cell contains 48, and the bottom-right cell contains 72. The bottom-left cell is empty. There are empty boxes to the left and right of the grid, and above and below the grid, representing the factors of the numbers. Below the grid are two buttons: "Check your answer" and "Try another".

Here is the solution to the puzzle:

X	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100



Note that the numbers above and to the left of 24 are factors of 24. By that I mean that the numbers 6 and 4 multiply to 24: $6 \times 4 = 24$. Another way to say this that 24 is the product of 6 and 4.

We can also see that $6 \times 8 = 48$, $4 \times 9 = 36$, and $8 \times 9 = 72$. Finally, note that each factor outside the puzzle has an identical factor on the other side of the puzzle. For instance, there is a "9" both to the left of "36" and to the right of "72" on the lower row of the puzzle.

When all of the multiplications work as above, the puzzle is solved.

But how do you solve the puzzle?

The first step is to line up products from the multiplication table. We need to find a row that has both 24 and 48 in it. But we also need 48 to be in the same column as 72. I'm adding color to the multiplication table to show how you can use it to solve the puzzle. The table on my web site doesn't change colors.

X	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

The 24 and the 48 are both in the 6's row, so we put a 6 on the left and right side of the puzzle box, on either side of the 24 and 48. The 48 and the 72 are both in the 8's column, so we put an 8 above and below the puzzle box in column with 48 and 72:

X	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

Next, we fill in the rest of the numbers outside of the puzzle box. We ask ourselves, “6 times WHAT is 24?” The answer is 4, so we put a 4 above and below the puzzle box in the column that has the twenty-four. Next, we look at the 8 under the 72 and ask “eight times WHAT is seventy-two?” Eight times 9 is 72, so put 9 to the left and right of the row with a 72 in it.

You can also see where the 4 and the 9 come from by looking at the yellow that was added to the 4’s column and the 9’s row in the multiplication table.

X	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

A 2x2 grid puzzle. The top row contains boxes with numbers 4 and 8. The bottom row contains boxes with numbers 6 and 9. The left column contains boxes with numbers 24 and 72. The right column contains boxes with numbers 48 and 72. The bottom-right cell is empty. The numbers 4, 8, 6, and 9 are also placed in small boxes above and below the grid, and to the left and right of the grid.

Check your answer

Try another

Finally, since $4 \times 9 = 36$, we put a 36 in the remaining blank space, and the puzzle is solved!

X	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

	4	8	
6	24	48	6
9	36	72	9
	4	8	

Check your answer

Try another