

NUMBER-NAMES REVISITED

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This revision upgrades one area of the original article, published on pages 83-90 of the May 2003 issue of Word Ways, and clarifies another area.

Fewest letters needed for each number of number-names

The first list attempted to set targets for the minimum number of letters needed to construct (one at a time) any given number of the number-names from 1 to 99, and the second list set upper limits to the minima by drawing on the words found in the bulk of the article. Dan Tilque soon produced some better results for the middle of the first list (a few included in this article), which led me to a serious attempt to find all the best solutions for every number of letters from 1 to 35 (the most needed to construct every number). It was never a trivial task, and actually makes a good brainteaser, because a solution for one number of letters does not necessarily lead to the next number of letters: you may need to throw away some letters, as well as replacing them and adding one. For example, you can find the optimum for 9 letters by successively adding a letter to one of the solutions for 7 and then one of the solutions for 8, but then, and again at 13 and 14, you have to discard some letters first. Moreover, the solution for 6 produces exactly the same number-names as that for 5. Furthermore, there are often a number of equally good solutions. The original article pointed out that getting the first few solutions was straightforward, but in the end I preferred to start from the known set of 35 letters for all the 99 number-names which was printed as a note on page 84: in either case, you do not have to consider letters additional to the 35. The shortest number-names all have three letters, although one might pretend the following list should start with A and AN! This list is actually arranged by column 2 (# lets), which contains each number of letters from 3 to 35: for each of these the list gives the maximum number of number-names that can be made (#nn). For the first part of the list, there is a column headed "word", which gives the number of letters found in the shortest words or phrases for that number of number-names. For reasons of convenience and space, the latter part of the list works by exception: only the missing names and numbers from 1-99 are listed.

Thus, alongside 10 letters in the second column, you will find two different sets of 10 letters, each set containing 9 number-names: but a 12-letter word is needed to contain this number of number-names. This list essentially replaces the first two lists and the table on pages 84 and 85 of the original. An asterisk indicates that the set of letters can make a word other than the number-name itself (only applies where the word contains the minimum number of letters for the number of number-names).

#nn	#lets	word	letters required to make the number-names indicated
1	3	3	ENO 1 ENT* 10 ISX* 6 OTW* 2
2	4	4	ENOT* 1 10
3	5	5	ENOTW* 1 2 10
	6	5	EENOT + any other letter makes no more number names than ENOTW, ie 1 2 10
4	7	7	EINNOTW* 1 2 9 10 EINNOTY* 1 9 10 90 ENOTTWY 1 2 10 20
5	8	8	EGHINNTY 8 9 10 80 90 EINNOTWY 1 2 9 10 90
			EINNSTXY 6 9 10 60 90 EINOSTXY* 1 6 10 60 61
7	9	9	EIINNSTXY* 6 9 10 60 69 90 96 EINNOSTXY 1 6 9 10 60 61 90
			EINNOTTWY 1 2 9 10 20 90 92

9	10	12	EIINNOSTXY	1 6 9 10 60 61 69 90 96	EINOSTTWXY	1 2 6 10 20 26 60 61 62
12	11	13	EINNOSTTWXY	1 2 6 9 10 20 26 60 61 62 90 92		
14	12	14	EEINNOSTTWXY	1 2 6 9 10 16 20 21 26 60 61 62 90 92		
			EIINNOSTTWXY	1 2 6 9 10 20 26 60 61 62 69 90 92 96		
18	13	17	EEFFIINNSTVXY	5 6 7 9 10 15 16 50 56 57 59 60 65 69 70 90 95 96		
21	14	17	EEFFINORSTUVXY	1 4 5 6 7 10 14 15 16 40 45 46 47 50 51 57 60 61 64 70 74		
			EEFFIINNOSTVXY	1 5 6 7 9 10 15 16 50 51 56 57 59 60 61 65 69 70 90 95 96		
26	15	23	EEFFIINNORSTVXY	1 5 6 7 9 10 15 16 40 45 46 47 49 50 51 56 57 59 60 61		
				65 69 70 90 95 96		
31	16	23	EEGHIINNORSTTWXY	1 2 3 6 8 9 10 13 16 20 21 26 30 31 36 39 60 61 62		
				63 68 69 80 81 82 86 89 90 92 96 98		
			EEFFIINNORSTUVXY	1 4 5 6 7 9 10 14 15 16 40 45 46 47 49 50 51 56 57		
				59 60 61 64 65 69 70 74 90 94 95 96		
			EEFFHINORSTTVWXY	1 2 3 5 6 7 10 13 15 16 20 25 26 30 31 37 40 45 46		
				47 50 51 52 53 57 60 61 62 63 70 72		

From here onwards, the third column is omitted since there are few relevant words, but there are phrases with 40 names in 24 letters, with 49 names in 37 letters, and with 58 in 43.

37	17	EEFGHIINNORSTTVXY	1 3 5 6 7 8 9 10 13 16 30 31 35 36 37 39 40 46 47 48 49			
			60 61 63 65 68 69 70 80 81 85 86 89 90 95 96 98			
46	18	EEFGHIINNORSTTVWXY	1 2 3 5 6 7 8 9 10 13 16 20 21 25 26 30 31 35 36 37 39			
			40 46 47 48 49 60 61 62 63 65 68 69 70 72 80 81 82 85 86 89 90 92 95 96 98			
		EEFFGHIINNORSTTVXY	1 3 5 6 7 8 9 10 13 15 16 30 31 35 36 37 39 40 45 46 47			
			48 49 50 51 53 56 57 58 59 60 61 63 65 68 69 70 80 81 85 86 89 90 95 96 98			

*NB From here onwards, the letters are those **omitted** from the full 35-letter set, and the numbers those **omitted** from the set 1-99.*

56	19	EEFGHLNNORSTUVWX	4 11 12 14 17 18 19 22 23 24 27 28 29 32 33 34 38 41 42			
			43 44 54 55 64 66 67 71 73 74 75 76 77 78 79 83 84 87 88 91 93 94 97 99			
63	20	EEFGHLNNORSTVWX	11 12 17 18 19 22 23 27 28 29 32 33 34 38 41 42 43 44 54			
			55 66 67 71 73 75 76 77 78 79 83 87 88 91 93 97 99			
69	21	EFGHLNNORSTVWX	11 12 17 19 22 23 28 29 32 33 34 38 41 42 43 44 54 55 66			
			67 73 75 76 77 79 83 88 91 97 99			
74	22	EFGHLNORSTVWX	11 12 17 22 23 28 32 33 34 38 41 42 43 44 54 55 66 67 73 75			
			76 77 83 88 99			
77	23	EFGHLNORSVWX	11 12 17 22 33 34 38 41 42 43 44 54 55 66 67 73 75 76 77 83 88 99			
79	24	EFGHLNORVWX	11 12 17 22 33 34 38 41 42 43 44 54 55 66 73 75 77 83 88 99			
79	24	EFGHLNRSVWX	11 12 17 22 33 34 38 43 44 54 55 66 67 73 75 76 77 83 88 99			
		EFGHLNSTVWX	11 12 17 22 23 28 32 33 38 54 55 66 67 73 75 76 77 83 88 99			
		EFGHNORSVWX	17 22 33 34 38 41 42 43 44 54 55 66 67 73 75 76 77 83 88 99			
		EFGLNORSVWX	11 12 17 22 33 34 41 42 43 44 54 55 66 67 73 75 76 77 88 99			
		EGHLNORSVWX	11 12 17 22 33 34 38 41 42 43 44 66 67 73 75 76 77 83 88 99			
		FGHLNORSVWX	11 12 22 33 34 38 41 42 43 44 54 55 66 67 75 76 77 83 88 99			
82	25	EFGHLNSVWX	11 12 17 22 33 38 54 55 66 67 73 75 76 77 83 88 99			
		EFGLNOSVWX	11 12 17 22 41 42 44 54 55 66 67 73 75 76 77 88 99			
85	26	EFGLNSVWX	11 12 17 22 54 55 66 67 73 75 76 77 88 99			
87	27	EFGLNVWX	11 12 17 22 54 55 66 73 75 77 88 99			
		EFGNSVWX	17 22 54 55 66 67 73 75 76 77 88 99			
		EGLNSVWX	11 12 17 22 66 67 73 75 76 77 88 99			
		FGLNSVWX	11 12 22 54 55 66 67 75 76 77 88 99			

89	28	EFGNVWX	17 22 54 55 66 73 75 77 88 99				
		EGLNVWX	11 12 17 22 66 73 75 77 88 99				
		EGNSVWX	17 22 66 67 73 75 76 77 88 99				
		FGLNVWX	11 12 22 54 55 66 75 77 88 99				
		FGNSVWX	22 54 55 66 67 75 76 77 88 99				
		GLNSVWX	11 12 22 66 67 75 76 77 88 99				
91	29	EGNVWX	17 22 66 73 75 77 88 99	FGLNWX	11 12 22 54 55 66 88 99		
		FGNVWX	22 54 55 66 75 77 88 99	GLNVWX	11 12 22 66 75 77 88 99		
		GNSVWX	22 66 67 75 76 77 88 99				
93	30	FGNWX	22 54 55 66 88 99	GLNWX	11 12 22 66 88 99		
		GNVWX	22 66 75 77 88 99				
95	31	GNWX	22 66 88 99				
96	32	GNW	22 88 99	GNX	66 88 99	GWX	22 66 88
						NWX	22 66 99
97	33	GN	88 99	GW	22 88	GX	66 88
				NW	22 99	NX	66 99
				WX	22 66		
98	34	G	88	N	99	W	22
						X	66

The number-names 1 to 99 need the letters shown:

99 35 EEEFFFGGHHIILNNNOORRSSTTTUVVWWXXY

Antidote - words which contain not one letter from any number-name, and words which do not contain any whole number name

Dan Tilque commented on the last paragraph headed Antidote (page 90): "just off the top of my head, I came up with BROADBAND, FOOLPROOF, and ABRACADABRA". He was provoked because the text was badly worded: the examples given contain just the letters ABCDJKMZ, which, along with P, are letters not used in the number-names 1 to 99. The idea was words which had no scintilla of a relationship to even a part of a number-name (ie no letter in common). On the other hand, words or phrases which contain no whole number-name are indeed abundant — well over a million. Some examples with their lengths (from the OED except where noted):

- 57 Al Jamahiriyyah al `Arabiyyah al Libiyyah ash Sha`biyyah al Ishtirakiyyah (Libya, 25° 0' N, 17° 0' E, NIMA)
- 40 San Antonio Missions National Historical Park: South Central Texas, Columbia Gazeteer
- 31 Trelease's beavertail pricklypear (ITIS plant)
- 31 National Vocational Qualification (Bloomsbury Thesaurus)
- 31 conjunctivodacryocystostomizing: (-stomy in Stedman)
- 30 dulce et decorum est pro patria mori (Chambers)
- 29 floccinaucinihilipilification
- 29 floccipaucinihilipilification: (1816 quote under previous)
- 27 Post Traumatic Stress Disorder
- 27 ("Structure and function of the glutamine **phosphoribosylpyrophosphate...**" J Biol Chem 1996 Jun 28;271)
- 27 Maurice Hugh Frederick Wilkins: Nobel laureate for DNA
- 23 anthropomorphologically
- 21 transubstantiationist
- 20 supercalifragilistic (OED supercalifragilisticexpialidocious)
- 20 indistinguishability
- 19 unconstitutionality

By now there are many of each length, for example 20000 or more OED headwords of length 12 like ABOLITIONIST. Before anyone spots it, I did not consider the obsolete spelling ninty!