Which Divisibility Rules do you know?

÷ 2: _____

÷ 3: _____

÷ 4: _____

÷ 5: _____

÷ 6: _____

÷ 7: _____

_____

÷ 8: _____

÷ 9: _____

÷ 10: _____

÷ 11: _____

÷ 12: _____

÷ 43: _____

_____

Divisibility Tests (by 2 to 12) for Positive Integers

What is the number that you wish to check for divisibility?

User Guide

39,732

Maximum value is 1,000,000,000,000,000
(any positive integer with up to 15 digits)

Check Divisibility by:

☑ 2	Yes	☑ 5	No	☑ 8	No
☑ 3	Yes	☑ 6	Yes	☑ 9	No
☑ 4	Yes	☑ 7	Yes	☑ 10	No
				☑ 11	Yes
				☑ 12	Yes

Check All Boxes

Uncheck All Boxes

Go

Divisibility by 2

Is the number even (e.g., ending in 0, 2, 4, 6 or 8)?

Yes

Divisibility by 3

Is the sum of the digits divisible by 3?

Yes

3+9+7+3+2 = 24
2+4 = 6 which is divisible by 3.
So, 39,732 is divisible by 3.

Divisibility by 4

Are the last two digits divisible by 4?

Yes

$32 = 4 \cdot 8$
So, 39,732 is divisible by 4.

Divisibility by 5

Does the number end in a 0 or a 5?

No

Divisibility by 7

Is the number without its last digit, less double the last digit, divisible by 7?

Yes

$3{,}973 - 2 \cdot 2 = 3{,}969$
$396 - 2 \cdot 9 = 378$
$37 - 2 \cdot 8 = 21$
$2 - 2 \cdot 1 = 0$ which is divisible by 7.
So, 39,732 is divisible by 7.

Divisibility by 8

Are the last three digits divisible by 8?

No

732 is not divisible by 8.
So, 39,732 is not divisible by 8.

Divisibility by 6

Is the number divisible by both 2 and 3?

Yes

Divisibility by 10

Does the number end in a zero?

No

Divisibility by 12

Is the number divisible by both 4 and 3?

Yes

Divisibility by 9

Is the sum of the digits divisible by 9?

No

3+9+7+3+2 = 24
2+4 = 6 which is not divisible by 9.
So, 39,732 is not divisible by 9.

Divisibility by 11

Is the difference of the sums of alternating digits divisible by 11?

Yes

3+7+2 = 12 9+3 = 12
12 - 12 = 0 which is divisible by 11.
So, 39,732 is divisible by 11.

$39{,}732 = 11 \cdot 3{,}612$

Divisibility by Greater Numbers

Glossary

Print

Close

Divisibility Tests for Positive Integers (Using Divisors Greater Than 12)

User Guide

Divisibility by a Prime Number > 12

Every prime number "p" (> 5) has a divisibility rule of the following type:

1. Multiply the last digit by some number "q".
2. Subtract "q" times the last digit from the original number without its last digit.
3. Check the result. If the resulting number is divisible by "p", then the original number is divisible by "p".
4. Repeat steps 1 to 3 above until divisibility is determined.

Note: every prime number "p" (> 5) has both an "add" value and a "subtract" value that works under this rule. The values for the two rules are different by the value of the prime number. So, if "q" is the "add" value for prime "p", then "q-p" will be the subtract value for "p".

Check Divisibility

What number do you wish to check for divisibility? 10,535

Maximum value is 1,000,000,000,000,000 (any positive integer with up to 15 digits)

Check divisibility by: 43

Go

Result: Yes

Below are the add and subtract values for each prime shown. Also provided is the add or subtract value for each prime that has the lower absolute value, identified as the "best" rule for that prime.

Values for Prime Divisibility Rules

Prime	Subtract	Add	Best
13	-9	4	+4
17	-5	12	-5
19	-17	2	+2
23	-16	7	+7
29	-26	3	+3
31	-3	28	-3
37	-11	26	-11
41	-4	37	-4
43	-30	13	+13
47	-14	33	-14
53	-37	16	+16
59	-53	6	+6
61	-6	55	-6
67	-20	47	-20
71	-7	64	-7
73	-51	22	+22
79	-71	8	+8
83	-58	25	+25
89	-80	9	+9
97	-29	68	-29

$1{,}053 + 13 \cdot 5 = 1{,}118$

$111 + 13 \cdot 8 = 215$

$21 + 13 \cdot 5 = 86$ which is divisible by 43.

So, 10,535 is divisible by 43.

$10{,}535 = 43 \cdot 245$

Divisibility by a Composite Number > 12

To check whether a number is divisible by a composite number, we need to check the divisibility of each of the prime factors in the number's unique prime factorization.

Example:

$120 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5 = 2^3 \cdot 3 \cdot 5$

Calculate any powers of primes in the prime factorization to get:

$120 = 8 \cdot 3 \cdot 5$

Then, test each of the resulting factors for divisibility into the number. In the example, we would need to test divisibility by 8, 3 and 5 to see if the original number is divisible by 120.

Test Any Positive Integer for Divisibility by Any Other Positive Integer

Check to see if: Enter Value

is divisible by: Enter Value

Go

Maximum values are 1,000,000,000,000,000 (any positive integer with up to 15 digits)

Special Rules for Divisibility by Powers of 2 or 5

To test whether a number is divisible by 2^n, test whether the last n digits of the number is divisible by 2^n.

To test whether a number is divisible by 5^n, test whether the last n digits of the number is divisible by 5^n.

Example: check whether 46,347,965,276,496 is divisible by 16.

Since $16 = 2^4$, we need only test whether the last 4 digits, (6,496) is divisible by 16. Since 6,496 is divisible by 16, so is the original number.

Glossary | Print | Close