

Chapter 3 / **Example 44****Determining the equation of a polynomial**

You can use your GDC in two different ways to solve this type of problem. Using your GDC to solve the three linear equations or finding the regression equation of a curve which passes through three points.

Find the equation of a quadratic function $f(x) = ax^2 + bx + c$ that passes through the points $(-1, 10)$, $(2, -2)$ and $(4, 0)$.

Press **MENU** **A** **EQN** to enter equation mode.

Press **F1** Simultaneous.

There are 2 unknowns so press **F2** 3.

Simultaneous
No Data In Memory

Number Of Unknowns?
2 3 4 5 6

Solve the equations
$$\begin{cases} a - b + c = 10 \\ 4a + 2b + c = -2 \\ 16a + 4b + c = 0 \end{cases}$$

Enter to coefficients into the matrix.

$a_n X + b_n Y + c_n Z = d_n$

	a	b	c	d
1	1	-1	1	10
2	4	2	1	-2
3	16	4	1	0

0

SOLVE **DELETE** **CLEAR** **EDIT**

Press **F1** SOLVE.

The calculator displays the solution $a = 1$, $b = -5$, $c = 4$

$\Rightarrow f(x) = x^2 - 5x + 4$

$a_n X + b_n Y + c_n Z = d_n$

X	1
Y	-5
Z	4

1

REPEAT

Use the coordinates of the three points $(-1, 10)$, $(2, -2)$ and $(4, 0)$

Press **MENU** **2** **STAT** to display the List Editor screen.

Enter the x-coordinates of the three points in the first column.

Press **EXE** after each number to move to the next cell.

	List 1	List 2	List 3	List 4
SUB				
1	-1			
2	2			
3	4			
4				

GRAPH **CALC** **TEST** **INTR** **DIST** **▶**

Press **▶** to move to the next column.

Enter the y-coordinates in the second column.

	List 1	List 2	List 3	List 4
SUB				
1	-1	10		
2	2	-2		
3	4	0		
4				

GRAPH **CALC** **TEST** **INTR** **DIST** **▶**

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To calculate the equation of the regression line

Press **F2** CALC, press **F3** REG, press **F3** X^2 .

The calculator displays the solution $a = 1$, $b = -5$, $c = 4$

$$\Rightarrow f(x) = x^2 - 5x + 4$$

	List 1	List 2	List 3	List 4
SUB				
1	-1	10		
2	2	-2		
3	4	0		
4				

GRAPH CALC TEST INTR DIST