

Divisibility I (Continues a Bit More)

Divisibility by 7 and 11.

Problem 1. How can you quickly determine whether a number is divisible by 11?

Consider that the following numbers are divisible by eleven:

121, 132, 143, 154, 165, 176, 187, 198, 209
220, 231, 242, 253, 264, 275, 286, 297, 308
319, 330, 341, 352, 363, 374, 385, 396, 407
10021, 10032, 10043, 10054, 10065, 10076
11022, 11033, 11044, 11055, 11066, 11077
12023, 12034, 12045, 12056, 12067, 12078
12122, 12133, 12144, 12155, 12166, 12177

Problem 2. Now for the hard one, how can you reasonably quickly determine whether a number is divisible by 7? (The approach is related to the approach for 11.)

Consider that the following numbers are divisible by seven:

77, 84, 91, 98
105, 112, 119, 126, 133, 140, 147, 154, 161, 168
203, 210, 217, 224, 231, 238, 245, 252, 259, 266
301, 308, 315, 322, 329, 336, 343, 350, 357, 364
931, 938, 945, 952, 959, 966, 973, 980, 987, 994
1001, 1008, 1015, 1022, 1029, 1036, 1043, 1050
2002, 2009, 2016, 2023, 2030, 2037, 2044, 2051
3003, 3010, 3017, 3024, 3031, 3038, 3045, 3052
10003, 10010, 10017, 10024, 11031
11004, 11011, 11018, 11025, 11032
20006, 20013, 20020, 20027, 20034
100002, 100009, 100016, 100023
999999, 1000006, 1000013

Making use of divisibility rules.

Problem 3. Figure out whether the following numbers are divisible by 2, 3, 5, 7 or 11. Circle the appropriate divisors.

85785 : 2 3 5 7 11

24794 : 2 3 5 7 11

80625 : 2 3 5 7 11

57233 : 2 3 5 7 11

69286 : 2 3 5 7 11

Problem 4. List all the prime numbers less than 150. (A prime number is a positive integer that has only two divisors, 1 and itself. Note that one is not a prime number.)