

Just In Time Quick Check
Standard of Learning (SOL) A.4a

Strand: Equations & Inequalities

Standard of Learning (SOL) A.4a

The student will solve multistep linear equations in one variable algebraically.

Grade Level Skills:

- Determine whether a linear equation in one variable has one, an infinite number, or no solutions.
- Apply the properties of real numbers and properties of equality to simplify expressions and solve equations.
- Solve multistep linear equations in one variable algebraically.

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting Resources:

- VDOE Mathematics Instructional Plans (MIPS)
 - [A.4ae - Progressing Through Equations](#) (Word) / [PDF Version](#)
- VDOE Algebra Readiness Formative Assessments
 - [A.4a](#) (Word) / [PDF](#)
- VDOE Rich Mathematical Tasks: Radical Rocks Task
 - [A.4ae Radical Rocks Task Template](#) (Word) / [PDF Version](#)
 - [A.4ae Radical Rocks Student Version of Task](#) (Word) / [PDF Version](#)
 - [A.4ae Radical Rocks Anchor Papers](#) (Word) / [PDF Version](#)
 - [A.4ae Radical Rocks Anchor Papers Scoring Rationales](#) (Word) / [PDF Version](#)
- Desmos Activity
 - [Smallest Solution](#)

Supporting and Prerequisite SOL: [A.1a](#), [8.14b](#), [8.17](#), [7.12](#)

SOL A.4a - Just in Time Quick Check

- 1) Solve the equation algebraically. Show your work/thinking.

$$4x - 10 = 6x - 12$$

- 2) Solve the equation algebraically. Show your work/thinking.

$$\frac{1}{2}x - 7 = 5 - 3\left(\frac{5}{6}x - 2\right)$$

- 3) Andre correctly solved an equation using the steps shown:

$$\begin{aligned}3(x + 2) &= 3x + 4 \\3x + 6 &= 3x + 4 \\3x + 6 - 3x &= 3x + 4 - 3x \\6 &= 4 \\6 - 4 &= 4 - 4 \\2 &= 0\end{aligned}$$

What does Andre's work show us about the type of solution to the equation? How do you know?

- 4) For what value of k will the equation have infinitely many solutions? How do you know?

$$-2(4x + 1) = \frac{1}{2}kx - 2$$

SOL A.4a - Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

- 1) Solve the equation algebraically. Show your work/thinking.

$$4x - 10 = 6x - 12$$

A common mistake students make is to add $6x$ to both sides of the equation since the operation on the right side of the equation is subtraction. This may indicate that students understand the use of inverse operations but do not apply the correct inverse operation to the term they are manipulating. Teachers may want to use algebra tiles to build a better conceptual understanding of the signs associated with each term and what inverse operations can be used in the process of isolating the variable. Teachers may also want to review solving equations with variables on one side of the equation.

- 2) Solve the equation algebraically. Show your work/thinking.

$$\frac{1}{2}x - 7 = 5 - 3\left(\frac{5}{6}x - 2\right)$$

One common mistake students may make is distributing 3 rather than -3. This indicates that the student may not fully understand the distributive property with a negative coefficient. Teachers may want to reinforce the relationship between addition and subtraction (i.e. subtracting three and adding negative three are equivalent). Teachers may also ask students to type each step of their work into Desmos in order to verify that they have performed each step correctly. This allows students to find their errors as they work through the problem rather than waiting until the end. In addition, using algebra tiles to demonstrate the distributive property with examples having integer coefficients can help students build conceptual understanding.

- 3) Andre correctly solved an equation using the steps shown:

$$\begin{aligned}3(x + 2) &= 3x + 4 \\3x + 6 &= 3x + 4 \\3x + 6 - 3x &= 3x + 4 - 3x \\6 &= 4 \\6 - 4 &= 4 - 4 \\2 &= 0\end{aligned}$$

What does Andre's work show us about the type of solution to the equation? How do you know?

A common misconception students have is interpreting what type of solution exists when the result of the equation does not contain a variable. This indicates that students do not have a firm understanding of algebraic solutions of equations with infinitely many or no solutions. Teachers may consider using Desmos to graph each side of the equation so that students see there are no common values (lines are parallel). Teachers may also consider using algebra tiles to help students see that the right and left sides of the equation will never balance.

- 4) For what value of k will the equation have infinitely many solutions? How do you know?

$$-2(4x + 1) = \frac{1}{2}kx - 2$$

A common mistake students may make is assuming $k = -8$ since the left side of the equation simplifies to $-8x - 2$. This indicates that while students understand that an equation with infinitely many solutions has a left and right side that are always equivalent, they don't take the next step to solve for k (by setting $\frac{1}{2}k = -8$). Since there are infinitely many solutions to the equation, one strategy teachers may suggest to students is to substitute any value in for x and then solve for k . Another strategy teachers may want to use is to have students verify their solution graphically (by graphing each side of the equation to see if the lines are coinciding).