Chapter 4 / **Example 2**

Modelling with functions

Raquel invests $1200 in a savings account whose value increases over time. The future value, V, of the account is a function of the time t (in years) invested, represented by the equation $V(t) = 1200 \times (1.03)^t$ for $0 \leq t \leq 50$.

a Find

i $V(0)$ **ii** $V(50)$

Interpret each of these in context.

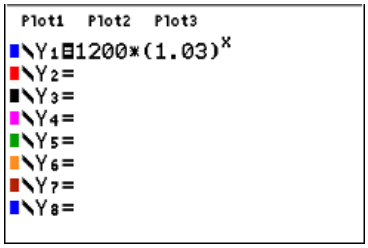
b If Raquel keeps her money invested for 50 years, determine how much she will earn on her initial $1200.

c Sketch a graph of the function V for $0 \leq t \leq 50$.

d If Raquel invests her money in 2015, determine the year when the value of her account will reach $2500.

Press [F1] [Y=] to display the equation entry screen.

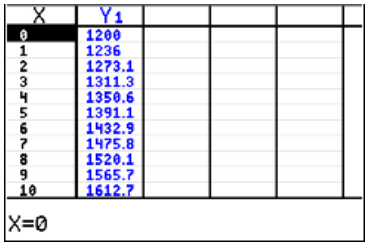
Type $1200 \times (1.03)^x$ and press [ENTER] to enter the equation as Y_1.



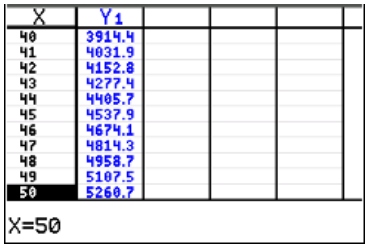
Press [2nd] [F5] [TABLE] to display a table of values for

$Y_1 = 1200 \times (1.03)^t$

The values of Y_1 are increasing from 1200



Scroll down with [▼] until you get to x = 50. The maximum value of Y_1 is 5260.

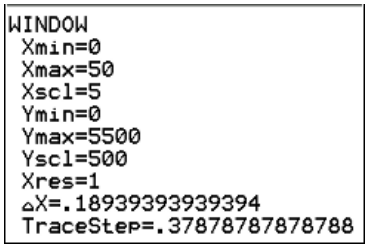


Use this information to choose suitable window settings to display the graph.

Press [F2] [WINDOW]

Set the axes to show $0 \leq x \leq 50$ with a scale of 5 and $0 \leq y \leq 5500$ with a scale of 500 and leave the last three items.

Press [F5] [GRAPH] when you have finished.



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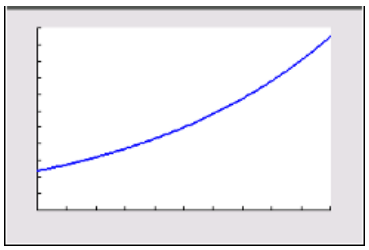
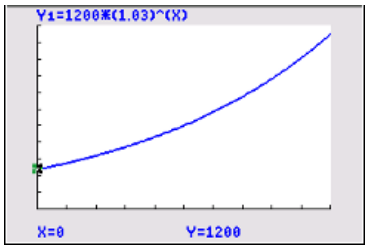
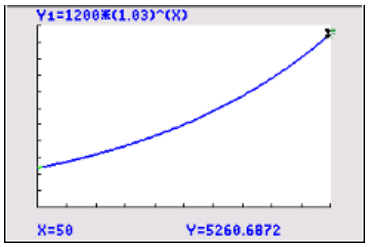
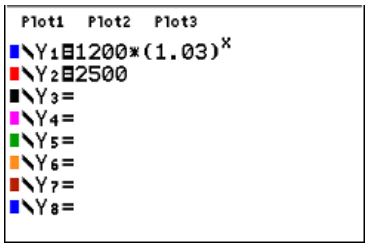
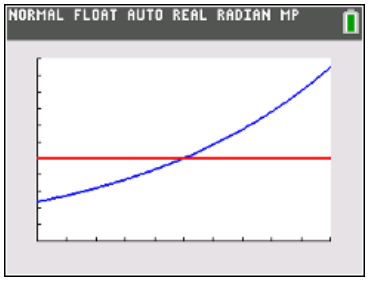
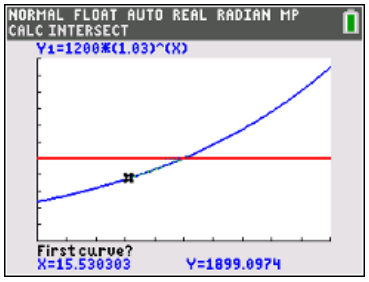
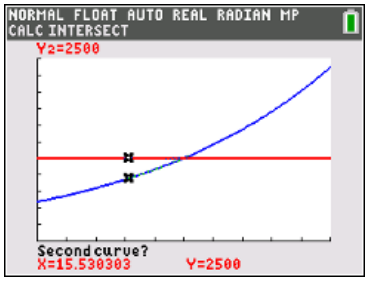
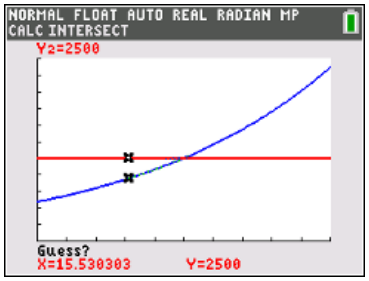
The GDC displays the graph of the value of Raquel's savings in a suitable window.	
To find the value of $V(0)$ press [2nd] [CALC] 1:value. Press [0] [ENTER] to change the x coordinate to 0. The GDC displays the coordinates of the y-intercept $(0,1200)$. Raquel invested \$1200 initially.	
Type 50 and press [ENTER] to change the x coordinate to 50. The GDC displays the coordinates of the y-intercept $(50,5260)$. Raquel will have \$5260 in the account after 50 years.	
Press [F1] [Y=] to display the equation entry screen. Type 2500 and press [ENTER] to enter the equation as Y_2.	
Press [F5] [GRAPH]. The GDC displays $Y_1 = 1200 \times (1.03)^t$ and $Y_2 = 2500$	

Chapter 4 / **Example 2**

Modelling with functions

Press 2nd [F4][CALC] 5:intersect To find the intersection you need to choose the two lines that intersect. The GDC shows a cross on one of the lines and 'First curve?'. Press ENTER.	
The GDC shows a cross on the other line and 'Second curve?'. Press ENTER.	
The GDC requires an initial guess for the position of the intersection. Choose the default position. Press ENTER.	
The GDC displays the intersection of the two straight lines at the point $(24.8, 2500)$ Raquel's account will reach a value of \$2500 during the year 2039.