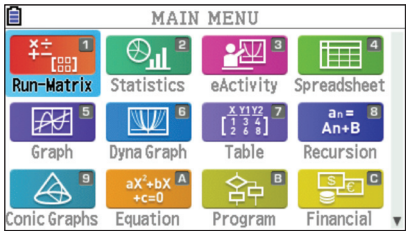
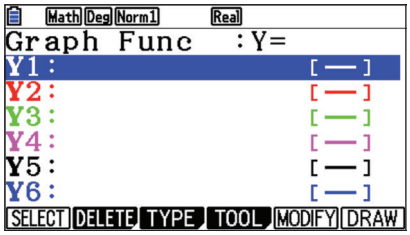
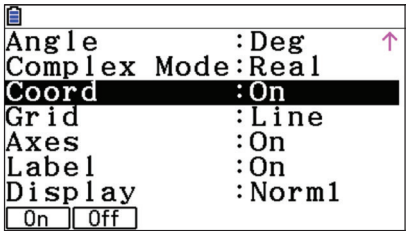
GRAPH

To construct graphs and use graphical analysis commands, use the Graph menu. From the Main Menu, press 5.

The first screen is the function/relation editor. To select how certain results will be displayed, press SHIFT MENU **(SET UP).** The suggested selections for **Coord, Grid, Axes** and **Label** are shown. Scroll down to these selections. To make a change, highlight the item and use the function button that appears directly below the desired tab. For example, when **Coord** is highlighted, F1 (On) will turn coordinates on and F2 (Off) will turn coordinates off. Press EXIT to return to the editor.



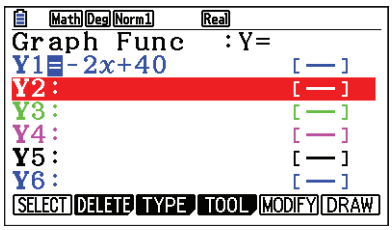


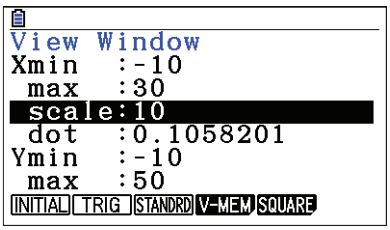


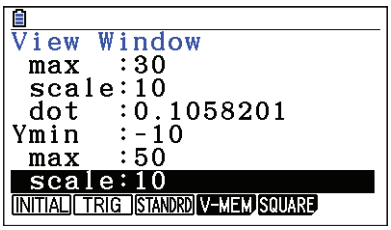
The Math Club plans to sell t-shirts. Previous experience suggests that the number of t-shirts sold depends on the price. A good model for the number sold, y, as a function of the price, x, is y = -2x + 40.

1. Construct a graph of this equation.

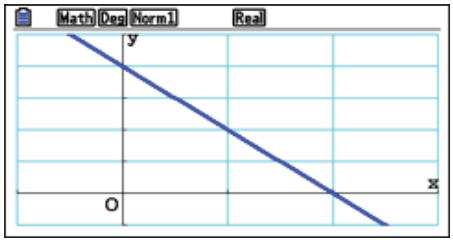
To construct a graph of this model, press (−) 2 X,θ,T + 4 0 EXE. To select the view window, press SHIFT F3 **(V-Window)**. Change the values for the window, as shown, pressing EXE after each value. The values for **Scale** determines the location for the marks on the axes and the gridlines. Press EXIT to return to the editor.





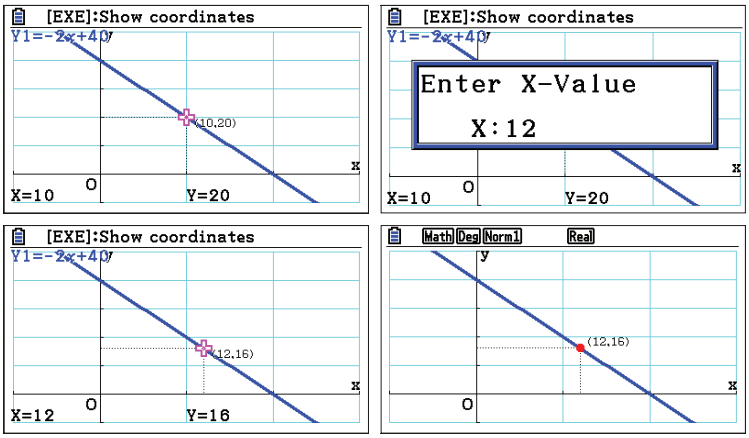


To draw the graph, press F6 (DRAW). When a graph is displayed the + key can be used to zoom in, the − key to zoom out, and ▶ ◀ ▲ ▼ to scroll.



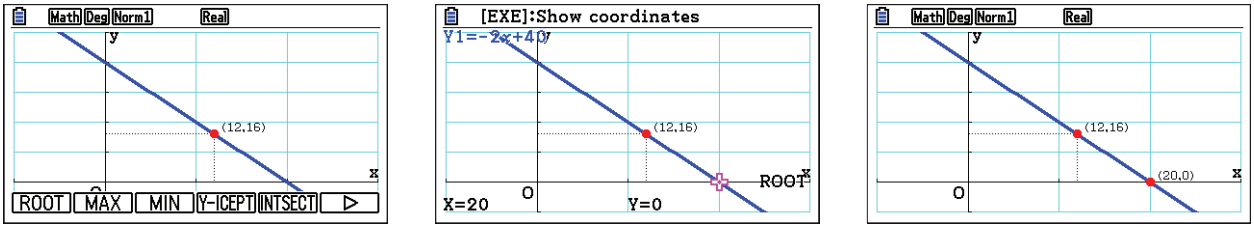
2. How many shirts would be sold at a price of $12 per t-shirt?

To trace on the graph, press SHIFT F1 **(Trace)**. Use ▶ ◀ to move the cursor. To select a specific value, type the value, in this case 1 2. A dialogue box opens, press EXE. To mark a point and keep the coordinates on the display, press EXE a second time.



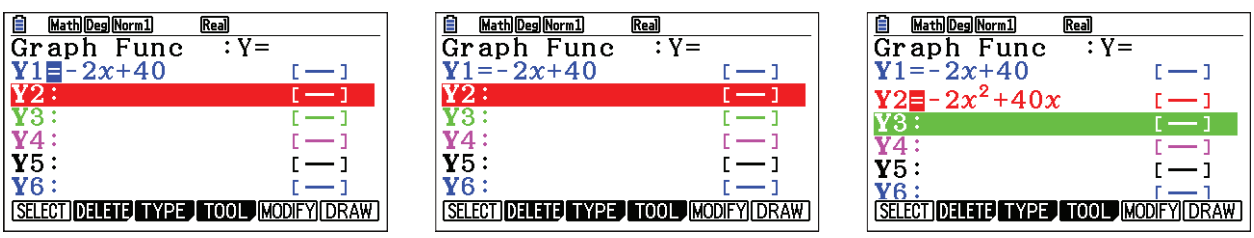
3. There is a price that is too high, meaning no shirts are sold. This point occurs at the x-intercept of the graph (where y = 0) and the value of x is a root of the equation $-2x+40=0$.

To find the root, press SHIFT F5 **(G-Solv)** F1 (ROOT). The result, $20, is shown at the bottom of the screen. To mark this intercept and keep the coordinates on the display, press EXE a second time.

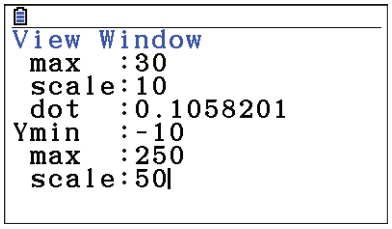


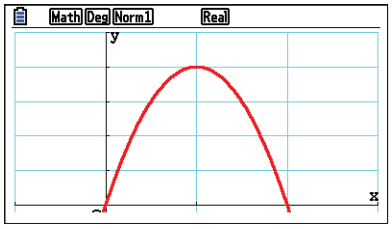
4. If $-2x+40$ shirts are sold at price, x, then the number of dollars collected for the sale is $x(-2x+40)$ or $-2x^2+40x$.

To graph this function, first, deselect the previous equation by pressing EXIT, ▲ so the cursor is on **Y1**, then press F1 (SELECT) ▼. Note, the = sign is not highlighted. The cursor should now be on **Y2**.
Press (−) 2 X,θ,T x^2 + 4 0 X,θ,T EXE.



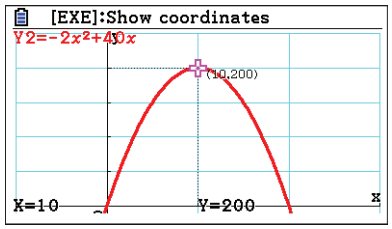
To set up the view window, press SHIFT F3 **(V-Window)**. Change the values for the window so that **Ymax** is 250 and **Yscale** is 50. Press EXIT to return to the editor. To draw the graph, press F6 (DRAW).

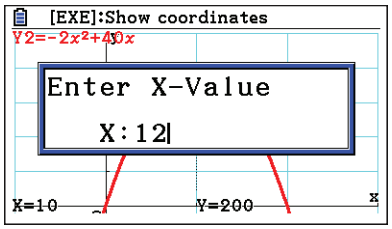


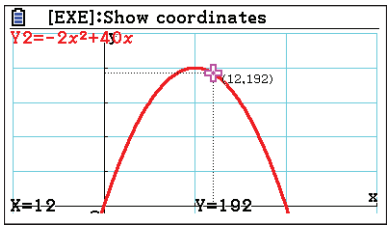


5. Compute the number of dollars earned, if each t-shirt is sold at $12.

To compute the number of dollars earned if shirts are sold for $12, press SHIFT F1 **(Trace)**. Type the value, in this case 1 2. A dialogue box opens, press EXE. The models predict that at a price of $12, 16 shirts will be sold for a total of $192.

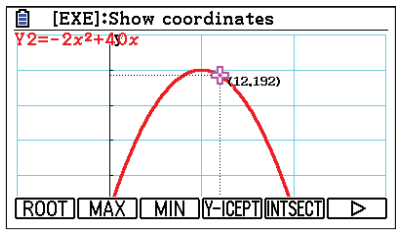


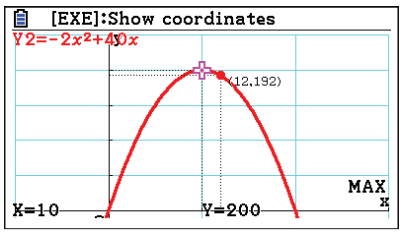


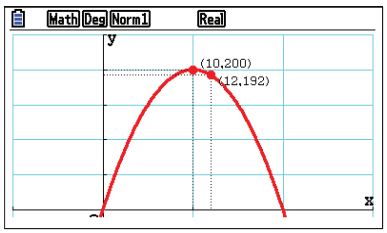


6. Determine the price that will give the greatest profit.

To determine the price that is predicted to make the most money, press SHIFT F5 **(G-Solv)** F2 (MAX). The results, $10 and $200, are shown at the bottom of the screen. To mark the point and keep the coordinates on the display, press EXE.

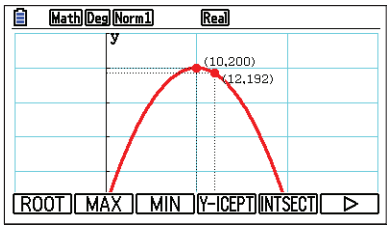


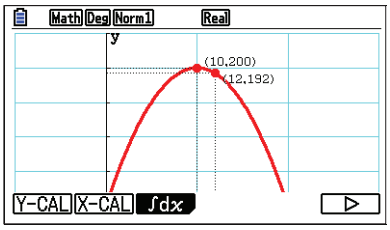


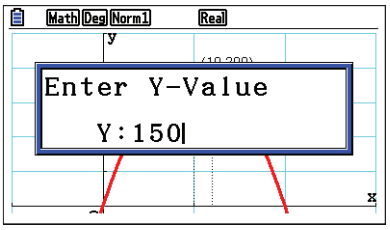


7. Determine the price of each t-shirt in order to collect $150.

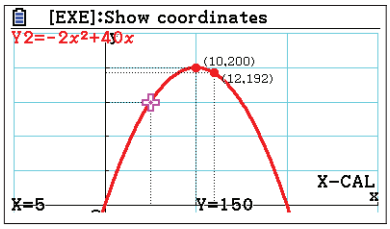
To determine the price of each t-shirt, in order to collect a total of $150, press SHIFT F5 **(G-Solv)** F6 (▷) F2 (X-CAL) 1 5 0 EXE. (The (▷) symbol moves to the next page of commands.)

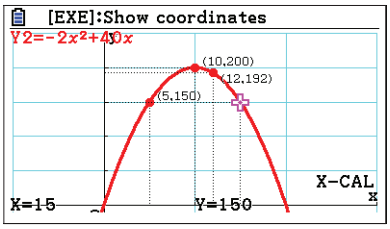






There is another point where y = 150. Use ▶ to move to the next point. Press EXE to mark one or both of these points. $150 can be earned by selling shirts at $5 or at $15.





8. Find the intersection of the equations in **Y1** and **Y2**.

Although it is not particularly meaningful in this example, a common problem is to find the intersection point of two graphs. Press EXIT to return to the editor. Highlight **Y1** and press F1 (SELECT). Now, both graphs will be drawn. Press F6 (DRAW). To find the intersection points for the two graphs, press F5 **(G-Solv)** F5 (INTSECT). 38 shirts are sold at the price of $1, for a total of $38. (These graphs also intersect at (20, 0) where no shirts were sold.)