Just In Time Quick Check

Standard of Learning (SOL) AII.7e

Strand: Functions
Standard of Learning (SOL) AII.7e ***The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include intercepts.***
Grade Level Skills: ● Identify the domain, range, zeros, and intercepts of a function presented algebraically or graphically, including graphs with discontinuities. ● Investigate and analyze characteristics and multiple representations of functions with a graphing utility.
Just in Time Quick Check
Just in Time Quick Check Teacher Notes
Supporting Resources: ● VDOE Mathematics Instructional Plans (MIPS) o AII.7adei - Intercepts, Asymptotes, and Discontinuity of Functions (Word) / PDF Version ● VDOE Word Wall Cards: Algebra II (Word) | (PDF) o x-Intercepts ● Desmos Activity o Polygraph: Parent Functions o Polygraph: Polynomial Functions o Polynomial Equation Challenge
Supporting and Prerequisite SOL: AII.6a, AII.8, A.4a, A.6c, A.7d, 8.16b, 8.16d, 8.17

SOL AII.7e - Just in Time Quick Check

1. The function $f(x)$ is given. Circle all the intercepts of the function.

$$f(x) = x^3 - 2x^2 - 5x + 6$$

$(0, 3)$	$(1, 0)$	$(3, 0)$	$(6, 0)$
$(-2, 0)$	$(0, -2)$	$(0, 6)$	$(0, 1)$

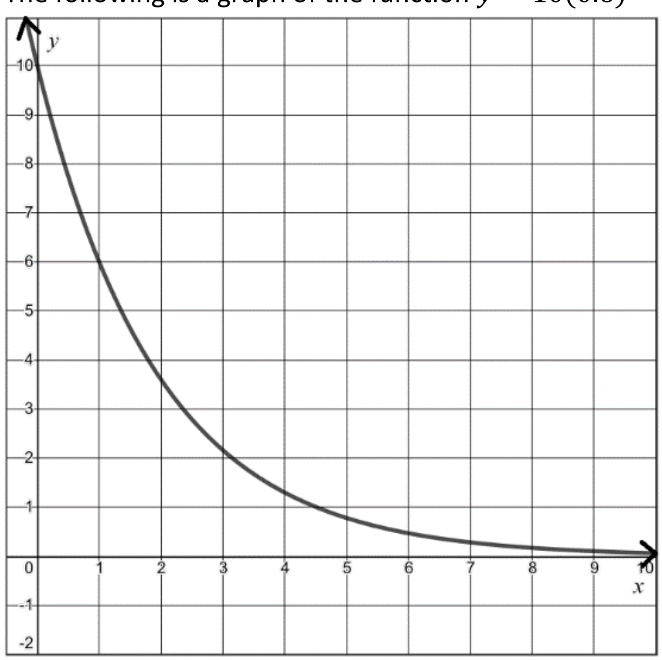
2. What is the y-intercept of the graph of

$$y = \frac{x+5}{x-4}\ ?$$

3. What are the x-intercepts of the following function?

$$f(x) = \frac{x^2 - 9}{x + 3}$$

4. The following is a graph of the function $y = 10(0.6)^x$



What is the x-intercept of the following function?

SOL AII.7e - Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

1. The function $f(x)$ is given. Circle all the intercepts of the function.

$$f(x) = x^3 - 2x^2 - 5x + 6$$

$(0, 3)$	$(1, 0)$	$(3, 0)$	$(6, 0)$
$(-2, 0)$	$(0, -2)$	$(0, 6)$	$(0, 1)$

A common error would be for students to circle: $(-2, 0)$, $(1, 0)$, and $(3, 0)$ and leave out $(0, 6)$. This may indicate a misunderstanding that intercepts only refer to the x-intercepts of a function. The teacher may want to have students graphically represent this function and review the definitions of intercepts with students.

2. What is the *y*-intercept of the graph of

$$y = \frac{x + 5}{x - 4} \text{ ?}$$

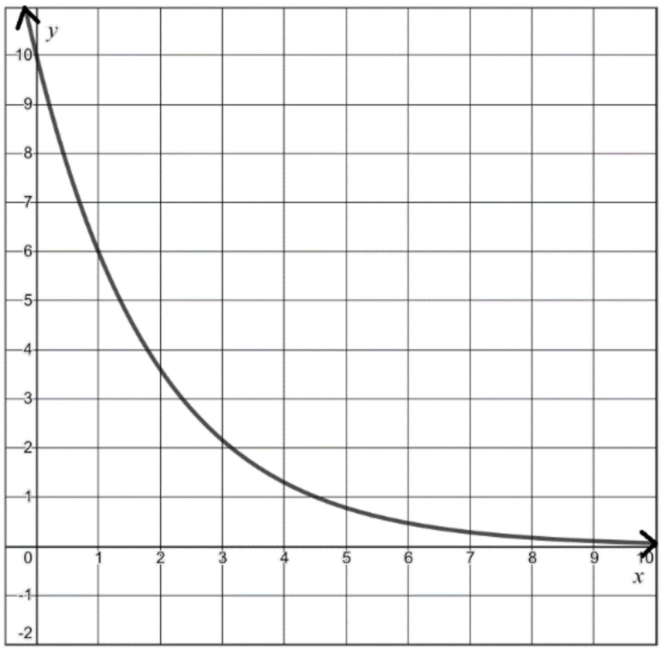
A common error some students may make is to provide answers of -5 and 4. This may indicate a misunderstanding that the y-intercept is found by setting the numerator and denominator equal to zero and solving. A teaching strategy that would be helpful is to have students substitute x = 0 into the equation to find a possible y-intercept of the function algebraically. In addition, have students use Desmos to create a visual representation and verify the y-intercept of this function. It might also be helpful to use Desmos to change the linear expressions used in the numerator and denominator of this function to explore the effect this has on the y-intercept e.g. change $x + 5$ to $x + 2$ and $x - 4$ to $x + 4$.

3. What are the *x*-intercepts of the following function?

$$f(x) = \frac{x^2 - 9}{x + 3}$$

A common error is that the students will state that this rational function has two x-intercepts at $(-3, 0)$ and $(3, 0)$. This may indicate that the student did not check for holes (removable discontinuities). A teaching strategy would be to encourage students to use Desmos to create a visual representation to avoid listing two x-intercepts in error. They can also use Desmos to drag a point along the function. As a student drags the point along the graph and hovers at $x = -3$, the student will see the graph is undefined at that value.

4. The following is a graph of the function $y = 10(0.6)^x$



What is the *x*-intercept of the following function?

A common error some students may make is to state that 10 is the x-intercept. This may indicate that a student does not realize that the exponential function, which appears to be approaching 10 on the x-axis, actually will not touch the x-axis unless the function is translated down. A teacher may want to review why an exponential function has a natural asymptote at $y = 0$, both algebraically and graphically.