

t	0	1	2	3	4	5	6	7	8	9	10
$C(t)$	0	4.87	7.17	10.27	12.81	13.05	15.03	13.3	12.22	11.29	8.26

- | | List 1 | List 2 | List 3 | List 4 |
|-----|--------|--------|--------|--------|
| SUB | | | | |
| 1 | 0 | | | |
| 2 | 1 | | | |
| 3 | 2 | | | |
| 4 | 3 | | | |
- 3
- GRAPH CALC TEST INTR DIST ▶

	List 1	List 2	List 3	List 4
SUB				
1	0	0		
2	1	4.87		
3	2	7.17		
4	3	10.27		

10.27

GRAPH CALC TEST INTR DIST \triangleright

StatGraph1	
Graph Type	: Scatter
XList	: List1
YList	: List2
Frequency	: 1
Mark Type	: <input type="checkbox"/>
Color Link	: Off
LIST	

Chapter 6 / Example 6

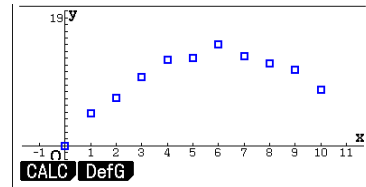
Quadratic regression

Press **EXIT**.

Press **F1** GRAPH1.

The GDC displays a scatter diagram of t against $C(t)$.

Because the data is approximately quadratic, quadratic regression is appropriate.



To calculate the equation of the regression line

Press **F1** CALC, press **F4** X^2 .

The parabola is given by the equation

$$C(t) = -0.374t^2 + 4.56t + 0.121.$$

The coefficient of determination is $R^2 = 0.986$, which shows very strong quadratic association.

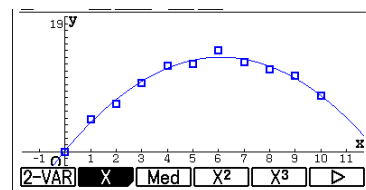
QuadReg
 $a = -0.3741375$
 $b = 4.56328438$
 $c = 0.12111888$
 $r^2 = 0.98617438$
 $MSe = 0.34069113$
 $y = ax^2 + bx + c$
COPY **DRAW**

Press **F5** COPY.

The GDC displays the equation entry screen.

Press **SHIFT** **9** PASTE and press **EXE**.

Press **F6** DRAW.



Choose suitable window settings to display the graph.

Press **MENU** 5 **GRAPH** **EXIT** **II**

Press **F1** SELECT.

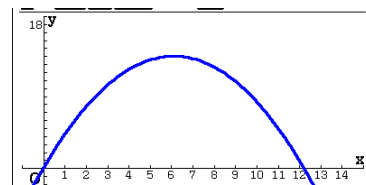
Press **SHIFT** **F3** V-WIN.

Set the axes to show $-1 \leq x \leq 15$ and $-2 \leq y \leq 19$ with a scales of 1. You can leave the other items as they are.

Press **EXIT** when you have finished.

View Window
 $X_{min} : -1$
 $max : 15$
 $scale : 1$
 $dot : 0.04232804$
 $Y_{min} : -2$
 $max : 19$
INITIAL **TRIG** **STANDARD** **V-MEM** **SQUARE**

Press **F6** DRAW to display the graph screen.



Chapter 6 / Example 6

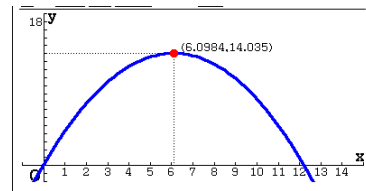
Quadratic regression

To find the vertex press **F5** G-SOLVE and then press **F2** MAX
Press **EXE** to display the coordinates.

Press **EXIT** to leave G-Solv mode and **F6** DRAW to display the graph screen again.

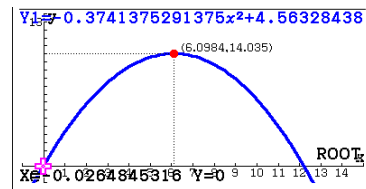
The GDC displays the vertex of the quadratic function at (6.10, 14.0).

The maximum amount of medication occurs around 6.1 hours after it was taken by the patient.



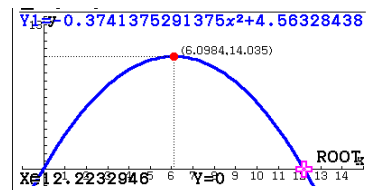
To find the x-intercepts or roots press **F5** G-SOLVE and then press **F1** ROOT.

The GDC shows the first root.



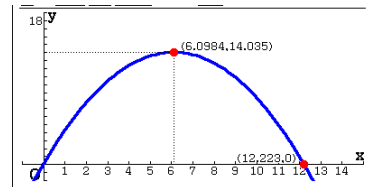
Press **▶** to move to the next root and press **EXE** to display its coordinates.

Press **EXIT** to leave G-Solv mode and **F6** DRAW to display the graph screen again.



The GDC displays a zero at (12.2, 0).

It will take about 12.2 hours for the whole of the medication to be fully absorbed.



Press **MENU** 1 **RUN-MAT** to display the Run-Matrix screen for arithmetical calculations.

Find $C(24)$.

Press **VAR** **F4** GRAPH **F1** Y and type 1.

Type (24) and press **EXE** **•**

Since $C(24) = -106$, the negative value means that the model cannot be used.

