Approximating Relative Maxima and Minima

Instructions for the TI-84 Plus

Example: Use a graphing calculator to determine any relative (local) maxima or minima of the function $f(x) = 1.4x^3 - x^2 - 2x + 3$. Use the window settings that are shown in Fig. 1.

Fig.1

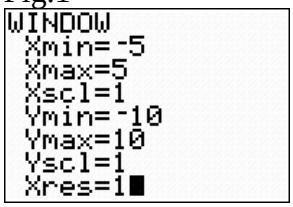
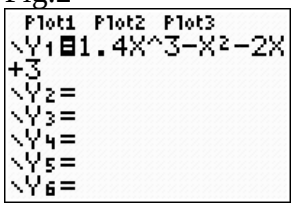


Fig.2



Press [Y=] to enter the function into the function editor. Press the following keystrokes to enter the function: [1] [.] [4] [X,T,Θ,n] [^] [3] [−] [X,T,Θ,n] [x^2] [−] [2] [X,T,Θ,n] [+] [3] [ENTER]. Your function editor should look like the one shown in Fig. 2. Press [GRAPH]. As you see in Fig.3 there is one local maximum and one local minimum. We will find the local maximum first. Press [2nd] [TRACE] to get the screen shown in Fig. 4. Press [4] for 4: maximum. The result is shown in Fig. 5.

Fig.3

Fig.4

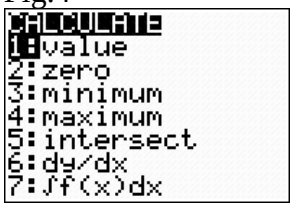
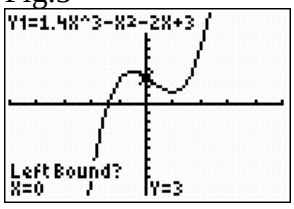


Fig.5



Press [◀] until you move the cursor to the left of the local maximum as shown in Fig.6. Press [ENTER]. Your screen should look like the one shown in Fig. 7. Press [▶] until the cursor is to the right of the local maximum as shown in Fig. 8.

Fig.6

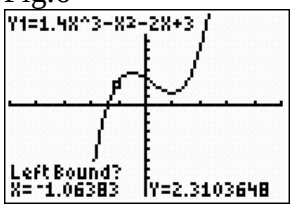


Fig.7

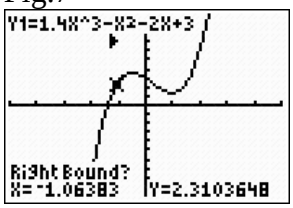
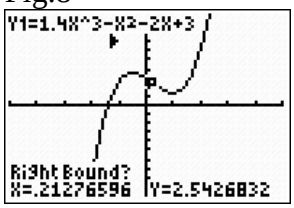


Fig.8



Press ENTER, then ENTER again. The result is shown in Fig.9. As you can see the local maximum is 3.58 at -.49, rounded to the nearest hundredth. To find the local minimum,

Fig.9

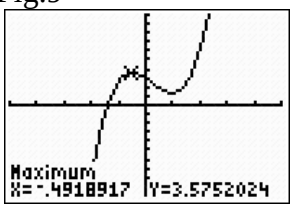
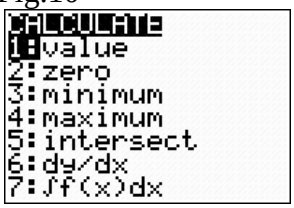


Fig.10



press 2nd TRACE. You will see the screen shown in Fig.10. Select 3: minimum by pressing 3. The result is shown in Fig.11. Move the cursor by pressing ›

Fig.11

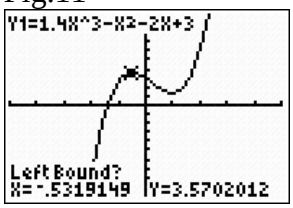
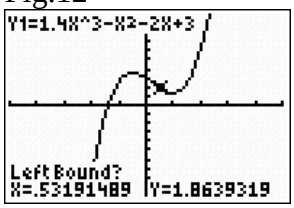


Fig.12



until the cursor is to the left side of the local minimum, as shown in Fig.12. Press ENTER. Your screen should look like the one shown in Fig.13. Press › until the cursor is to

Fig.13

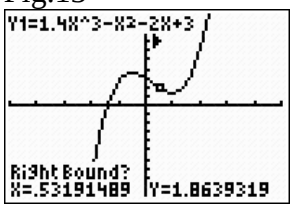
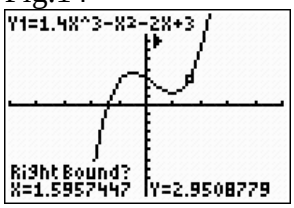
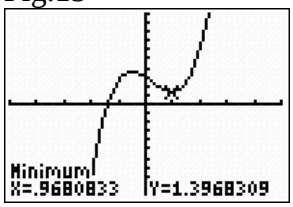


Fig.14



the right side of the local minimum, as shown in Fig.14. Press ENTER then ENTER again to get the local minimum as shown in Fig.15.

Fig.15



As you see in Fig.15 the local minimum is 1.40 at .97, rounded to the nearest hundredth.