WORD SUMS (NO CARRYING!)

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The simplest form of arithmetic that we all learn in grade school is addition. Each of us has spent countless hours over problems like 123 + 456 = 579.

There are several ways to do the same thing with words. For example, Cryptarithms (or Alphametics) are puzzles where letters have been substituted for the digits in an arithmetic problem. Most people have seen such puzzles as SEND + MORE = MONEY in which one substitutes digits for letters to obtain a valid arithmetical sum. Numerous books of such puzzles have been published; see the November Word Ways for the review of a recent one by Steve Kahan.

The Word Sum is a form of word addition closer to the spirit of Word Arithmetic. In Word Sums, each letter has its natural value, namely A=1, B=2 through Z=26. The letters in the Word Sum are added in each column. If the sum in a column is greater than 26 it is reduced by 26. That is, after Z you wrap around to A again. For example, T+R is 20+18 or 38; this is reduced by 26 to 12 or L. There is no carrying from one column of the sum to another. (When carrying is allowed, one has Base 27 addition as discussed in the May 1993 Word Ways by Lee Sallows.)

The sum ABAFT + OCCUR = PEDAL can be set up as

| ABAFT | 1 2 1 6 20 |
| OCCUR | 15 3 3 21 18 |
| PEDAL | 16 5 4 1 12 |

Using the Merriam-Webster Pocket Dictionary (1994 edition), there are 705 such sums using five-letter words. Using a larger dictionary, of course, would result in many more. Some of the sums form amusing phrases, or even complete sentences:

ADULT + FEAST = GIVEN
AMEND + JADED = KNISH
APPLY + ROBIN = SERUM
BLAZE + FIRST = HUSSY
BOOST + MOOSE = ODDLY
CHASE + PITHY = SQUAD
CINCH + PEARL = SNOT
CLOSE + DITSY = GUILD
FETCH + MOULD = STOOL

FORCE + MECCA = STUFF
FOUND + METAL = STOOP
INLAY + TARDY = CODEX
KNOCK + SATIN = DOILY
MOTEL + SWUNG = FLOSS
SNIPS + TACKY = MOLAR
TWIST + THICK = NERVE
WEDGE + SPLIT = PUPPY
In some cases the words are remarkably related:

ARENA + HOGAN = IGLOO  PHONY + VAGUE = LIVID
MIAMI + PLANE = CUBAN  SENSE + SPORT = LUCKY

including one amazing pair of sums:

HOLLY + SKIFF = AZURE  HOLLY + TWIST = BLUES

Here are a few other five-letter Word Sums I liked for various reasons:

GIANT + MIZEN = TRASH  LAYER + ANVIL = MOUND
GROSS + VIOLA = CADET  MODEL + STAIR = FIEND
INERT + JUICY = SINUS  RAYON + SHORE = KINGS

Moving on to six-letter words, the Word Sums become a good deal rarer. Four of them used abbreviations; I list the remaining 51:

AFRAME + OUTSET = PALTRY  DIMITY + WIGWAM = ARTFUL
AGHAST + SHEAVE = TOMBOY  DISARM + PRINCE = TABOUR
AMULET + UNHOOK = VACATE  DREDGE + LIMPET = PARTLY
ANIMUS + GAILEY = HORROR  DROWSE + OCCULT = SURREY
ANTHEM + CURSOR = DILATE  ELICIT + OFFICE = TROLLY
ANYONE + LASCAR = MORROW  EMETIC + REVOKE = Wraith
ASLANT + SOFTEN = THURSH  FLOPPY + LOOSEN = RADIUS
ASSIGN + BOVINE = CHORUS  FRIDAY + MIKADO = SATEEN
BAUBLE + SOUGHT = UPPITY  GANTRY + INDUCT = POROUS
BRANCH + PIMPLE = RANDOM  GARDEN + INTENT = POLISH
BREEZE + CAYMAN = ESDRAS  GENIUS + TARIFF = AFFRAY
BRONCO + KINDLY = MACRON  GRIPPE + KITSCH = RACISM
BRONZE + CANDOR = ESCROW  HERETO + SHAGGY = AMSLAN
BRONZE + CANTER = ESCHEW  IMMURE + TRENCH = CERIUM
BUSILY + UNLESS = WIENER  LINNET + TRUDGE = FAIRLY
CAUGHT + ROUBLE = UPPITY  LISSOM + WETHER = INMATE
CAVEAT + INSIDE = LOONEY  MANIOC + UNABLE = HOOKAH
CAYUSE + INSIST = LORDLY  MEDdle + VIRAGO = INVEST
CHARGE + HAMLET = KINDLY  MINION + URGENT = HAUNCH
CHILLI + TACTIC = WILFUL  ODDITY + RANSOM = GERBIL
CLOVEN + EOCENE = HARASS  PREFIX + ZINNIA = PASTRY
CORDON + PAWNEE = SPORTS  SALVER + VAGINA = OBSESS
DANGLE + INFEST = MOTLEY  SLEEVE + WORKER = PAWPAW
DEMODE + WIGWAM = ANTLER  UNHOOK + WALLET = ROTATE
DENGUE + SCULPT = WHISKY  VOLUTE + WEIGHT = STUBBY
DESPOT + Wamble = AFFRAY

With a word length of seven letters, there are only four possible Word Sums in this dictionary:

CRINKLE + MARXISM = PSALTER  PIGSKIN + WRESTLE = MALLEUS
OSMOSIS + SHARPEN = HANGING  PLACEBO + ROMANCE = HANDSET
There are no Word Sums in the Pocket Dictionary using two eight-letter summands or addends. In order to get to longer words it is necessary either to use a larger dictionary, or to use more than two summands. I chose the latter course since the number of combinations is much higher, so that more solutions would be likely, and it is more likely to produce solutions longer than eight letters.

Using the Pocket Dictionary with three eight-letter summands there are 195 possible Word Sums. None of them formed particularly interesting phrases, or involved four related words. The following 27 seemed the best of the lot:

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\begin{align*}
\text{ARTIFICE} + \text{QUANTITY} + \text{ACTUALLY} &= \text{SPORADIC} \\
\text{AIRSPACE} + \text{DECEDED} + \text{MUSICIAN} &= \text{RINGWORM} \\
\text{ALEHOUSE} + \text{DRUNKARD} + \text{DIPSTICK} &= \text{IMPOTENT} \\
\text{ALPHABET} + \text{ELEPHANT} + \text{MEMORIAL} &= \text{SCHMALTZ} \\
\text{SHIPMENT} + \text{ALTHOUGH} + \text{SURPRISE} &= \text{MOUNTING} \\
\text{ARMYWORM} + \text{JUNCTION} + \text{RETARDED} &= \text{CRUCIBLE} \\
\text{MANDOLIN} + \text{OVERVIEW} + \text{ARTISTIC} &= \text{COMEDOWN} \\
\text{BESMIRCH} + \text{CHEYENNE} + \text{CHEYENNE} &= \text{HUCKSTER} \\
\text{SUDANESE} + \text{TRIMMING} + \text{BIRDBATH} &= \text{OVERCOAT} \\
\text{DIPSTICK} + \text{LEGATION} + \text{BUILDING} &= \text{RIFFRAFF} \\
\text{CHANUKAH} + \text{ILLUMINE} + \text{STRINGER} &= \text{ENERVATE} \\
\text{DESOLATE} + \text{VARIABLE} + \text{CICERONE} &= \text{CONCERTO} \\
\text{PRECIOUS} + \text{VIBRATOR} + \text{CONQUEST} &= \text{OPULENCE} \\
\text{VIGILANT} + \text{DERRIERE} + \text{HANDBILL} &= \text{HOMEWORK} \\
\text{DISUNITE} + \text{POLITICS} + \text{INVITING} &= \text{CLAMBAGE} \\
\text{HEIGHTEN} + \text{PREMOLAR} + \text{DOMINION} &= \text{BLACKOUT} \\
\text{DUTIABLE} + \text{RELATIVE} + \text{WELNHGH} &= \text{SERVITOR} \\
\text{PARAKEET} + \text{TORTOISE} + \text{DYESTUFF} &= \text{NOONTIDE} \\
\text{EVALUATE} + \text{INTEGRAL} + \text{TERRAPIN} &= \text{HOMICIDE} \\
\text{GUNPOINT} + \text{FISHBOWL} + \text{SATURDAY} &= \text{FEASIBLE} \\
\text{PLEASING} + \text{GENETICS} + \text{PRACTICE} &= \text{MITIGATE} \\
\text{REABSORB} + \text{PERVERSE} + \text{HEADGEAR} &= \text{POTBELLY} \\
\text{REASSIGN} + \text{PREMOLAR} + \text{HOUSEFLY} &= \text{PLAYMATE} \\
\text{HUNTRESS} + \text{MANEUVER} + \text{RELEVANT} &= \text{MANDIBLE} \\
\text{LAMBASTE} + \text{MUSTACHE} + \text{TICKLISH} &= \text{SEIGNEUR} \\
\text{LUKEWARM} + \text{PRESSING} + \text{UNDERCUT} &= \text{WATCHMAN} \\
\text{SANCTION} + \text{VENGEFUL} + \text{THRUSTER} &= \text{INTERIOR}
\end{align*}
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Proceeding to nine-letter words, there are only three combinations that work. They are:

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\begin{align*}
\text{IBUPROFEN} + \text{INFLATION} + \text{LORGNETTE} &= \text{DESIGNING} \\
\text{INCLEMENT} + \text{MINCEMEAT} + \text{TURPITUDE} &= \text{PRIESTESS} \\
\text{REPULSION} + \text{SUBDIVIDE} + \text{TRIENNIAL} &= \text{ERADICATE}
\end{align*}
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