

Divisibility rules

Study guide · Math tricks

Divisibility rules

Tell whether a number divides evenly without doing the division. They make factoring, simplifying fractions, and spotting primes much faster.

Divisible by	When	Example
2	The last digit is even: 0, 2, 4, 6, or 8.	3,578 : ends in 8
3	The digits add up to a multiple of 3.	4,281 : $4 + 2 + 8 + 1 = 15$, and 15 is a multiple of 3
4	The last two digits make a multiple of 4.	7,316 : 16 is a multiple of 4
5	The last digit is 0 or 5.	2,345 : ends in 5
6	It passes the tests for both 2 and 3.	1,314 : even, and $1 + 3 + 1 + 4 = 9$
7	Double the last digit and subtract it from the rest. If what is left is a multiple of 7 (0 counts), so is the number. Repeat for big numbers.	343 : $34 - 2 \times 3 = 28$, and $28 = 4 \times 7$
8	The last three digits make a multiple of 8.	5,096 : $096 = 96 = 12 \times 8$
9	The digits add up to a multiple of 9.	6,237 : $6 + 2 + 3 + 7 = 18$
10	The last digit is 0.	4,590 : ends in 0
11	Alternately add and subtract the digits from the left. If the result is a multiple of 11 (0 counts), so is the number.	2,728 : $2 - 7 + 2 - 8 = -11$
12	It passes the tests for both 3 and 4.	1,932 : $1 + 9 + 3 + 2 = 15$, and 32 is a multiple of 4

To check whether a number is prime, you only need to try primes up to its square root. For 91: $\sqrt{91}$ is a bit under 10, so try 2, 3, 5, 7. And $91 = 7 \times 13$, so it is not prime.