Just In Time Quick Check

Standard of Learning (SOL) A.7c

Strand: Functions

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The student will investigate and analyze linear and quadratic function families and their characteristics both algebraically and graphically, including zeros.

Grade Level Skills:

- Identify the domain, range, zeros, and intercepts of a function presented algebraically or graphically.
- Use the *x*-intercepts from the graphical representation of a quadratic function to determine and confirm its factors.
- Investigate and analyze characteristics and multiple representations of functions with a graphing utility.

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Just in Time Quick Check Teacher Notes

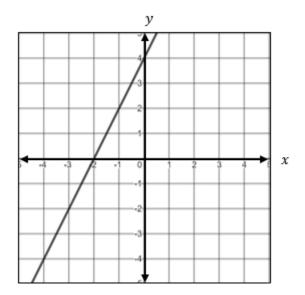
Supporting Resources:

- VDOE Mathematics Instructional Plans (MIPS)
 - o A.7bcd Functions 2: Exploring Quadratic Functions (Word) / PDF Version
 - A.7cd Quadratic Connections (Word) / PDF Version
 - A.7cd Solving Linear Equations Using Functions with Desmos (Word) / PDF Version
- VDOE Algebra Readiness Formative Assessments
 - A.7c,d (Word) / PDF
- VDOE Word Wall Cards: Algebra I (Word) | (PDF)
 - Solutions or Roots, Zeros, x-Intercepts
 - o Parent Functions Linear, Quadratic
- VDOE Rich Mathematical Tasks: The Soccer Competition
 - o A.7 The Soccer Competition Task Template (Word) / PDF Version
- Desmos Activities
 - Transforming Lines
 - o Two Truths and a Lie: Quadratics
 - o What's My Transformation?
 - o Polygraph: Parabolas and Polygraph: Parabolas Part 2
 - o Polygraph: Quadratics
 - o Will It Hit the Hoop?

Supporting and Prerequisite SOL: A.1b, A.2c, A.4b, A.7b

SOL A.7c - Just in Time Quick Check

- 1) What is the zero of $f(x) = -\frac{2}{3}x + 4$?
- 2) The graph of y = 2x + 4 is shown. What is the solution to 2x + 4 = 0?



- 3) What are the root(s) of the function $f(x) = 2x^2 x 6$?
- 4) If a second-degree polynomial function with a leading coefficient of 1 has zeros of x=3 and x=-2, what is the factored form of this function?
- 5) Let $g(x) = \frac{1}{2}x 3$ and h(x) = 3x + k. For what value of k is the zero of h(x) equivalent to the zero of g(x)?

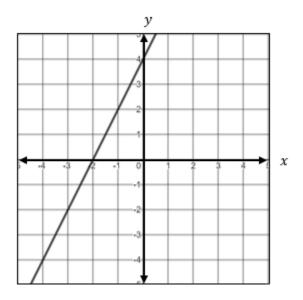
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Common Errors/Misconceptions and their Possible Indications

1) What is the zero of $f(x) = -\frac{2}{3}x + 4$?

A common error would be for a student to replace x with 0 instead of replacing y. This indicates a misunderstanding that a zero is the value where the function is set equal to zero. A strategy that could be used is to graph the function to show where it crosses the x-axis is also where the function is equal to 0.

The graph of y = 2x + 4 is shown. What is the solution to 2x + 4 = 0?



A common error would be for a student to include the y-intercept as a zero of the function. This indicates a misunderstanding that zeros are both x and y-intercepts. The definition of zero should be reviewed with the student. A strategy that could be used is to list the intercepts as a set of ordered pairs or as a table to demonstrate that only the x-intercept value is where the entire function is equal to zero.

3) What are the root(s) of the function $f(x) = 2x^2 - x - 6$?

A common error is for a student to only list the positive zero of 2 instead of both the positive and negative zero. This indicated a misconception that there can be more than one zero and zeros can be positive or negative values. A strategy that could be used is the graph the function using Desmos or graph paper and show how at both zeros the function is equal to zero.

4) If a second-degree polynomial function with a leading coefficient of 1 has zeros of x = 3 and x = -2, what is the factored form of this function?

A common error a student may make is to write the factored form as f(x) = (x+3)(x-2). This indicates a misunderstanding of the connection between x-intercepts and factors. A strategy that could be used is to review the connection between factors and solutions. This could be done algebraically or graphically.

5) Let $g(x) = \frac{1}{2}x - 3$ and h(x) = 3x + k. For what value of k is the zero of h(x) equivalent to the zero of g(x)?

A common error would be for a student to say that k = 6, which is the zero of g(x). This indicates the student would benefit from additional practice in comparing functions and working with constant variable terms. A strategy that could be used is for the students to experiment with the slider feature in Desmos to demonstrate what happens to the graph and equation of h(x) as k changes in value.