

Use the following roots to find the equation for the quadratic function:

1.  $x = \{-5, 1\}$

$$\begin{aligned} x &= -5 & x &= 1 \\ x+5 &= 0 & x-1 &= 0 & \text{a-value} \\ & (x+5) & (x-1) & & \text{is} \\ & & & & \text{negative} \\ x^2 - x + 5x - 5 & & & & \\ - (x^2 + 4x - 5) & & & & \\ \boxed{-x^2 - 4x + 5} & & & & \end{aligned}$$

2.  $x = \{-3/2, 4\}$

$$\begin{aligned} x &= -3/2 & x &= 4 \\ 2x+3 &= 0 & x-4 &= 0 \\ (2x+3) & (x-4) \\ 2x^2 - 8x + 3x - 12 & & & & \\ \boxed{2x^2 - 5x - 12} & & & & \end{aligned}$$

3.  $x = \{-9, -6\}$

$$\begin{aligned} x &= -9 & x &= -6 \\ x+9 &= 0 & x+6 &= 0 \\ (x+9) & (x+6) \\ (x^2 + 6x + 9x + 54) & & x(x+6) & & \\ f(x) = \boxed{x^2 + 15x + 54} & & 9(x+6) & & \end{aligned}$$

4.  $x = \{1/4, 2/5\}$

$$\begin{aligned} x &= 1/4 & x &= 2/5 \\ 4x-1 &= 0 & 5x-2 &= 0 \\ (4x-1) & (5x-2) \\ 20x^2 - 8x - 5x + 2 & & & & \\ f(x) = \boxed{20x^2 - 13x + 2} & & & & \end{aligned}$$

## Solving Quadratic Equations by using the Graphing Calculator



$$y = 2x^2 - 4x + 9$$

$$y = 4x^2$$

$$y = -x^2 + 3x - 9$$

## Step 1

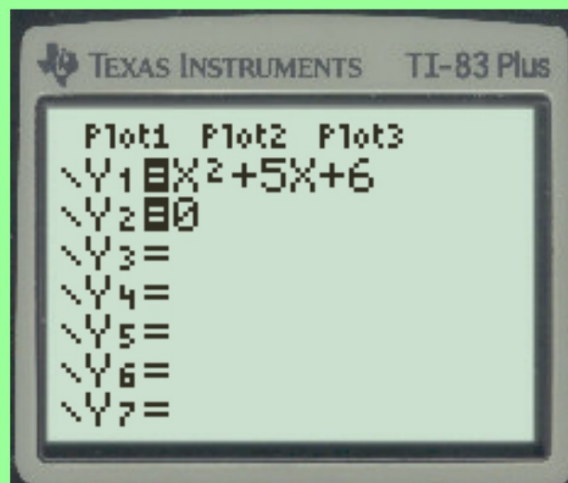
Solve using the calculator:

Example 1:  $y = x^2 + 5x + 6$

### Steps in Calculator:

y1 = type the equation

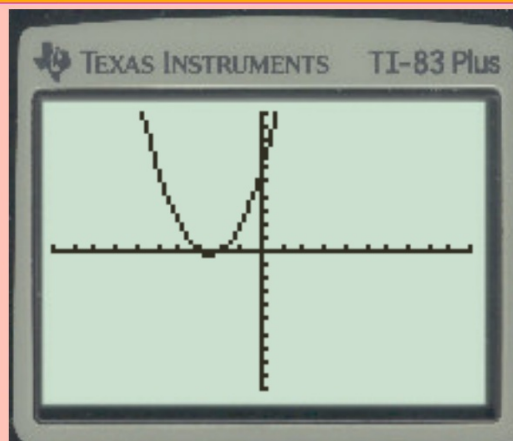
y2 = 0



## Step 2:

On the Calculator

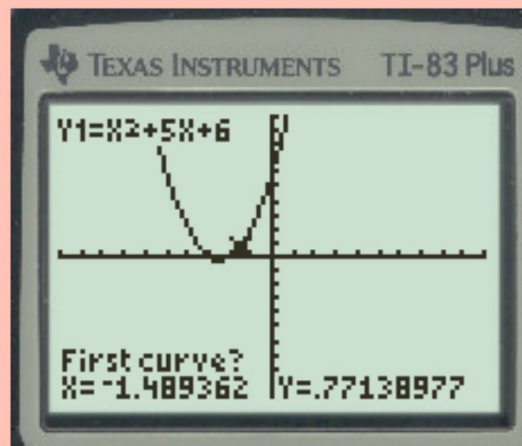
-Zoom 6



## Step 3:

On the Calculator

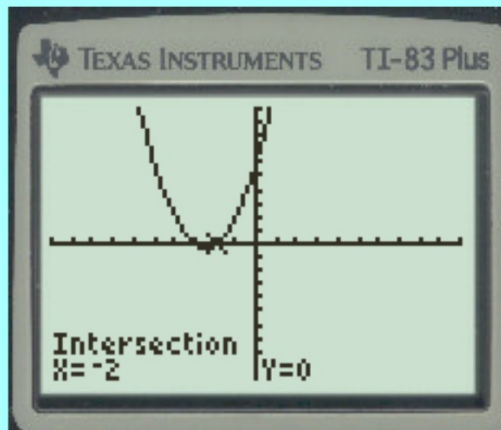
- 2ND TRACE
- 5: Intersection
- move near the x-intercepts



### Step 4:

On the Calculator

- Enter Enter Enter



### Step 5:

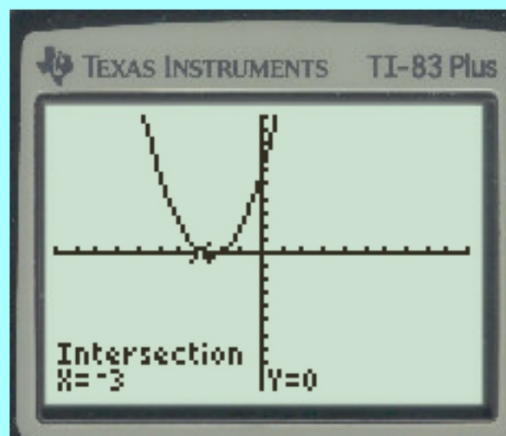
On the Calculator

-2nd-Trace-5

-Move cursor close to the other intersection

-Enter Enter Enter

The intersections are  $(-2, 0)$  and  $(-3, 0)$ , so the roots are  $\{-2, -3\}$



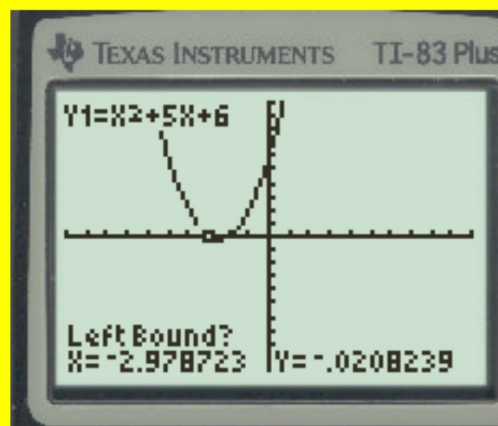
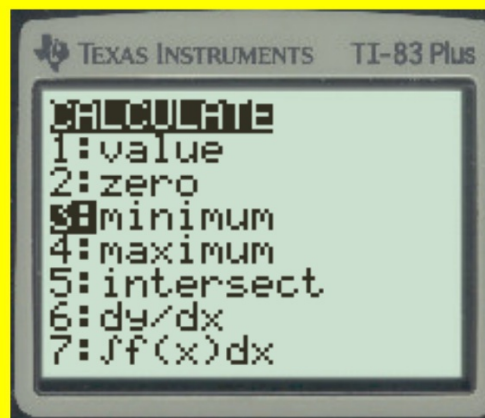
## Step 6:

## Finding the Vertex on the Calculator

### On the Calculator

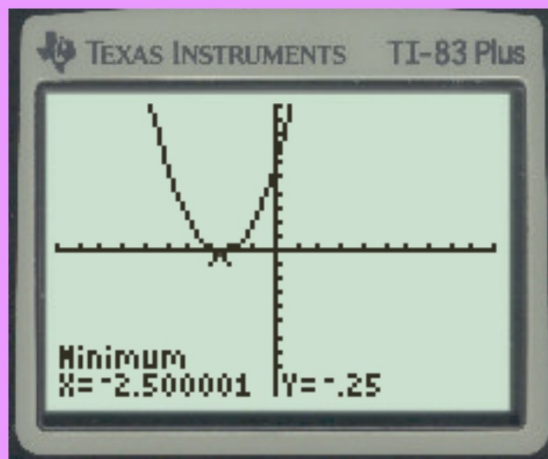
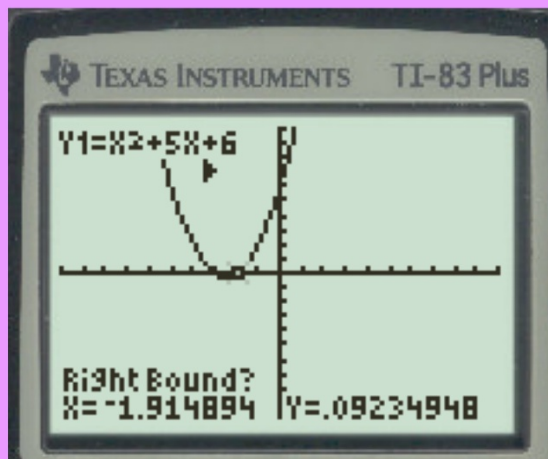
- 2nd Trace
- Select Min if a is +
- Select Max if a is -

-When the calculator asks you for left bound put the cursor to the left of the vertex and press ENTER.



**-When the calc asks for right bound put the cursor to the right of the vertex and press ENTER.**

**-Hit ENTER again**



**The vertex is (-2.5, -.25)**

Solve using the graphing calculator and identify the vertex. If you get a decimal round to the nearest hundredth.

1.  $y = x^2 + 4x + 4$

2.  $y = -x^2 - 6x + 5$

3.  $y = 2x^2 - 8x + 5$

4.  $y = x^2 + 8x + 16$

5.  $y = 3x^2$   
 $(0, 0)$

6.  $y = -2x^2 + 4x - 3$   
 $(1, -1)$

7.  $y = x^2 + 16$

8.  $y = 2x^2 + 7x + 4$

Root  
 $x=0$

NO  $\mathbb{R}$   
roots



Natale found a tennis ball outside a tennis court. She picked up the ball and threw it over the fence into the court. The path of the ball can be represented by  $h = -16t^2 - 2t + 5$

1. Find the maximum height of the tennis ball
2. How long will it take to reach the ground?