Periods of duplication in the combinations

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | **Induction** |
| **R0** | **3** | **6** | **9** | **12** |  |
|  | 1-2  1 good  1 dupe  3-6 dupe | 1-30  3 good  3 dupe  31-75 dupe | 1-560  10 good  10 dupe  561-1680 dupe | 1-11550  35 good  35 dupe  11551-34650 dupe | The length of the alternating sequence is 1/3 of the total. The rest are duplicates.  The period of alternation is C(n, r) where r is (clubs / 3) – 1 and n is 2r + 1. |
| **R1** | **4** | **7** | **10** | **13** |  |
|  | 1-6  1 good  1 dupe | 1-210  3 good  3 dupe | 1-4200  10 good  10 dupe | 1-90090  35 good  35 dupe | The entire length is an alternating sequence.  The period of alternation is C(n, r) where r is (clubs / 3) – 1 and n is 2r + 1. |
| **R2** | **5** | **8** | **11** | **14** |  |
|  | 1-12 good  13-21 2/1  2 dupe  1 good  22-30 dupe | 1-210 good  211-360 3/2  6 dupe  4 good  361-460 9/1  9 dupe  1 good  461-560 dupe | 1-4200 good  4201-7140 4/3  20 dupe  15 good  7141-9100 6/1  30 dupe  5 good  9101-10325 34/1  34 dupe  1 good  10326-11550 dupe | 1-90090 good  90091-152460 5/4  70 dupe  56 good  152461-194040 15/3  105 dupe  21 good  194041-220500 20/1  120 dupe  6 good  220501-236376 25/1  125 dupe  1 good  236377-252252 dupe | See next page |

R2 data

|  |  |
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| Number of clubs, or blank to stop: 5  good 12  3 x dupe/good (total 9) 2/1  dupe 9  Number of clubs, or blank to stop: 8  good 210  15 x dupe/good (total 150) 6/4  10 x dupe/good (total 100) 9/1  dupe 100  Number of clubs, or blank to stop: 11  good 4200  84 x dupe/good (total 2940) 20/15  56 x dupe/good (total 1960) 30/5  35 x dupe/good (total 1225) 34/1  dupe 1225  Number of clubs, or blank to stop: 14  good 90090  495 x dupe/good (total 62370) 70/56  330 x dupe/good (total 41580) 105/21  210 x dupe/good (total 26460) 120/6  126 x dupe/good (total 15876) 125/1  dupe 15876  Number of clubs, or blank to stop: 17  good 2018016  3003 x dupe/good (total 1387386) 252/210  2002 x dupe/good (total 924924) 378/84  1287 x dupe/good (total 594594) 434/28  792 x dupe/good (total 365904) 455/7  462 x dupe/good (total 213444) 461/1  dupe 213444 | 5  12 good inf  9 2:1 2:1 3/4 3  9 dupe inf  8  210 good inf  150 6:4 3:2 5/7 15  100 9:1 9:1 4/6 10  100 dupe inf  11  4200 good inf  2940 20:15 4:3 7/10 84  1960 30:5 6:1 6/9 56  1225 34:1 34:1 5/8 35  1225 dupe inf  14  90090 good inf  62370 70:56 5:4 9/13 495  41580 105:21 15:3 8/12 330  26460 120:6 20:1 7/11 210  15876 125:1 25:1 6/10 126  15876 dupe inf  17  2018016 good inf  1387386 252:210 6:5 11/16 3003  924924 378:84 9:2 10/15 2002  594594 434:28 31:2 9/14 1287  365904 455:7 65:1 8/13 792  213444 461:1 461:1 7/12 462  213444 dupe inf |

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| --- | --- | --- | --- |
| # runs | an all good run | clubs // 3 | an all dupe run |
| run lengths | combos(clubs - 1) | start: clubs – 2 / clubs – 1. num & denom -= 1 each time  alternatively (# of alternations)  start: C(n,r) where r = clubs//3 and n = 3r  then: work upwards take C(n-1,r) | = last alternating run |
| run periods | all good | start: C(n,r):C(n,r+1) where r = clubs//3 and n = 2r  then: work upwards take C(n-1,r-1). Add it to the left side and subtract it from the right side. | all dupe |