

Activities from the article:

Why Use a Function Approach when Teaching Algebra?

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Exploration

Class _____ Name _____

For each of the following functions, find the maximum or minimum, and specify the range.

		Maximum	Minimum	Range
1.	$3 x + 2 - 5$	_____	_____	_____
2.	$5 x - 3 + 7$	_____	_____	_____
3.	$2 x + 4 + 3$	_____	_____	_____
4.	$-2 x - 3 + 6$	_____	_____	_____
5.	$-5 x + 1 + 4$	_____	_____	_____
6.	$-2.6 x - 5 - 7$	_____	_____	_____
7.	Given the absolute value function of the form $y = d x + e + f$, where d , e , and f are real numbers and $d \neq 0$, answer the following questions:			
a.	What is the maximum or minimum value of the function? _____			
b.	What is the first (or last) number in the range of the function? _____			
c.	What number, d , e , or f , helps you decide if there is a maximum or a minimum? _____			

1. What is the zero of the function $f(x) = 2(x - 3)$ 1. _____
2. What is the zero of the function $g(x) = 2x - 6$? 2. _____
3. How are functions f and g related? 3. _____
4. What is the zero of the function $f(x) = -4(x - 3)$? 4. _____
5. What is the zero of the function $g(x) = -4x + 12$? 5. _____
6. How are functions f and g related? 6. _____
7. What are the zeros of the function $f(x) = (x + 1)(x - 3)$? 7. _____
8. What are the zeros of the function $g(x) = x^2 - 2x - 3$? 8. _____
9. How are functions f and g related? 9. _____
10. What are the zeros of the function $f(x) = (x - 2)(x + 2)$? 10. _____
11. What are the zeros of the function $g(x) = x^2 - 4$? 11. _____
12. How are functions f and g related? 12. _____
13. If the zeros of $f(x)$ are -1 and 3 , create one possible $f(x)$. 13. _____
14. If the zeros of $f(x)$ are -4 and -2 , create one possible $f(x)$. 14. _____
15. If the zero of $f(x)$ is 5 , create one possible $f(x)$. 15. _____
16. If the zeros of $f(x)$ are -4 , 2 , and 1 , create one possible $f(x)$. 16. _____
17. If d and e are the integer zeros of a quadratic function $f(x)$,
create one possible $f(x)$. 17. _____

1. What are the zeros of the function $f(x) = (2x - 1)(x + 3)$?
Express them as reduced fractions. 1. _____
2. What are the zeros of the function $g(x) = 2x^2 + 5x - 3$?
Express them as reduced fractions. 2. _____
3. How are functions f and g related? 3. _____
4. What are the zeros of the function $f(x) = (3x - 1)(2x + 5)$?
Express them as reduced fractions. 4. _____
5. What are the zeros of the function $g(x) = 6x^2 + 13x - 5$?
Express them as reduced fractions. 5. _____
6. How are functions f and g related? 6. _____
7. What are the zeros of the function $f(x) = (2x - 3)(x + 2)$?
Express them as reduced fractions. 7. _____
8. What are the zeros of the function $g(x) = 2x^2 + x - 6$?
Express them as reduced fractions. 8. _____
9. How are functions f and g related? 9. _____
10. What are the zeros of the function $f(x) = (3x - 2)(2x + 3)$?
Express them as reduced fractions. 10. _____
11. What are the zeros of the function $g(x) = 6x^2 + 5x - 6$?
Express them as reduced fractions. 11. _____
12. How are functions f and g related? 12. _____
13. If $\frac{1}{2}$ and 3 are the zeros of a quadratic function $f(x)$,
create one possible $f(x)$ containing integer parameters. 13. _____
14. If $\frac{2}{3}$ and -3 are the zeros of a quadratic function $f(x)$,
create one possible $f(x)$ containing integer parameters. 14. _____
15. If $\frac{2}{3}$ and $-\frac{1}{4}$ are the zeros of a quadratic function $f(x)$,
create one possible $f(x)$ containing integer parameters. 15. _____
16. If $\frac{a}{b}$ and $\frac{d}{e}$ are the zeros of a quadratic function $f(x)$,
create one possible $f(x)$ containing integer parameters. 16. _____
17. Describe in your own words any connection you see between the zeros of a function and the symbolic form of the function.

In the first two explorations, you learned about the connection between function parameters and the related zeros of the function. Below is a quick review and then a continuation of the exploration.

1. Find the zeros of the function $y = (2x + 1)(x - 3)$. 1. _____
2. Find the zeros of the function $y = 2x^2 - 5x - 3$. 2. _____
3. Why are the zeros the same for $y = (2x + 1)(x - 3)$ and $y = 2x^2 - 5x - 3$? 3. _____
4. Find **any** polynomial whose zeros are -5 and 5 . 4. _____
5. Find **any** polynomial with integer parameters whose zeros are $-\frac{4}{5}$ and 3 . 5. _____
6. Based on what you learned in the first two explorations, write the function $y = x^2 + x - 2$ another way using the zero-parameter connection. 6. _____
7. Based on what you learned in the first two explorations, write the function $y = x^2 - 4$ another way using the zero-parameter connection. 7. _____
8. The function $y = 2x^2 - 5x - 3$ can be symbolized another way. Write it using other symbols with integer parameters. 8. _____
9. Why do you think the function $y = x^2 + 4$ cannot be written in different symbolic form with integer parameters? 9. _____
10. Why do you think the function $y = x^2 + 2x + 4$ cannot be written in different symbolic form with integer parameters? 10. _____
11. When you re-write a function like $y = x^2 + 3x - 28$ as $y = (x + 7)(x - 4)$, we say you are re-writing in factored form. Or we say you are factoring. For each of the following functions, re-write them in factored form. That is, factor them.
 - a. $3x^2 - x - 2$ a. _____
 - b. $x^2 - 9$ b. _____
 - c. $20x^2 + 33x - 36$ c. _____