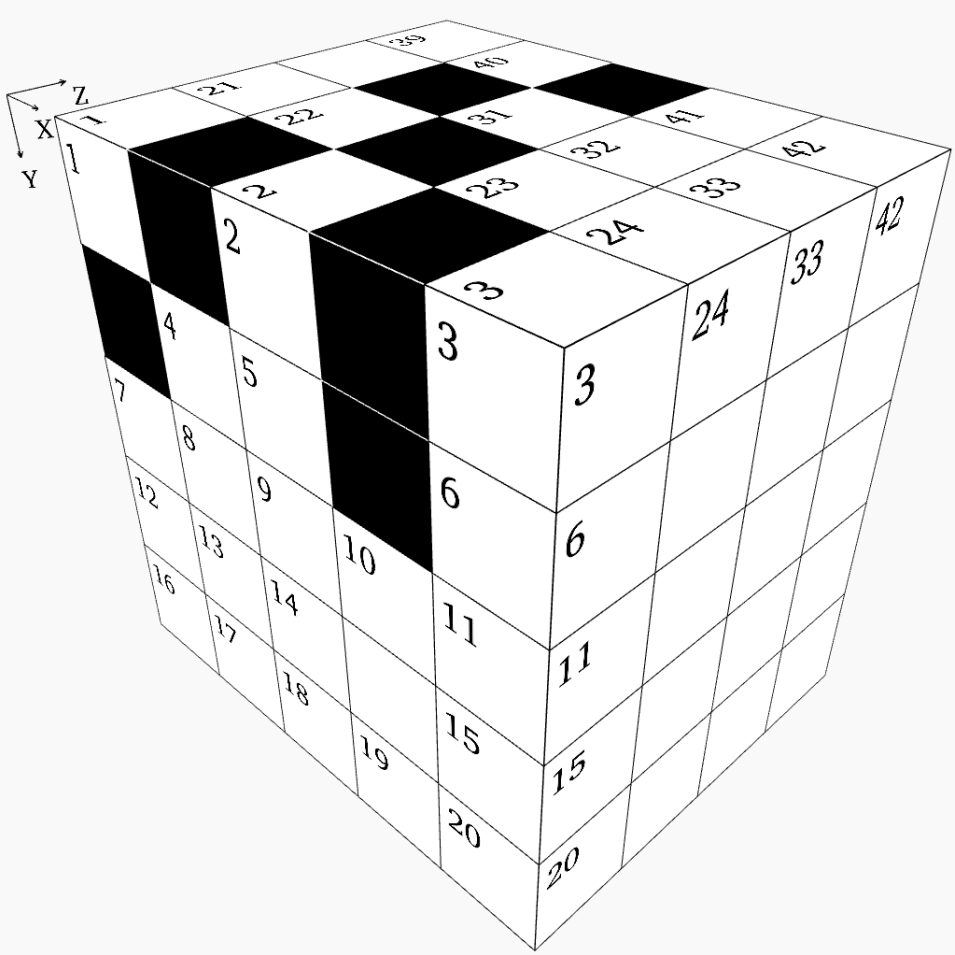
Difficulty: ★★★★☆

Box - Hard Puzzle #18

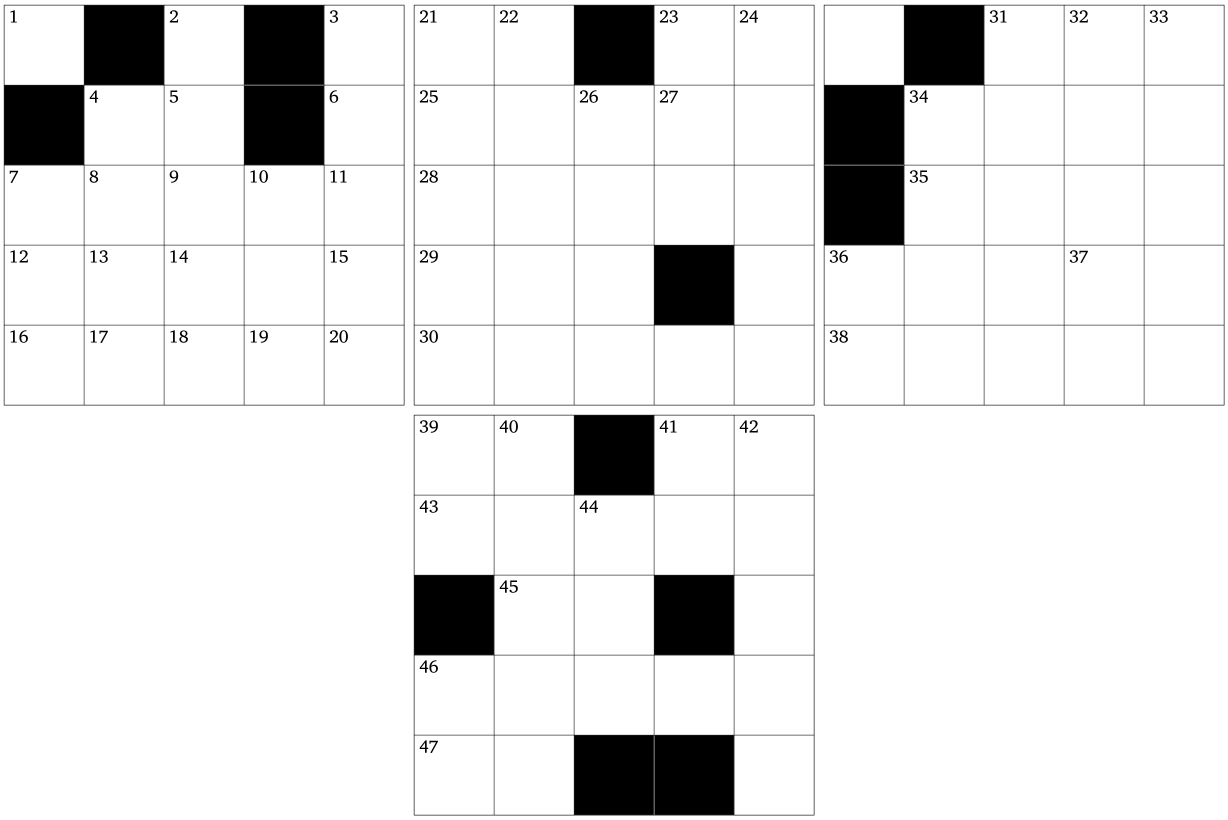


This puzzle is like a crossword, but with numbers. Each digit occupies a 3D block and can be a part of a "word" in the X,Y, and Z directions.

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 box pictured above and divide it into individual X-Y layers, we will get these planes:



X Direction

4 Same as Z7
7 Eighty-nine times a prime number
12 A prime number
16 Twice a prime number
21 X41 minus X23
23 X47 plus Z37
25 Twelve thousand nine hundred twenty more than X43
28 Seventy times a prime number
29 Z1 minus Z18
30 A prime number
31 A prime number
34 Eleven times a prime number
35 Thirty-nine times a prime number
36 Ten times a prime number
38 A palindrome
39 Mean of X41 and X21
41 Mean of Y7 and X21
43 Thirteen thousand five hundred eighty-three more than Y3
45 Mean of X47 and X23
46 Twenty times a prime number
47 Y46 minus Y36

Y Direction

2 X36 minus half of X23
3 Forty-six times a prime number
4 A prime number
7 Y41 plus Y39
10 Three times a prime number
21 Sixty-one times a prime number
22 Two thousand eight hundred fifty-one more than X36
23 Z23 minus Y39
24 Eleven times a prime number
26 Twelve times a prime number
31 Seven thousand one hundred thirteen more than X38
32 Twice the result of Y40 minus Y46
33 One thousand eight hundred fifty-three less than Y31
34 X28 minus Y26
36 Z37 reversed
39 X25 divided by Z4
40 Thirty times a prime number
41 Y39 plus Z37
42 Fifty-three times a square
44 Twenty-one times X21
46 Same as X39

Z Direction

1 Five times a prime number
3 Consecutive digits unordered
4 A prime number
5 Mean of Z13 and X4
6 Y42 minus Y33
7 Y44 divided by forty-two
8 Twice a prime number
9 Half of Y3, then subtract Y22
10 Twice the result of Y44 minus Y10
11 Eleven times a prime number
12 A square
13 Nine times a prime number
14 Thirty-two times a prime number
15 Y4 plus half of Y7
16 A prime number
17 Twice the result of X30 minus X34
18 Twenty-one times X45
19 Twice a prime number
20 Three hundred fifty-four more than Z9
23 Twice the result of X31 minus Z27
27 Three times a prime number
37 Mean of Y46 and Z7

Solution: