



ALGECAL CALCULATOR MANUALS

Mike Zhu & Helen Wu, Programmed by Richard LU



DECEMBER 12, 2025
EVERYONE MATH INSTITUTE
Norman, OK, USA email: mthcnt@gmail.com
Copyright registered

Vertical algebraic calculator (12/12/2025)

Negative coefficient notations:

$$2\hat{1} = 2 \times 10 - 2 \times 1 = 20 - 2 = 18; \quad \text{..... } \textcircled{1}$$

$$4\hat{3}1 = 4 \times 10^2 - 3 \times 10 + 1 = 400 - 30 + 1 = 371 \quad \text{..... } \textcircled{2}$$

$$3\hat{4}\hat{7} = 3 \times 10^2 - 4 \times 10 - 7 = 300 - 40 - 7 = 26\hat{7} = 253 \quad \text{..... } \textcircled{3}$$

$$\hat{5}\hat{8} = -5 \times 10 - 8 = -58 = \hat{6}2 \quad \text{..... } \textcircled{4}$$

In the above, we introduce negative coefficient notations. $\textcircled{1}$ is a two-digit number with a negative number (-2) at ones place, which is the same as traditional decimal number 18. $\textcircled{2}$ is a three-digit number with a negative number (-3) at tens place, which is the same as traditional decimal number 371. $\textcircled{3}$ is another three-digit number with a negative number at tens place (-4) and a negative number at ones place (-7), which is the same as traditional decimal number 253. $\textcircled{4}$ is a two-digit number with both negative numbers at tens place (-5) and at ones place (-8), which is the same as traditional decimal number -58; This number can also be written, using the new notation, as $\hat{6}2$.

More information:

<https://math.ou.edu/~mzhu/AI.html>

Go to AlgeCal calculator:

<https://luv.iolet.org/algecalc/>

Book:

<https://www.amazon.com/dp/B0D9765XX8>

Keys

- Typing “21^” will display as “21^”.
- Use “*” or “x” to represent multiplication.

AlgeCal Calculator		Factoring	中文
--------------------	--	-----------	----

421x21^			Calculate
Clear		Del	
7	8	9	+
4	5	6	-
1	2	3	x
0		^	

$$\begin{array}{r}
 421 \\
 \times 21^{\wedge} \\
 \hline
 1^{\wedge} \\
 2^{\wedge} \\
 4^{\wedge} \\
 2 \\
 4 \\
 + 8 \\
 \hline
 08001^{\wedge}
 \end{array}$$

Regular Notation

Tap **Regular Notation** to show numbers in normal format.

$$\begin{array}{r}
 4 \\
 + 8 \\
 \hline
 7999
 \end{array}$$

Regular Notation

Subtraction from the left to the right.

With the introduction of negative coefficients, subtraction can be performed from left to right—just as we do when subtracting polynomials.

AlgeCal Calculator		Factoring		中文	
--------------------	--	-----------	--	----	--

5263-2345			Calculate
Clear		Del	
7	8	9	+
4	5	6	-
1	2	3	×
0		^	

$$\begin{array}{r}
 5263 \\
 - 2345 \\
 \hline
 \end{array}$$

$\hat{2}$
 $\hat{2}$
 $\hat{1}$

$$\begin{array}{r}
 + 3 \\
 \hline
 03\hat{1}2\hat{2}
 \end{array}$$

Regular Notation

Cross product and factoring practice

Writing $19 = 2\hat{1}$, we can observe a cross product pattern that is useful for factorization. Can you determine mentally whether 437 is a prime number? How about $44\hat{3}$, is it prime?

Calculator		Factoring		中文	
------------	--	-----------	--	----	--

21^x23			Calculate
Clear		Del	
7	8	9	+
4	5	6	-
1	2	3	x
0		^	

$$\begin{array}{r}
 2\hat{1} \\
 \times 23 \\
 \hline
 6 \\
 44\hat{3} \\
 \hline
 044\hat{3}
 \end{array}$$

Regular Notation

Once you recognize that $44\hat{3}$ is not a prime number, you can practice factoring trinomials as well:

Calculator	Factoring	中文
------------	-----------	----

443^ ▾

let $x = 10$

$$443^{\wedge} \rightarrow 4x^2 + 4x - 3$$

$$\begin{array}{r}
 2\hat{1} \\
 \times \\
 2\hat{3}
 \end{array}$$

$$(2x - 1)(2x + 3)$$

$$(20 - 1)(20 + 3)$$

$$19 \times 23 = 437$$