

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 **[APPS]** :PlySmlt2

Press **[enter]** and select 2:SIMULTANEOUS EQN SOLVER

You are solving 3 equations with 3 unknowns

Press **[f5]** NEXT.

```

SIMULT EQN SOLVER MODE
EQUATIONS 2 3 4 5 6 7 8 9 10
UNKNOWN 2 3 4 5 6 7 8 9 10
DEC  FRAC
NORMAL SCI  ENG
FLOAT 0 1 2 3 4 5 6 7 8 9
RADIAN DEGREE
[MAIN] [HELP] [NEXT]

```

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.

```

SYSTEM MATRIX (3 x 4)
[ 1  -1  1  10 ]
[ 4   2  1  -2 ]
[ 16  4  1   0 ]

[SYSM](3,4)=0
[MAIN] [MODE] [CLEAR] [LOAD] [SOLVE]

```

Press **b** SOLVE.

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

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

```

SOLUTION
x1=1
x2=-5
x3=4

[MAIN] [MODE] [SYSM] [STORE] [F<D]

```

Press **[f1]** MAIN.

Press **6** QUIT APP.

```

MAIN MENU
1:POLYNOMIAL ROOT FINDER
2:SIMULTANEOUS EQN SOLVER
3:ABOUT
4:POLY ROOT FINDER HELP
5:SIMULT EQN SOLVER HELP
6:QUIT APP

```

Chapter 3 / Example 44

Determining the equation of a polynomial


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

Press **[stat]** 1:Edit and press **[enter]****[format]**

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

Press or after each number to move to the next cell.

[illegible]

Press  to move to the next column.

Enter the y -coordinates in the second column.

[illegible]

To calculate the equation of the regression line

Press **stat** and **▶** to access the CALC menu.

Select 5:QuadReg and press **enter**.

Leave the X List as L_1 and the Y List as L_2 .

Navigate down to Calculate and press **enter**.

QuadReg
Xlist:L1
Ylist:L2
FreqList:
Store RegEQ:
Calculate

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

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

QuadReg
 $y = ax^2 + bx + c$
 $a = 1$
 $b = -5$
 $c = 4$