

CROSS NUMBER

Mr. Merrick · Logic Puzzles

How to solve: Fill the grid so that every listed Across and Down clue is satisfied. These clues are intended to work together, so crossings matter. All clues are mathematical.

Puzzle 1

2×2

1	2
3	

Across

1. A two-digit prime whose digits sum to 10.
3. A two-digit square.

Down

1. A two-digit multiple of 9.
2. A two-digit triangular number.

Puzzle 2

3×3

1	2	3
4		
5		

Across

1. A three-digit square divisible by 9.
4. Another three-digit square divisible by 9.
5. A three-digit square that begins with 4.

Down

1. A three-digit number with strictly increasing digits whose digit sum is 9.
2. A three-digit Harshad number.
3. A three-digit number with strictly decreasing digits whose digit sum is 9.

Harshad number: A number that is divisible by the sum of its digits.

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Solutions and Reasoning

Puzzle 1

¹ 1	² 9
³ 8	1

Reasoning

- 1 Across is a two-digit prime whose digits sum to 10, so it must be 19, 37, or 73.
- 2 Down is a two-digit triangular number.
- Eliminating possibilities using crossings shows 1 Across must be 19.
- Then 2 Down is 91, forcing 3 Across to be 81.
- Finally, 1 Down becomes 18, a multiple of 9.

Puzzle 2

¹ 2	² 2	³ 5
⁴ 3	2	4
⁵ 4	0	0

Reasoning

- 1 Down has strictly increasing digits with sum 9, so it is 126, 135, or 234.
- Crossing constraints force it to be 234.
- This fixes leading digits of the Across entries.
- Then 1 Across is 225 and 4 Across is 324.
- 3 Down must be 540.
- This forces 5 Across to be 400.
- Finally, 2 Down is 220, a Harshad number.