

Zeros of Polynomials

ID: 13643

Time required
15–20 minutes

Activity Overview

In this activity, students will graph polynomials to determine the value and number of zeros for a given polynomial. They will use the **Intersection Points** tool and the **Coordinates and Equations** tool to find and display the zeros.

Topic: Polynomials

- Zeros & Roots
- Rational Root Theorem

Teacher Preparation and Notes

- Students may want or need to change the window to see the graphs. Students can change the window by selecting **MENU > Window > Window Settings** and enter appropriate settings for the window.
- To download the student and solution TI-Nspire documents (.tns files) and student worksheet, go to education.ti.com/exchange and enter “13643” in the quick search box.

Associated Materials

- ZerosOfPoly_Student.doc
- ZerosOfPoly.tns
- ZerosOfPoly_Soln.tns

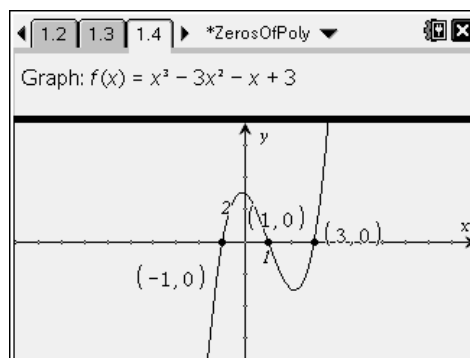
Suggested Related Activities

To download any TI-Nspire technology activity listed, go to education.ti.com/exchange and enter the number in the quick search box.

- Discriminating Against the Zero (TI-Nspire Technology) — 11521
- Asymptotes and Zeros (TI-Nspire Technology) — 9286
- Watch Your P's and Q's (TI-Nspire Technology) — 8517
- One of the Many Ways (TI-Nspire Technology) — 11885

Problem 1 – Finding Zeros Graphically

Students will graph polynomial functions and use the **Intersection Point(s)** tool (**MENU > Points & Lines > Intersection Point(s)**) and **Coordinates and Equations** tools (**MENU > Actions > Coordinates and Equations**) to find the values of the zeros. This process will display the coordinates of the points. Students will need to understand that the first number of the coordinate is the value of the zero. Explain to them that all real zeros are also x-intercepts.



Students are asked to observe the number of zeros compared to the degree of the polynomial. They should notice that the number of zeros is less than or equal to the degree of the polynomial.

Discussion Questions

- How does one know by plugging a number into the equation that it is a zero?
- For any polynomial, how many zeros are there and what is the degree of the polynomial?
- Why are there less zeros than the degree of the polynomial?
- What is common about where the number of zeros is less than the degree of the polynomial?

Solutions – student worksheet

Function	Zeros
$f(x) = x^3 - 3x^2 - x + 3$	1, -1, 3
$f(x) = x^3 - 3x - 2$	-1, 2
$f(x) = x^4 + 5x^3 + 3x^2 - 5x - 4$	-4, -1, 1
$f(x) = x^4 - x^3 - 7x^2 + x + 6$	-2, -1, 1, 3
$f(x) = x^4 - 3x^3 - 6x^2 + 28x - 24$	-3, 2
$f(x) = x^5 + 2.6x^4 - 1.11x^3 - 3.74x^2 - 0.73x + 0.3$	-2.5, -1, -0.5, 0.2, 1.2

1. *Sample Answer:* The number of roots is less than or equal to the degree, n , of the polynomial.
2. Sometimes
3. False
4. 5