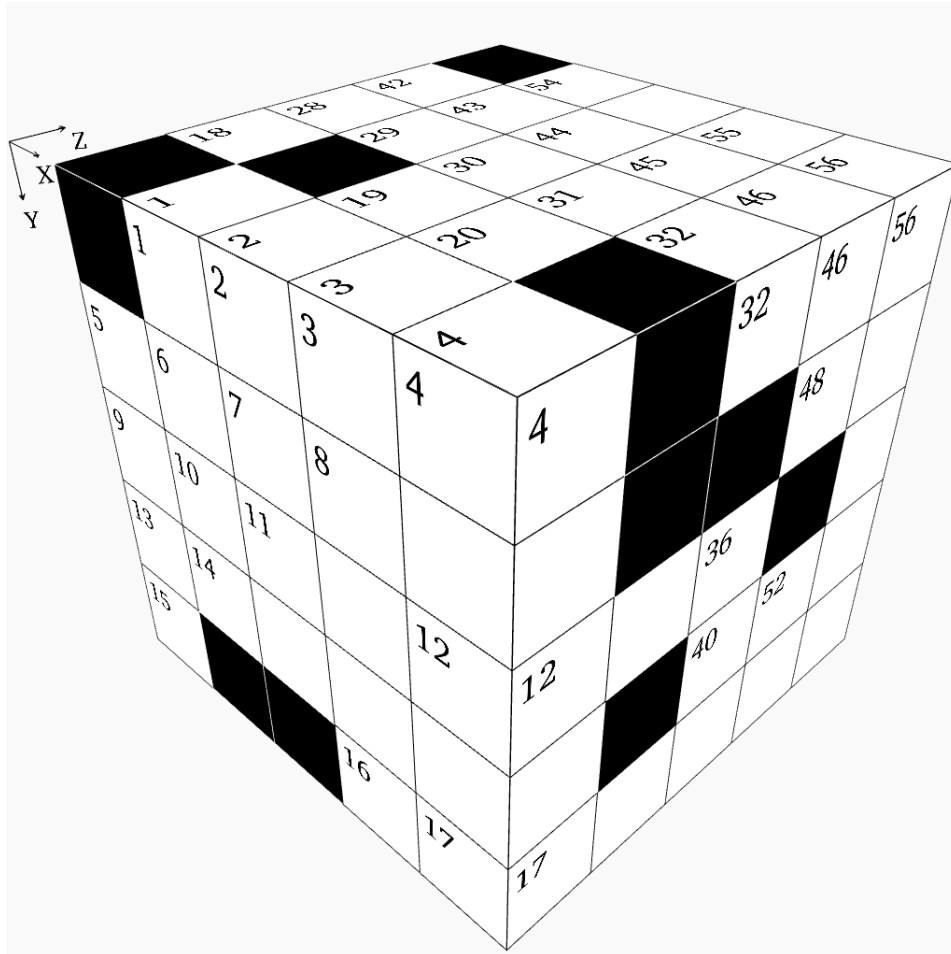


## Cube - Hard Puzzle #45



This puzzle is like a crossword, but with numbers. Each digit occupies a 3D block and can be a part of a "word" in the X,Y, and Z directions.

### Rules:

1. "Words" may not start with a zero.
2. "Words" in the X direction read from left to right.
3. "Words" in the Y direction read from top to bottom.
4. "Words" in the Z direction read from front to back.
5. There is one unique solution which satisfies all the clues given below.
6. Some "words" may not have clues. They will be determined by the "words" which intersect them.

If we take the cube pictured above and divide it into individual X-Y layers, we will get these planes:

1	2	3	4	18	19	20	28	29	30	31	32	
5	6	7	8	21	22	33						
9	10	11	12	23				34	35	36		
13	14			24				37	38	39	40	
15			16	17	25	26	27	41				
					42	43	44	45	46	54	55	56
					47			48	57			
					49			52	58	59		
					50	51		52	60			
					53				61		62	

### X Direction

- 1 A prime number
- 5 Twice the result of Z8 minus Y5
- 9 Three thousand one hundred seven more than Y22
- 13 A prime number
- 16  $X_{19} - Y_{52}$
- 19  $Z_{12} - Z_{32}$
- 21  $Y_4 - X_9$
- 23  $Z_{29} - \text{half of } X_{16}$
- 24  $Z_{48} + Y_{28}$
- 25  $Y_{20} + Z_{29}$
- 28 Twice a prime number
- 33  $X_{28} - Z_{13}$
- 34 Sixteen times a prime number
- 38 Thirty-one times Z48
- 41 Twice a prime number
- 42 Three thousand nine hundred thirty-four more than Z10
- 47 Ninety-seven times a prime number
- 49 Fifty times a prime number
- 50 A prime number
- 53  $Z_{18} - X_{57}$
- 54 Twice a prime number
- 57  $X_{53} - X_{62}$
- 58 Seven thousand eight hundred seventy-two less than Z11
- 60 Consecutive digits unordered
- 61  $Z_{18} - X_{16}$
- 62 Mean of  $Y_{20}$  and  $Y_{46}$

### Y Direction

- 1 Four times a prime number
- 2 Twice a prime number
- 3 Twice a prime number
- 4 Eighteen times a prime number
- 5 Fifteen times a prime number
- 18 Fifteen times a prime number
- 19  $Z_{32} + Z_{29}$
- 20 Mean of  $X_{62}$  and  $X_{19}$
- 22 Four times a prime number
- 28  $X_{24} - Y_{59}$
- 29  $Z_{40} - Z_{18}$
- 30  $Y_{31} + \text{half of } X_{19}$
- 31 All digits are the same
- 36  $Y_1 - Y_2$
- 37 Four-fifths of Z49
- 42  $Z_{18} + \text{half of } Z_{15}$
- 43  $Y_{55} - X_{34}$
- 44 Mean of  $Y_3$  and  $Y_{52}$
- 45 Two hundred ninety less than  $Y_{31}$
- 46 Mean of  $Y_{59}$  and  $X_{53}$
- 52  $X_{61} - Y_{28}$
- 54 Twice the result of  $X_{42} - Y_{22}$
- 55 Seven thousand seven hundred ninety-eight more than  $Y_{56}$
- 56  $X_{50} + \text{half of } X_{54}$
- 58  $Z_{26} - \text{divided by } Z_{48}$
- 59 A square

### Z Direction

- 2 Eight thousand sixty-seven more than Z11
- 3 Forty-seven times a prime number
- 5 A prime number
- 6 Three thousand eight hundred eleven less than Z17
- 7 Sixty-seven times a square
- 8 Six times a prime number
- 9  $X_{19} - X_{16}$
- 10 Sixty-three times a prime number
- 11 A prime number
- 12 A square
- 13 Consecutive digits unordered
- 14 Half of  $X_{62}$
- 15 Mean of  $Y_{43}$  and  $Y_4$
- 17 Nine thousand nine hundred thirty-nine less than  $X_{58}$
- 18  $X_{19} + Y_{28}$
- 26  $Y_{58} - Y_{59}$
- 27 Mean of  $Z_{38}$  and  $Y_{37}$
- 29 Seventeen times a prime number
- 32  $Y_{58} - X_{62}$
- 35 A prime number
- 38  $Z_{26} - \text{divided by } Z_{18}$
- 39 Three times a prime number
- 40  $X_{41} - X_{16}$
- 48 Sum of digits in  $Z_{35}$
- 49 Five times a prime number
- 51 Mean of  $X_{62}$  and  $Y_{52}$

**Solution:**

	7	6	2	1	1		9	8		7	4	1	9	4
3	3	6	1	8	5	9	7	9		4	4	0	9	
1	2	6	1	5	4	5	1		7		2	0	9	6
6	4	2	7	9	9	0				7		4	9	6
5			8	4	5	8	2		3	6	9	8		2

2	9	1	9	7		3	8	9	8
7	2	0	7	1		9		4	6
9	6	5	0		5	3	1	7	9
8	4	9	9	1	5	7	6	3	4
1	2	6		4	8	8		8	0