Prime number formula
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\[ p \notin \left\{ \sum_{n=1}^{a} c + c \right\} \]

p is prime if and only if p not in the sequence/set.

where \( a \) is all natural numbers less than or equal to \( \left( \frac{p}{c} - 1 \right) \), \( a \in \mathbb{N} \)

\[ a = \{1, 2, \ldots, \left( \frac{p}{c} - 1 \right) \} \]

and

where \( c \) is all the primes less than or equal to the squareroot of p, \( c \in \mathbb{N} \)

\[ c = \{2, 3, 5, \ldots, c \leq \sqrt{p} \} \]

or if we want to use all natural numbers except 1 and not only primes.

\[ C = \{2, 3, 4, 5, 6, \ldots, c \leq \sqrt{p} \} \]

example:

\[ p = 29 \]

\[ c \leq \sqrt{29} = 5 \], \( \{2, 3, 5\} \)

\[ a \leq \frac{p}{c} - 1 \]

\[ c = 2 \] so \[ \frac{29}{2} - 1 = 13 \] so \( a = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13\} \)

\[ \sum_{n=1}^{a} 2 + 2 = \text{set a where } c \text{ is 2} \{4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28\} \]

\[ c = 3 \] so \[ \frac{29}{3} - 1 = 8 \] so \( a = \{1, 2, 3, 4, 5, 6, 7, 8\} \)

\[ \sum_{n=1}^{a} 3 + 3 = \text{set a where } c \text{ is 3} \{6, 9, 15, 18, 21, 24, 27\} \]

\[ c = 5 \] so \[ \frac{29}{5} - 1 = 4 \] so \( a = \{1, 2, 3, 4\} \)

\[ \sum_{n=1}^{a} 5 + 5 = \text{set a where } c \text{ is 5} \{5, 10, 15, 20, 25\} \]

so p is prime because it’s not in the set where \( c = 2, c = 3 \) and \( c = 5 \)