Crossnumbers

Quarterly

Lockdown Special   2020

A Little *Some*thing by Oyler

No entry starts with zero and all entries are distinct. Nine out of the ten digits are used in the puzzle. Factors and multiples are non-trivial. In order to resolve an ambiguity solvers must heed the title.
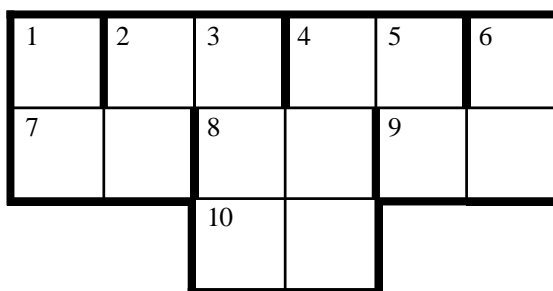
1	2	
3		4
5		

Across

2 its digit product is a square

3 prime

5 multiple of a cube

Down

1 triangular – 5ac

2 product of two consecutive numbers

4 sum of the entered digits

Backing or reversing BREXIT by Zag

Some liberties have been taken with the letters. Answers are unique none starting with a zero. Solvers have to identify the 3 entries consistent with the title.

1	2	3	4	5	6
7		8		9	
		10			

	Across		**Down**
2	NA	**1**	I + O – N
4	N + N	**2**	O + NA
7	IN	**3**	NH
8	B + B	**4**	BH
9	B + N	**5**	NB
10	NO – TB	**6**	NA + NA

Social Distancing by Moog

Since we are all now observing social distancing it appears that numbers are doing likewise. A socially distant number is one whose adjacent digits differ by two or more. So 169 is an example of a socially distant square number whilst 324 isn't. All entries exhibit social distancing. No entry starts with zero and all are distinct.

1	2	3	4	5
	6	7		
8	9		10	11
12			13	

	Across		**Down**
1	square	**1**	prime
3	square	**2**	prime
6	prime	**4**	cube
9	square	**5**	triangular
12	triangular	**7**	Lucas
13	Lucas	**8**	prime whose digit product equals another entry
		9	triangular
		10	square
		11	prime = sum of the entered digits

Superfriends by Zag

In time of lockdown it is essential to have superfriends. Now a friend may fall short and not prove to be a superfriend and conversely one who was not a friend may actually turn out to be a superfriend.

We say a number is friendly if it is divisible by the sum of its digits like 12=4*(1+2) or 324=36*(3+2+4). A number is **superfriendly** if the sum of the number and its digit sum is friendly like:

42(itself friendly) that becomes 48=42+4+2 with 48 also friendly equalling 4*(4+8) or

29(not friendly) that becomes 40, friendly.

All entries are unique superfriends, none starting with a zero.

1	2	3		4	5
6			7	8	
9	10		11	12	
	13			14	

Across

- **1** factor of 2dn
- **3** jumble of 13ac
- **6** adjacent prime to 11ac
- **8** digit sum of 7dn
- **9** reverse of 10dn
- **11** adjacent prime to 6ac
- **13** see 3ac
- **14** triangular

Down

- **2** see 1ac
- **3** see 7dn
- **4** factor of 9ac
- **5** jumble of 6dn
- **6** see 5dn
- **7** 3dn + superfriend
- **10** multiple of 8ac
- **12** square

Solutions to Lockdown Special

A Little *Some*thing by Oyler

¹5	²8	2
³1	7	⁴3
⁵4	0	9

3ac must end in 3 and 5ac/2dn must be even. 2ac can be 14/41, 19/91, 28/82 or 49/94. This reduces the 2dn possibilities to 156, 182, 210, 240, 420, 462 or 870 so 5ac ends in 0, 2 or 6 so is a multiple of 8 not 27. 1dn + 5ac is a triangular number. Taking that with 2dn and 3ac eliminates all on the 4dn criterion apart from the grid opposite with 4dn 39 or 36.

The dilemma of putting a 6 or a 9 in the bottom right hand corner cell is resolved by the title which was supposed to suggest a sum. So, 409 + 173 = 582.

Backing or reversing BREXIT by Zag

¹5	²1	³1	⁴1	⁵4	⁶2
⁷4	9	⁸1	0	⁹1	2
		¹⁰3	7		

The letters in the clues represented the atomic numbers of elements.

B = 5
N= 7
O = 8
NA = Na = 11
NB = Nb = 41
IN = In = 49
I = 53
TB = Tb = 65
NO = No = 102
BH = BH = 107
NH = Nh = 113

BREXIT reversed is TIXERB or Ti Xe Rb with atomic numbers 22, 54 and 37 respectively and those entries were to be highlighted in the grid.

Social Distancing by Moog

6ac/4dn fixes 4dn as 27. 3ac must end in 9 not 5 from 5dn clue. 5dn = 91. 13ac is 47 from 10dn not 29. 10dn = 64. 7dn must be 29 as no squares end 86. 9ac = 196. From 2dn 6ac = 727. At this point we can deduce that 11dn = 97. The only entries left are square, prime and triangular. 8dn can be 29, 37, 47, 53, 73, 79, 83 or 97. Of these only 53 can give a product that's another entry. 12ac = 351 and 9dn = 15 confirming 8dn. 1ac is now forced to be 81 and 2dn = 17. 1dn = 83 and 3ac = 729 not 529 from 11dn.

Superfriends by Zag

1 2	2 4	3 1	6	4 2	5 6
6 8	8	7 8	8 1		8
9 6	10 3	1	11 8	12 8	3
3	13 6	1	2	14 1	5

Potential entries are presented normally with, in italics, the sum of the number and its digit sum. If that sum is not friendly and ineligible is followed by an X.

12dn candidates are 16,*23*X; 25,*32*X; 36,*45*; 49,*62*X; 64,*74*X; 81,*90*. If 12dn=36 then 14ac=66,*78*X confirming 12dn=81, 14ac=10,*11*X or 15,*21*.

8ac is the digit sum of 7dn so is in the range 10 to 27 and calculating as above the unused superfriends are 18,21,24,27. Possible 10dn are 36, 54, 72, 90X, 42, 63, 84X, 48, 72, 96, 54, 81 (duplicate). All reverses are also possible so the 9ac,10dn,8ac are:

63,36,18 allowing 4dn=21; 45,54,18 no 4dn; 27,72,18 no 4dn.
24,42,21 4dn=12X; 36,63,21 also 4dn=12X.
84,48,24 4dn=42 or 12X; 27,72,24 no 4dn; 69,96,24 no 4dn.
45,54,27 no 4dn.

Candidate 4dn,8ac,9ac,10dn are 21,18,63,36 or 42,24,84,48. In the first case the 6 from 9ac must be the lead digit in 5dn (which has a prime ending from 11ac). The only 5dn superfriend candidate is 683 then 6dn is 863 or 368X. 11ac thus ends 83 and with 6ac starting 8 has to be 883. 6ac is either 881X or 887. 2dn candidates are 18(duplicate), 48 then 1ac=24.

The other case has 8 from 9ac as the 5dn lead digit with only 849 superfriendly with a prime ending. 6dn is 489 or 984X. 11ac ends 89, cannot be 489 (duplicate) and so 6ac cannot be an adjacent prime eliminating this possibility.

13ac with the 2 from 3ac is of the form 62? or 6?2 allowing 621, 626, 628, 612. The corresponding 3ac is 162 or 612, 662X, 682X or 862X, 162 confirming 13ac=621 or 612. 7dn with digit sum 18 from 8ac is respectively 981 or 882. If 13ac=621, 3dn can be 17? or 67? with valid entries 171, 176 or 177. 7dn-3dn is 810X, 805X or 804X confirming 13ac=612, 3ac=162, with the same 3dn options and 7dn-3dn=711, 706X or 705X establishing 3dn=171.