



Zeros of a Quadratic Function

Student Activity

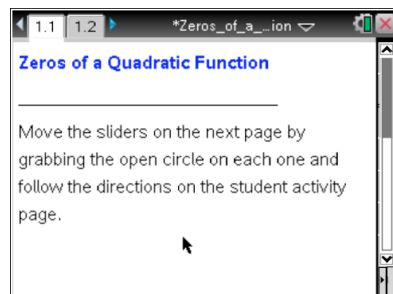
Name _____

Class _____

Open the TI-Nspire document

Zeros_of_a_Quadratic_Function.tns.

In this activity, you will observe graphs of pairs of linear functions and the related quadratic function. You will investigate the points at which the functions cross the x-axis and the zeros of the functions.



Move to page 1.2.

Press **ctrl** **▶** and **ctrl** **◀** to navigate through the lesson.

1. Use the sliders to set $y_1 = 2x + 2$ and $y_2 = 1x - 2$. Observe that the graph of $y_1 = 2x + 2$ appears to cross the x-axis at $x = -1$. When $x = -1$, $y_1 = 0$ because $2(-1) + 2 = 0$. $x = -1$ is called a **zero** of the function $y_1 = 2x + 2$.
 - a. Where does the graph of $y_2 = 1x - 2$ appear to cross the x-axis?
 - b. Verify that this value of x is a zero of y_2 .
2.
 - a. When $y_1 = 2x + 2$ and $y_2 = 1x - 2$, what is the function y_3 ?
 - b. How many times does the graph of $y_3 = 2x^2 - 2x - 4$ cross the x-axis?
 - c. What are the zeros of y_3 ?
 - d. Write a conjecture about the relationship between the zeros of the linear functions and the zeros of the quadratic function.
3.
 - a. Given the information below, use the sliders of the .tns document to fill in the rest of the table.

| y_1 | y_2 | Zeros of | | y_3 | Zeros of |
|----------|---------|----------|-------|-----------------|--------------|
| | | y_1 | y_2 | | y_3 |
| $2x + 4$ | $x - 1$ | | | | |
| $3x + 3$ | | | -4 | | |
| | | | | | -5 and 4 |
| | | | | $x^2 - 2x - 15$ | |

- b. What is the relationship between the zeros of the quadratic function and the zeros of the linear functions? Compare this to the conjecture you made in question 2d.



Zeros of a Quadratic Function

Student Activity

Name _____

Class _____

4. Factor each of the quadratic functions below.
 - a. $2x^2 + 2x - 4$
 - b. $3x^2 + 15x + 12$
 - c. $x^2 + x - 20$
 - d. $x^2 - 2x - 15$
5. How do the factors in question 4 relate to the information in the table in question 3?
6. Write a pair of linear functions whose product yields a quadratic function with zeros of 3 and -2 . What is the corresponding quadratic function? Describe the process you used to determine your answers.
7. Given the quadratic function $y = x^2 - 11x + 30$, determine its zeros. Describe the process you used to obtain your solutions.
8. Samuel says, "I can solve $x^2 - 11x + 30 = 0$ by factoring it, setting each factor equal to zero, and solving for x ." Is this a valid method? Explain.