**Harold’s Prime Numbers**

**Cheat Sheet**

22 October 2022

**Prime Numbers**

|  |  |  |
| --- | --- | --- |
| **Range** | **#** | **Prime Numbers** |
| 1 to 100 | 25 | 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97 |
| 101-200 | 21 | 101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199 |
| 201-300 | 16 | 211, 223, 227, 229, 233, 239, 241, 251, 257, 263, 269, 271, 277, 281, 283, 293 |
| 301-400 | 16 | 307, 311, 313, 317, 331, 337, 347, 349, 353, 359, 367, 373, 379, 383, 389, 397 |
| 401-500 | 17 | 401, 409, 419, 421, 431, 433, 439, 443, 449, 457, 461, 463, 467, 479, 487, 491, 499 |
| 501-600 | 14 | 503, 509, 521, 523, 541, 547, 557, 563, 569, 571, 577, 587, 593, 599 |
| 601-700 | 16 | 601, 607, 613, 617, 619, 631, 641, 643, 647, 653, 659, 661, 673, 677, 683, 691 |
| 701-800 | 14 | 701, 709, 719, 727, 733, 739, 743, 751, 757, 761, 769, 773, 787, 797 |
| 801-900 | 15 | 809, 811, 821, 823, 827, 829, 839, 853, 857, 859, 863, 877, 881, 883, 887 |
| 901-1000 | 14 | 907, 911, 919, 929, 937, 941, 947, 953, 967, 971, 977, 983, 991, 997 |
| 1001-1100 | 16 | 1009, 1013, 1019, 1021, 1031, 1033, 1039, 1049, 1051, 1061, 1063, 1069, 1087, 1091, 1093, 1097 |
| 1101-1200 | 12 | 1103, 1109, 1117, 1123, 1129, 1151, 1153, 1163, 1171, 1181, 1187, 1193 |
| 1201-1300 | 15 | 1201, 1213, 1217, 1223, 1229, 1231, 1237, 1249, 1259, 1277, 1279, 1283, 1289, 1291, 1297 |
| 1301-1400 | 11 | 1301, 1303, 1307, 1319, 1321, 1327, 1361, 1367, 1373, 1381, 1399 |
| 1401-1500 | 17 | 1409, 1423, 1427, 1429, 1433, 1439, 1447, 1451, 1453, 1459, 1471, 1481, 1483, 1487, 1489, 1493, 1499 |
| 1501-1600 | 12 | 1511, 1523, 1531, 1543, 1549, 1553, 1559, 1567, 1571, 1579, 1583, 1597 |
| 1601-1700 | 15 | 1601, 1607, 1609, 1613, 1619, 1621, 1627, 1637, 1657, 1663, 1667, 1669, 1693, 1697, 1699 |
| 1701-1800 | 12 | 1709, 1721, 1723, 1733, 1741, 1747, 1753, 1759, 1777, 1783, 1787, 1789 |
| 1801-1900 | 12 | 1801, 1811, 1823, 1831, 1847, 1861, 1867, 1871, 1873, 1877, 1879, 1889 |
| 1901-2000 | 13 | 1901, 1907, 1913, 1931, 1933, 1949, 1951, 1973, 1979, 1987, 1993, 1997, 1999 |
| 2001-2100 | 14 | 2003, 2011, 2017, 2027, 2029, 2039, 2053, 2063, 2069, 2081, 2083, 2087, 2089, 2099 |
| 2101-2200 | 10 | 2111, 2113, 2129, 2131, 2137, 2141, 2143, 2153, 2161, 2179 |
| 2201-2300 | 15 | 2203, 2207, 2213, 2221, 2237, 2239, 2243, 2251, 2267, 2269, 2273, 2281, 2287, 2293, 2297 |
| 2301-2400 | 15 | 2309, 2311, 2333, 2339, 2341, 2347, 2351, 2357, 2371, 2377, 2381, 2383, 2389, 2393, 2399 |

**Primes**

|  |  |
| --- | --- |
| **Term** | **Definition or Formula** |
| **Prime Numbers (p)** | * A natural number which has exactly two factors, 1 and itself.
* 1 is not a prime number.
* Negative integers are not prime numbers.
 |
| **Composite Numbers (n)** | * A natural number that has more than two factors.
* It can be divided 1, itself, and by at least one natural number.
* 1 is not a composite number.
 |
| **The Fundamental Theorem of Arithmetic** | * Each positive integer is either prime or the product of powers of primes.
* Every integer greater than 1 can be factored uniquely into a product of primes.
* Every positive integer other than 1 can be expressed uniquely as a product of prime numbers where the prime factors are written in non-decreasing order.
 |
| **Prime Factorization** | where *ei* is the multiplicity of prime *pi* |
| **Greatest Common Divisor (GCD)** | Largest positive integer that is a factor of both x and y.Think Intersection (∩) of . |
| **Least Common Multiple (LCM)** | Smallest positive integer that is an integer multiple of both x and y.Think Union (∪) of . |
| **Relatively Prime (Coprime)** |  |

**Prime Theorems**

|  |  |
| --- | --- |
| **Theorem** | **Description** |
| **∞ Primes** | There are an infinite number of primes. |
| **Prime Number Theorem (Counting)** | Let π(x) be the number of prime numbers in the range from 2 through x. |
| **Chance of a Prime #** | For a random positive n-digit integer, . |
| **nth Prime Number** |  |

**Sources**:

* [SNHU MAT 230](https://www.snhu.edu/admission/academic-catalogs/coce-catalog#/courses/4kVhSZLtg) - Discrete Mathematics, zyBooks.
* [SNHU MAT 260](https://www.snhu.edu/admission/academic-catalogs/coce-catalog#/courses/NkdqI-8Fe) - Cryptology, I[nvitation to Cryptology](https://www.amazon.com/Invitation-Cryptology-Thomas-H-Barr/dp/0130889768/ref%3Dsr_1_1?crid=9A8O5P2JQ7F&keywords=978-0-13-088976-8&qid=1656057152&sprefix=978-0-13-088976-8%2Caps%2C71&sr=8-1), 1st Edition, Thomas Barr, 2001.