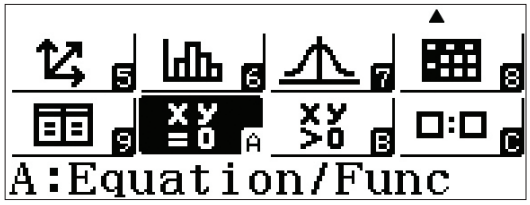
EQUATION/FUNC

The **fx-991EX** numerically solves equations elegantly. It is accomplished with the help of the Natural Textbook Display™ in the Equation/Func mode. The Equation/Func mode uses Newton's method to find solutions to equations. The **fx-991EX** has the power to handle Simultaneous Equations with up to 4 unknowns and Polynomial Equations up to the 4th degree.

SIMULTANEOUS EQUATIONS

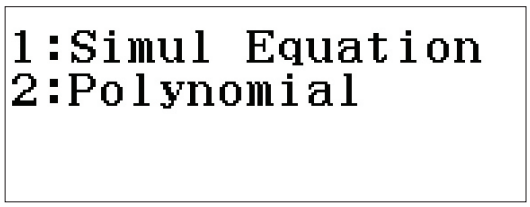
From the Main Menu, use the arrow keys to highlight the Equation/Func icon and press [=] or press [(−)](A).



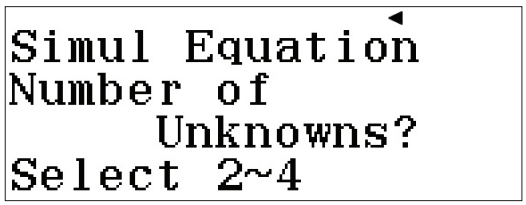
To solve the following system of simultaneous equations

$$\begin{cases} 2x + y = 5 \\ -4x + 6y = 12 \end{cases},$$

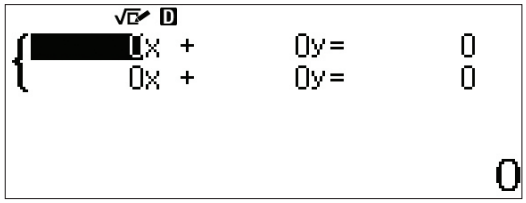
select [1](Simul Equation).



Choose the number of Unknowns. For this example, press [2](Unknowns).

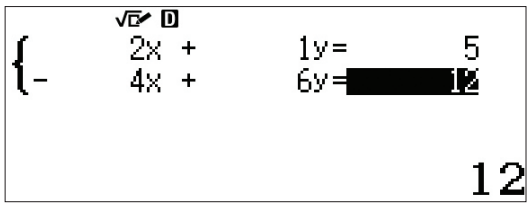


A 2x2 system of equations template is displayed. The template is in Ax + BY = C form in which A, B and C can be any value. For fractional values, use the [▭] key.

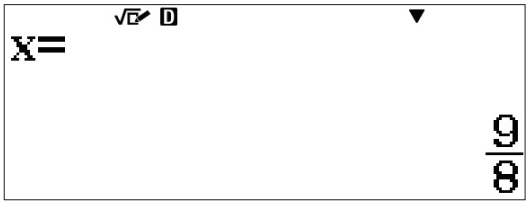


Type in each value followed by the [=] key.

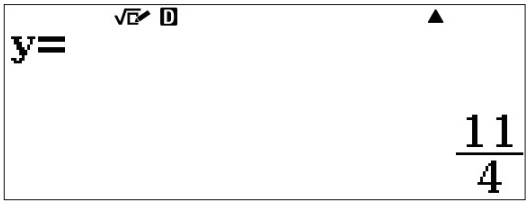
Press [2] [=] [1] [=], etc.



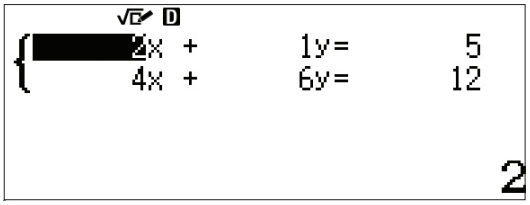
To solve, press [=] and use the arrow keys ([▼] [▲]) to toggle between solutions.



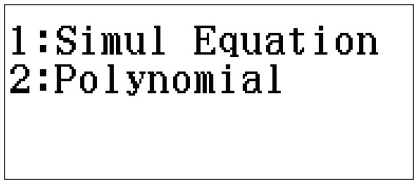
The solutions are shown in natural display format. For decimal approximations, press [S⇔D].

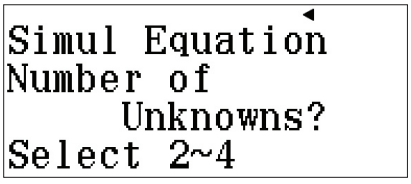


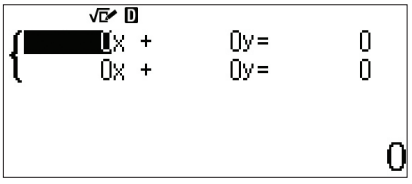
To change the values in the system of equations without changing the type of equation or system, press [AC].



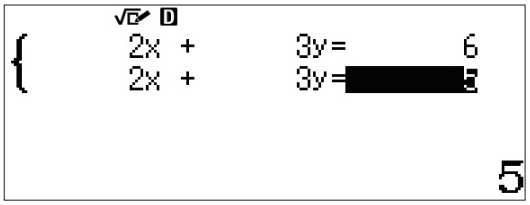
To change the type of equation or system size, press [OPTN] and select from the on-screen menus.



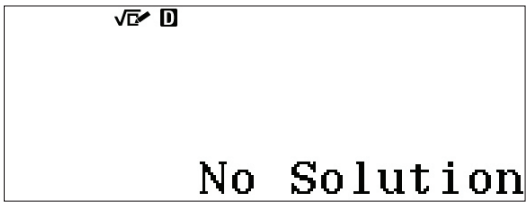




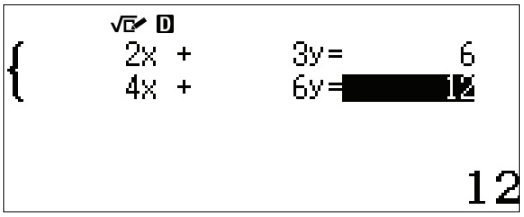
The **fx-991EX** also solves inconsistent systems, both independent and dependent. Enter the displayed inconsistent and independent system



Press [=] to see the solution.



Enter the displayed inconsistent dependent system.

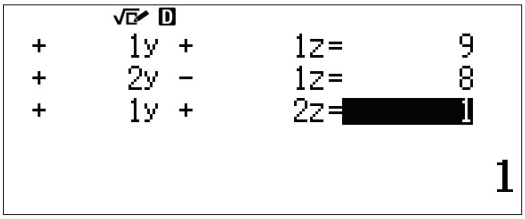


Press [=] to see the solution.

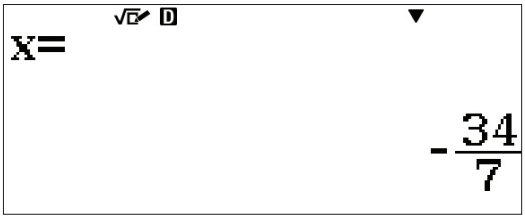
To input a larger system of simultaneous equation

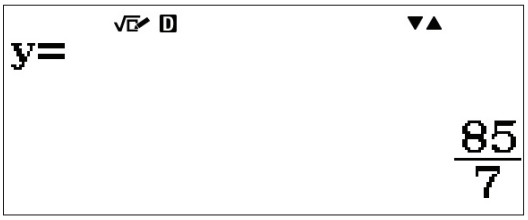
$$\begin{cases} 1x + 1y + 1z = 9 \\ 3x + 2y - 1z = 8 \\ 3x + 1y + 2z = 1 \end{cases},$$

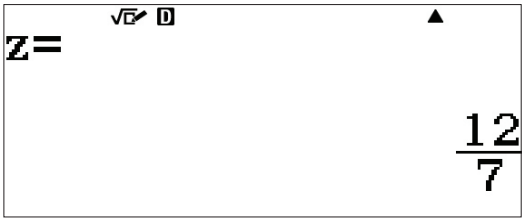
press [OPTN] [1] (Simul Equation) [3] (Unknowns).



Enter the coefficents for each equation and press [=] to solve.



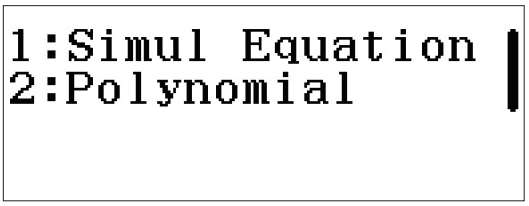




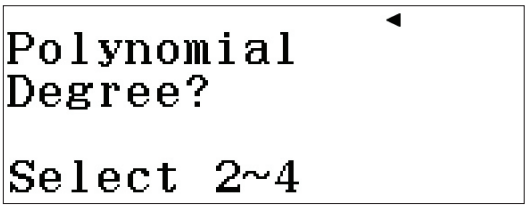
POLYNOMIAL EQUATIONS

The **fx-991EX** has the computing power to solve polynomial equations up to 4th degree.

To start solving polynomial equations, in the Equation/Func icon, press OPTN 2 (Polynomial).

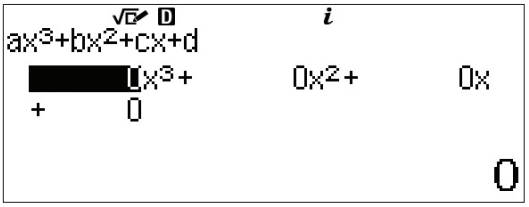


Select the degree of the polynomial. For this example, use a 3rd degree polynomial. Press 3 (Degree).

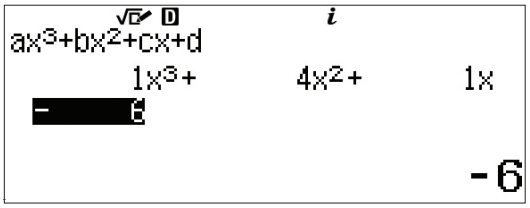


Fill out the template for a 3rd degree polynomial. Type in each coefficient followed by the = key.

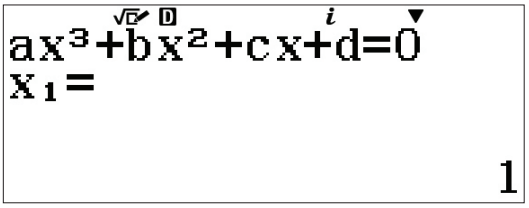
$x^3 + 4x^2 + x - 6 = 0$

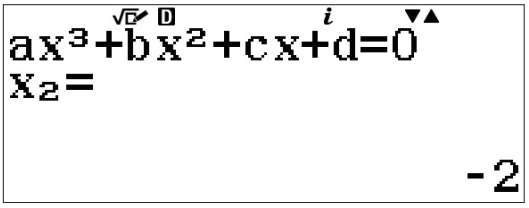


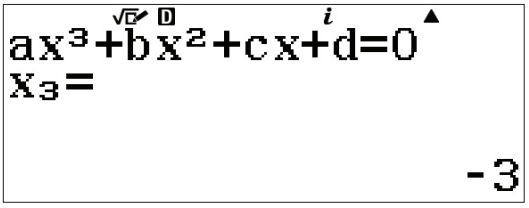
Press = to solve the equation.



Use the arrow keys (▲ ▼) to toggle through the solutions.

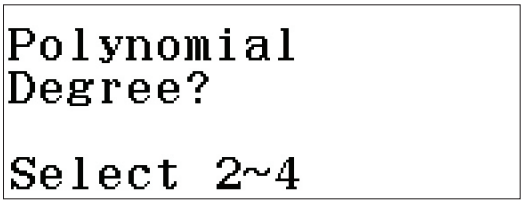




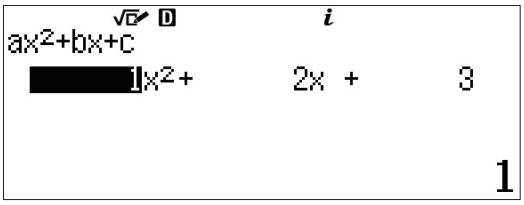


The **fx-991EX** has the power to solve polynomials in the complex plane.

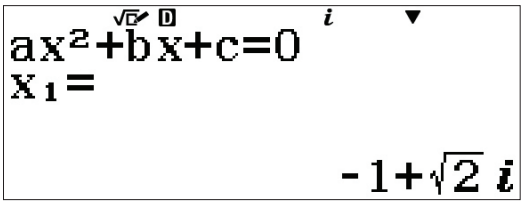
Press [OPTN] and change the type of polynomial to quadratic ([2]).



Enter the coefficients that appear in the displayed screen into the quadratic template, and press [=].



The solutions are displayed in simplified radical form including the imaginary unit.



Press ▼ to see the second imaginary solution.