Just In Time Quick Check

[Standard of Learning (SOL) A.7](https://www.doe.virginia.gov/home/showpublisheddocument/2866/637982462406870000)d

| Strand:Functions |
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| Standard of Learning (SOL) A.7d *The student will investigate and analyze linear and quadratic function families and their characteristics both* *algebraically and graphically, including intercepts.* |
| 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**](#quick)  |
| [**Just in Time Quick Check Teacher Notes**](#jitteachnote) |
| Supporting Resources: * VDOE Mathematics Instructional Plans (MIPS)
	+ [A.7bcd - Functions 2: Exploring Quadratic Functions](https://www.doe.virginia.gov/home/showpublisheddocument/15956/638035206233170000) (Word) / [PDF Version](https://www.doe.virginia.gov/home/showpublisheddocument/15958/638035206239270000)
	+ [A.7cd - Quadratic Connections](https://www.doe.virginia.gov/home/showpublisheddocument/15964/638035206254730000) (Word) / [PDF Version](https://www.doe.virginia.gov/home/showpublisheddocument/15966/638035206260970000)
	+ [A.7cd - Solving Linear Equations Using Functions with Desmos](https://www.doe.virginia.gov/home/showpublisheddocument/15960/638035206243970000) (Word) / [PDF Version](https://www.doe.virginia.gov/home/showpublisheddocument/15962/638035206249570000)
* VDOE Algebra Readiness Formative Assessments
	+ [A.7c,d](https://www.doe.virginia.gov/home/showpublisheddocument/30986/638046554983300000) (Word) / [PDF](https://www.doe.virginia.gov/home/showpublisheddocument/30988/638046554989270000)
* VDOE Word Wall Cards: Algebra I   [(Word)](https://www.doe.virginia.gov/home/showpublisheddocument/18630/638041054191430000)  |  [(PDF)](https://www.doe.virginia.gov/home/showpublisheddocument/18628/638041054182370000)
	+ x-Intercepts
	+ Parent Functions - Linear, Quadratic
* VDOE Rich Mathematical Tasks: The Soccer Competition
	+ [A.7 The Soccer Competition Task Template](https://www.doe.virginia.gov/home/showpublisheddocument/26568/638045686349330000) (Word) / [PDF Version](https://www.doe.virginia.gov/home/showpublisheddocument/26570/638045686354630000)
* Desmos Activities
	+ [Transforming Lines](https://teacher.desmos.com/activitybuilder/custom/5beeffea3d231b0c5a36db5f)
	+ [Two Truths and a Lie: Quadratics](https://teacher.desmos.com/activitybuilder/custom/5d337131828b87201c4ca136)
	+ [What’s my Transformation?](https://teacher.desmos.com/activitybuilder/custom/56001cb3ccac42274a00be25)
	+ [Polygraph: Parabolas](https://teacher.desmos.com/polygraph-parabolas), [Polygraph: Parabolas Part 2](https://teacher.desmos.com/activitybuilder/custom/574f12421390db611564fa32)
	+ [Polygraph: Quadratics](https://teacher.desmos.com/polygraph/custom/5bbb6c34ac8e9f0b29fcdbb8)
	+ [Will It Hit the Hoop?](https://teacher.desmos.com/activitybuilder/custom/56e0b6af0133822106a0bed1)
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| **[Supporting and Prerequisite SOL](https://www.doe.virginia.gov/teaching-learning-assessment/k-12-standards-instruction/mathematics/instructional-resources/just-in-time-mathematics-quick-checks)**: [A.1b](https://www.doe.virginia.gov/home/showpublisheddocument/25352/638045617786030000), [A.4a](https://www.doe.virginia.gov/home/showpublisheddocument/25380/638045617856370000), [A.6c](https://www.doe.virginia.gov/home/showpublisheddocument/25424/638045619517400000), [8.16b](https://www.doe.virginia.gov/home/showpublisheddocument/25324/638045435991270000), [8.16d](https://www.doe.virginia.gov/home/showpublisheddocument/25332/638045440668500000), [8.17](https://www.doe.virginia.gov/home/showpublisheddocument/25340/638045440689900000), [7.10c](https://www.doe.virginia.gov/home/showpublisheddocument/25180/638045413961200000), [7.12](https://www.doe.virginia.gov/home/showpublisheddocument/25196/638045414008400000) |

SOL A.7d - Just in Time Quick Check

1. Circle all of the following functions that have an *x*-intercept of 3.

$$f\left(x\right)=x^{2}-2x+3$$

 $g\left(x\right)=2x-6$

 $h\left(x\right)=x^{2}-9$

 $p\left(x\right)=-\frac{1}{2}x+3$

 $q\left(x\right)=-3x^{2}+10x-3$

1. Let $g\left(x\right)=-\frac{2}{3}x+5$ and $h\left(x\right)=\frac{4}{5}x+k$. For which value of $k$ will the *x*-intercept of $g(x)$ be

equivalent to the *x*-intercept of $h(x)$?

1. Write the *x*- and *y*-intercept of the function $f\left(x\right)=3x-4$ each as an ordered pair.
2. Circle the *y*-intercept of the function shown on the graph.



1. Which of the following functions have exactly one *x*-intercept?

 $f\left(x\right)=4x(x-5)$

 $g\left(x\right)=x^{2}-6x+9$

 $h\left(x\right)=2x^{2}+4x+3$

 $j\left(x\right)=-3(x+1)$

SOL A.7d - Just in Time Quick Check Teacher Notes

 **Common Errors/Misconceptions and their Possible Indications**

1. Circle all of the following functions that have an *x*-intercept of 3.

$$f\left(x\right)=x^{2}-2x+3$$

 $g\left(x\right)=2x-6$

 $h\left(x\right)=x^{2}-9$

 $p\left(x\right)=-\frac{1}{2}x+3$

 $q\left(x\right)=-3x^{2}+10x-3$

*A common error a student may make is to select the functions with a y-intercept of 3, such as f(x) and p(x). This may indicate that a student has difficulty differentiating between an x-intercept and y-intercept using an algebraic approach. A strategy that might be useful is to have a student represent the functions visually and determine which functions have an x-intercept of 3 then make the connection algebraically. Desmos is a powerful tool that can be used to show connections between algebraic forms, graphs, and intercepts.*

1. Let $g\left(x\right)=-\frac{2}{3}x+5$ and $h\left(x\right)=\frac{4}{5}x+k$. For which value of $k$ will the *x*-intercept of $g(x)$ be equivalent to the *x*-intercept of $h(x)$?

*A common error that a student may make is to say that* $k=7.5$*, which is the x-intercept 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.*

1. Write the *x*- and *y*-intercept of the function $f\left(x\right)=3x-4$ each as an ordered pair.

*A common error a student may make is to write the x-intercept as (0,* $\frac{4}{3}$*) or the y-intercept as (-4, 0). This may indicate a misunderstanding of representing x- and y-intercepts as ordered pairs. A strategy that might be helpful for students is to verify the intercepts using a graphing utility such as Desmos. In addition, a student might find helpful to use the table feature in Desmos to verify intercepts.*

1. Circle the *y*-intercept of the function shown on the graph.



*A common error a student may make is to circle both the x- and y-intercepts or to circle only the x-intercepts. This may indicate that a student has difficulty distinguishing between x- and y-intercepts and a misunderstanding between intercepts and solutions of a function. A strategy that might be helpful for students is to represent the x- and y-intercepts as a set of ordered pairs or as a table to show the similarities and differences between the coordinates.*

1. Which of the following functions have exactly one *x*-intercept?

 $f\left(x\right)=4x(x-5)$

 $g\left(x\right)=x^{2}-6x+9$

 $h\left(x\right)=2x^{2}+4x+3$

 $j\left(x\right)=-3(x+1)$

*A common error a student may make is to select f(x) as having only one x-intercept because it is written in factored form and appears to have one binomial factor. This may indicate that a student does not recognize that the GCF of 4x is also a factor of the function and constitutes a unique x-intercept. A strategy that might be helpful for students is to verify the intercepts using a graphing utility such as Desmos. In addition, a student might find helpful to use the table feature in Desmos to verify the x-intercepts a function.*