Graphing Polynomials and Jumping to Find the Roots

A polynomial $y = f(x)$ is an expression of the sums of several terms that contain different powers of the same originals. The roots are found at the intersection of the x- axis and the graph, i. e. when $y = 0$.

Example

Draw a graph of a polynomial and find the roots by using the Calculate feature.

1. Graph the polynomial $y = x^4 + x^3 - 5x^2 - 3x + 1$.

2. Find the four roots one by one.

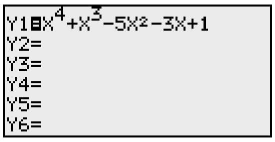
Before Starting

There may be differences in the results of calculations and graph plotting depending on the setting.
Return all settings to the default value and delete all data.
Setting the zoom factors to 5 : [ZOOM] [A] [ENTER] [A] [ENTER] [A] [ENTER] [2nd F] [QUIT]

Step & Key Operation	Display	Notes

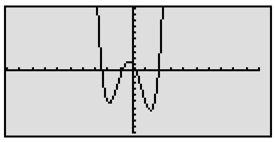
1-1 Enter the polynomial $y = x^4 + x^3 - 5x^2 - 3x + 1$

[Y=] [X/θ/T/n] [a^b] [4] [▶] [+] [X/θ/T/n]
[a^b] [3] [▶] [—] [5] [X/θ/T/n] [X^2]
[—] [3] [X/θ/T/n] [+] [1]



1-2 View the graph.

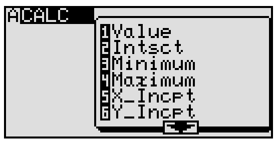
[GRAPH]

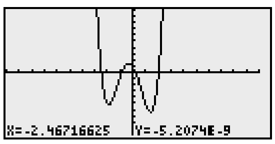


2-1 Find the first root.

[2nd F] [CALC]

[5]

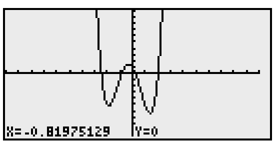




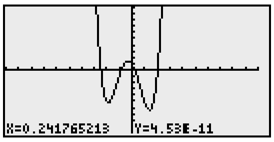
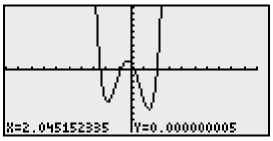
$x \doteqdot -2.47$
Y is almost but not exactly zero. Notice that the root found here is an approximate value.

2-2 Find the next root.

[2nd F] [CALC] [5]



$x \doteqdot -0.82$

Step & Key Operation	***Display***	***Notes***
2-3 Find the next root. 2nd F CALC 5		$x \doteqdot 0.24$
2-4 Find the next root. 2nd F CALC 5		$x \doteqdot 2.05$

The calculator allows jumping to find the roots by graphing a polynomial and using the Calculate feature, without tracing the graph.