ANAGRAM ARITHMETIC

ANIL
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eleven + two = twelve + one (Melvin Wellman, *Enigma*, April 1948)
thirteen + twenty – one = (ninety/two) – ten – three (Dave Morice, *WW* 92-244)

These are the only known pure number name anagram equations in English except rearrangements of their words. Naturally I exclude the infinite tautologies that swap whole digits (fifty-six+one = fifty-one+six). It's a matter of opinion whether to count tautologies that swap a non-digit suffix (**sixteen + four** = fourteen + six; **ninety • seven** = seventy • nine). Such suffix swaps occur in the teens in Spanish, Italian, French, Portuguese, German, Danish, Swedish, Norwegian, transliterated Russian, Slovene and Arabic, and no doubt other languages, but not Dutch, Welsh or transliterated Hebrew, Hindi, Chinese or Japanese.

Lee Sallows (92-59) found two SPANISH anagram equations that don't just swap a suffix,

trece + dos = doce + tres 13+2=12+3 = 15
catorce + uno = once + cuatro 14+1=11+4 = 15.

The first case swaps two suffixes, so is arguably also a tautology. But the second, like the Wellman and the Morice, is a superior anagram in that it rearranges some letters. Sallows also compounded these numbers into two 8-factor equations totalling 30 each, which are also superior.

I found additional "superior" anagrams in several languages.

>one ENGLISH, which turned out to be a rearrangement of Dave's digits. (Sorry, Dave. *Ouch!*)

twenty – thirteen + one = (ninety/ten) + two – three [=8; Dave's = 32]

>a long but informal ENGLISH (It's macaronic [*sex* = Latin six] and uses two plurals in lieu of multiplication signs. Still it's noteworthy as it's less tautological than any other letter anagram herein, uses all four operations plus powers and includes a very big number.):

(seventy+fifty)/(one trillion$^{-(\text{seven+four})}$ • *sex*) = (sixty+forty)/ten fives – nil • one • four elevens
$(70+50)/(10^{12-11}x6) = (60+40)/10x5 - 0x1x4x11$, or $120/60 = 100/50 - 0$ [= 2].

>DUTCH:

veertig en drei – vjiftien = tien + [dertig(vier – een)/vijf] 43 – 15 = 10 + [30(4 – 1)/5].

>HINDI, plus perhaps more for the same reason as Arabic (see below):

unatisa + sata = sattaisa + nau 29+7=27+9

>two ITALIAN, but a single letter-pair rearrangement:

quattordici + ôtto = diciôtto + quattro 14+8=18+4
quattordici + tre = tredici + quattro 14+3=13+4

>PORTUGUESE, using variant spellings for 1, masculine and feminine:

dezanove + um = dez + nove + uma 19+1=10+9+1

>nine WELSH word palindromes, where tri in the example can be replaced by any other digit:

un deg tri = (tri + deg)/un 13 = (3+10)/1

>four ARABIC, but all having the same single letter move, for example:

khamsta a'ashar + thalatha = thalathat a'ashar + khamsa 15+3=13+5

The others are like mixes of 15/5 with16/6 (sittat a'ashar/sitta), 17/7 (saba'at a'ashar/saba'a) and 18/8 (thamaniat a'ashar/thamania). Arabic (and Hindi) numbers have alternative English spellings, so yet more superiors may lurk there.

>and HEBREW:

taysha + eser = tasha esery 9+10=19.

ITALIAN (3), HINDI and ENGLISH yielded "inferior" Sallows' #1 type double suffix swaps.

novanta · sette = settanta · nove	90x7=70x9 (a single swap in English, above)
novanta · cinque = cinquanta · nove	90x5=50x9
settanta · cinque = cinquanta · sette	70x5=50x7
atthaisa + baraha = baisa + attharaha	28+12=22+18
one sexdecillion · one quintillion = one quindecillion · one sextillion	$10^{51}x10^{18}=10^{48}x10^{21}$

Other 8-factor equations are possible. #1-2, of Sallows type 1, are the same equation in ENGLISH and NORWEGIAN. #2 suggests Santa's reindeer! It's unique for Norwegian, but English has four more like #1 (skeletally 9+6=8+7) at 9+5=8+6, 9+3=7+5, 8+5=7+6 and 8+3=6+5.

1. **ninety + sixty + eighteen + seventeen = eighty + seventy + sixteen + nineteen**
2. **nitti + seksti + atten + sytten = atti + sytti + seksten + nitten**
   "On Nitti, on Seksti, on Atten and Sytten, on Atti, on Sytti, on Seksten and Nitten!"
3. **nitten + femten + seks + tre = seksten + tretten + ni + fem** 19+15+6+3 = 16+13+9+5
4. **sjutton + sexton + fem + tre = femton + tretton + sju + sex** 17+16+5+3 = 15+13+7+6
5. **neunzig + vierzig + achtzehn + funfzehn = achtzig + funfzig + neunzehn + vierzehn**
   90+40+18+15 = 80+50+19+14

The others, in DANISH (#3), SWEDISH (#4) and GERMAN, fall short of being Sallows type 1: #3-4 move two non-digit suffixes (-ten/-tten, -ton/-tton) but don't double swap; #5 double swaps but zehn is a digit, unlike zig or the suffixes in #1-4. #5 could also be reindeer.

Even longer equations are possible, but sheesh! I found no more good short equations of numbers below twenty in any language mentioned above. Other languages or higher numbers, anyone?

However, even the 'superiors'—including Wellman's (cf 06-51)—are not ideal: corresponding pairs are etymologically related, so far less coincidental than in a perfect anagram. This is only partially true of Dave's, the Dutch and my best two English, but in all the others including the Wellman mere changes of inflexion or usage keep them from being simple digit swaps.

I presented many arithmetic and mathematics anagrams in *up/dn* (WW monograph #5, '02), mostly with "helper" words and/or Roman numerals. Here is a rehash of those that did not need helper words, at least in the target, although some may verge on being tautologies.

Two · ten · twenty = net twenty^{two}
ten – V = net V
XV = VxV – X
octuple = couplet + couplet + couplet + couplet
octuple = couplet · couplet · couplet (The last three are polyanagrams.)

$D^2/(X\cdot V) = Vx2D$ $500^2/(10x5)=5x2x500$
$L^2/V = V\cdot 2L$ $50^2/5 = 5x2x50$
$X^2/V = 2X$ $10^2/5 = 2x10$ (The last three are palindromes.)

Variants of "eleven + two = twelve + one": (See 02-308 for many more coincidences here.)

one + twelve = two + eleven A word reversal of the classic that gives numerals
1 + 12 = 2 + 11 that make a palindrome as well as an anagram, and
I + XII = II + XI a palindrome in Roman numerals as well, or
I + XII = II + XI = XIII a polyanagram complete with the common answer.

PAIRED-DIGIT JOKE ANAGRAM EQUATIONS

I've surveyed all English digit pairings in various precarious hilarious/nefarious relationships. Here are the most fun results. They're free of helper words in the targets, but mostly do rely on helpers or Romans in the anagrams that complete or solve the equations. Few involve tautologies but most are playfully contrived. Please forgive and enjoy.

ADDITIONS	SOLUTIONS	RATIONALISATIONS
one + four	**= U of Nero**	U = V in Nero's Latin.
one + five	**= VI (no fee)**	a freebie (You're welcome.)
one + six	**=** ***sex*** **+ 1, no?**	Tautology or to*tal* orgy?
two + three	**= The W tore.**	One V was torn off the W (double V) to serve the cause.
two + nine	**= one + twin**	twin 1's = 11
three + seven	**= V? He's e'er** ***ten!***	*Not* five, you 1/2 wit!
seven + one	**= Nose even.**	The odd seven noses forward just enough to get even.
seven + eight	**= ten + V** ***(Gee-ish!)***	(*Almost amazing!*) In turn, ten + V =
ten + five	**= V-teen (*****if...*****)**	*If* you'll allow such macaronic miscegenation.

SUBTRACTIONS:

Ten – one	**= nonet.**	a palindrome, not an anagram
nine – eight	**=** ***eine*** **Thing**	another macaronic, a singular German monster (Hitler?)
seven – two	**= sweet V, no?**	This one's sugar-coated to make it more palatable.
seven – six	**= (X/V) – I 's seen.**	seen but not herd, a loner

five – zero	**= V (ie, froze)**	Subtracting zero will never melt away five's fiveness.
five – one	**= IV (no fee)**	Another freebie. My largess comes in symmetrical pairs.
one – one	**'E = 0 (none).**	'E is the invisible man.

MULTIPLICATION TIMES:

zero · nine	**= none-izer**	Zero, like a black widow, "eats" whatever it mates with.
one · eight	**= one "H" I get**	H, the 8th letter, counts as 8. C'mon, they even look alike.
two · ten	**= twento**	Twento is Oz slang for twenty. (Okay, I made it up.)
three · six	**= three+six+three+six**	This polyanagram looks like a tautology but isn't.

DIVISION Division:

two / one	**= neo two (new too)**	a double pun (neo=new, two=too) (a polyanagram)
four / two **4/2**	**Our *f* = two.** **= 4 – 2**	"half" tautology; *f* = function
six · four / eight **(4/8) · 6**	**= trio's huge fix** **= 6/(8/4)**	A roundabout way to say three. Better as a numeral anagram-palindrome inverse-tautology threeo.

POWERS THAT BE anagrams: Like $4/2 = 4-2$, and $2^2 = 2+2$, these are helperless. (poor things)

$\mathbf{1.618034^2 = 2.618034^1}$	$\mathbf{5^{6-2} = 625}$	$\mathbf{71^{(9+3)/(5-1)} = 357{,}911}$
$\mathbf{5^2 = 25}$	$\mathbf{4^{10/2} = 1{,}024}$	$\mathbf{4^{10+8+5-7-6} = 1{,}048{,}576}$
$\mathbf{11^2 = 121}$	$\mathbf{76^{7-5} = 5{,}776}$	$\mathbf{4^{4+4+3(10-9)} = 4{,}194{,}304}$
$\mathbf{2^{8-1} = 128}$	$\mathbf{105^{2/1} = 11{,}025}$	$\mathbf{55^{9-6-1+2+0} = 9{,}150{,}625}$
$\mathbf{6^{1+2} = 216}$	$\mathbf{33^{5+7-9} = 35{,}937}$	$\mathbf{36^{6+7(8+2-7-2-1)} = 217{,}678{,}236}$
$\mathbf{(3+4)^3 = 343}$	$\mathbf{49^{7-6+1+1} = 117{,}649}$	$\mathbf{19^{7+3(7-7)+3(8-8)} = 893{,}871{,}737}$

The first item is the Fibonacci ratio squared. The rest are some sixth of those I found with a pocket calculator. They are infinite in number at higher powers, where the answer will almost always contain both the base and the power factor digits. This makes big ones trivial and uninteresting as most of the digits have to be zeroed away like in the last two examples.

ACROSTIC EQUATIONS, invented by Dave (96-179; cf 08-153), resemble anagram equations a bit. They spell numbers with the initial letters or Roman numerals of other numbers; eg:

TEN = **T**wenty + **E**ighty – **N**inety; **TEN** = **T**wo + **E**ight + **N**il; **SIX** = **S**eventeen – **I** – **X**.

SUMAGRAM or REDUCTIVE ANAGRAM EQUATIONS

Daniel Austin (04-134) introduced and explored SUMAGRAMS, not equations but using number name anagrams and arithmetic of sorts. They spell out words by adding, subtracting and rearranging the letters of numbers; eg, **envoys** = six**ty**-**one** + **s**e**v**en – sixteen. They can spell any number (of numbers). Is there any number whose sumagram can be arrayed arithmetically to equal the number itself, creating an equation? For a start, to avoid tautologies, it can't be a number used to generate the alphabet (0, 2 through 11, 16, 20, 40, 68, 80, 86, 1000, million, billion, trillion, quintillion, septillion, octillion, nonillion, decillion). Without computer aid, the search is pretty well limited to numbers containing only E, I, N, O, T, U, W or Y because all the other letters' sumagrams contain or rely on the letter R, whose sumagram includes both trillion and nonillion, too unweildy for mere mortals. The exception to this limitation is numbers containing *two* R's and/or two of any other forbidden letters, so that they can "cancel out". In fact, to my surprise, I found a solution for every number meeting both criteria. First, here's how the numerical values of the "easy" letters were obtained (after Austin; indentations indicate the order in which they were derived):

E = 0 = SIXT**E**EN – SIX – TEN = 16 – 6 – 10
I = -47 = N**I**NE – N – N – E = 9 – 28 – 28 – 0
N = 28 = TE**N** – T – E = 10 + 18 – 0
O = 64 = TW**O** – T – W = 2 + 18 + 44
T = -18 = SIX**T**Y-EIGHT – EIGHTY-SIX = 68 – 86
U = 18 = FO**U**R + T + Y – FORTY = 4 – 18 + 72 – 40
W = -44 = T**W**ENTY – T – E – N – T – Y = 20 + 18 – 0 – 28 + 18 – 72
Y = 72 = EIGHT**Y** – EIGHT = 80 – 8

The sumagram equations of TRUTHFUL NUMBERS:
one = $(O + N)^E = (64+28)^0 = 1$ (This **one** is the best of the lot, being in correct spelling order.)
nineteen = N/N – T + E(I+E+E+N) = (28/28) + 18 + 0(-47+0+0+28) = 1+18+0 = 19
twenty-one = O + W + T/T + E(N+N+Y+E) = 64 – 44 + 1 + 0 = 21
twenty-two = T–T – (W+W)/(Y/T) + E(N+O) = (-18+18) –88/(72/-18) +0(28+64) = 88/4 = 22
twenty-nine = N + T/T + E(N+N+W+E+Y+I) = 28 + 1 + 0 = 29
thirty-three = $-(T+T) - H/H - R/R - (I+T+Y+E)^E = 36 - 1 - 1 - (72+47+18+0)^0 = 34 - 1 = 33$
forty-four = (F – F) + (O/O + R/R)(U – Y/T) = 0 + 2(18 – [72/-18]) = 2(22) = 44
sixty-six = -(I+T) + (S/S) + (X – X)(I+Y) = -(-47 – 18) +1 + 0(72 – 47) = 65 + 1 + 0 = 66
seventy-seven = $Y - T - N/(S/S+V/V)+N^E+E+E+E = 72+18 - 28/2 + 28^0+0+0+0 = 90-14+1=77$
eighty-eight = E(E + I/I +T) –(G/G +H/H +T) +Y = 0(0+1-18) –(1+1–18) +72 = 0+16+72 = 88
ninety = Y – T + E(N+N+I) = 72 + 18 + 0(28+28–47) = 90
ninety-one = Y – T + N/N + E(I+O+N+E) = 72 + 18 + 1 + 0 = 91
ninety-two = $Y - T + N/N + (I/T/W/O)^E = 72 + 18 + 28/28 + (-47/-18/-44/64)^0 = 90+1+1 = 92$
ninety-nine = Y + N –N/N + E(N+I+T+I+E) = 72+28–1+0 = 99

ALPHANUMERIC "ANAGRAM" EQUATIONS

In the Feb. issue (11-34) Susan Thorpe introduced NUMERICAL CHARADE TAUTONYMS in which arithmetical manipulations of the gematrial values (A=1, Z=26, etc) of the left- vs. right-hand letters of numerous words can be set equal; eg, QUADRILLION = 17+21+1–4+18+9 = 12+12+9+

15+14 = 62. But 62 ≠ quadrillion. Are there any number words that split into such charades so that the two sums equal the named number (or half of it each)? I'll leave that one for Susan, but she inspired me to ask if there are any numbers whose arithmetised gematrial values equal the number itself. Such cases too would join the junior ranks of TRUTHFUL NUMBERS. I managed to find a few below twenty but stopped there. The longer the number name the easier it is to find fits. As well, since several short numbers proved intractable I didn't feel the usual urge to completeness.

These superior gematrial equations retain the spelling order and thus are charades, so to speak:

one	$= (15 - 14)^5$	= 1
three	$= 20/(-8 + 18) + 5/5$	= 3
seven	$= -(19 + 5 - 22 + 5) + 14$	= 7
ten	$= -(20/5) + 14$	= 10
fourteen	$= 6 + 15 - 21 + 18 + 20 - 5 - 5 - 14$	= 14
fifteen	$= 6 + 9 + 6 - 20 + 5 - 5 + 14$	= 15
sixteen	$= -(19 + 9 - 24) + 20 + (5 - 5)14$	= 16
seventeen	$= -(19 + 5 - 22 - 5) + 14 + 20(5 - 5)/14$	= 17
nineteen	$= -(14 + 9 - 14 + 5 - 20 + 5)5 + 14$	= 19
twenty	$= -20(23 - 5 - 14 + 20 - 25)$	= 20

while these 'anagrams' required rearranging the order of the values, so are somewhat inferior:

eight	$= 8(5 + 9 + 7 - 20)$	= 8
nine	$= 9 + 5(14 - 14)$	= 9
eleven	$= 22 - 12 + (14 + 5)^{(5-5)}$	= 11
twelve	$= 12 + (5 - 5)(20 + 22 + 23)$	= 12
thirteen	$= 14 - (20 + 8 - 9 - 18) + (5-5)(20 + 14)$	= 13
eighteen	$= 20 + 7 - 9 + (5 - 5)(5 + 8 + 14)$	= 18

NUMBER ALPHOMES: a quiz (Answers are out back.)

1. Name the only English number that is its own alphome, ie, is spelt in alphabetical order.

2. Name the one English number that is a reverse alphome.

3. Find mentioned above the only alphome in Spanish, Portuguese and Danish, two in Dutch and two in German (same as the Danish and one of the Dutch, in a compound). None is mentioned among the other languages, excluding two-letter words (in the whole quiz) for obvious reasons.

4. Also cited are one reverse alphome number each in Italian-Danish-Swedish-Norwegian (same word), in Russian-Slovene-Welsh (same word) and in Portuguese. Find these three words.

5. There are only six alphomes and one or no reverse alphomes in the languages cited that are not mentioned in the article. Can you complete the list? They are one alphome each in Swedish and Russian, four in French, and one debatable reverse alphome in Arabic. Unless you're a polyglot you'll need help from Google or up to five dictionaries here.