

Just In Time Quick Check
Standard of Learning (SOL) A.5a

Strand: Equations and Inequalities

Standard of Learning (SOL) A.5a

The student will solve multistep linear inequalities in one variable algebraically and represent the solution graphically.

Grade Level Skills:

- Solve multistep linear inequalities in one variable algebraically and represent the solution graphically.
- Apply the properties of real numbers and properties of inequality to solve multistep linear inequalities in one variable algebraically.
- Determine and verify algebraic solutions using a graphing utility.

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting Resources:

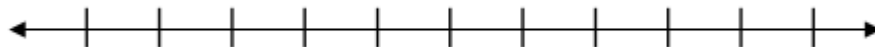
- VDOE Mathematics Instructional Plans (MIPS)
 - [A.5ac - Lemonade Stand: Solving Practical Problems Using Linear Inequalities in One Variable](#) (Word) / [PDF Version](#)
 - [A.5a - Solving Linear Inequalities in One Variable](#) (Word) / [PDF Version](#)
- VDOE Algebra Readiness Formative Assessments
 - [A.5a,c](#) (Word) / [PDF](#)
- VDOE Word Wall Cards: Algebra I ([Word](#)) | ([PDF](#))
 - Inequality
 - Graph of an Inequality
 - Transitive Property for Inequality
 - Addition/Subtraction Property of Inequality
 - Multiplication Property of Inequality
 - Division Property of Inequality
- VDOE Rich Mathematical Tasks: Trampoline Party Task
 - [A.5ac Trampoline Party Task Template](#) (Word) / [PDF Version](#)
- Desmos Activity
 - [Point Collector](#)

Supporting and Prerequisite SOL: [A.1a](#), [A.4a](#), [8.1](#), [8.14b](#), [8.18](#), [7.13](#)

SOL A.5a - Just in Time Quick Check

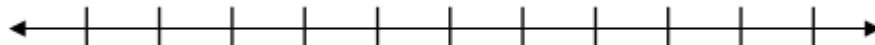
- 1) Solve the inequality and graph the solution set on the number line. Show your work/thinking

$$15 \leq 3(8x - 4) - 9x$$



- 2) Solve the inequality and graph the solution set on the number line. Show your work/thinking.

$$8 - 2(3x + 9) < 4x - 5$$



- 3) Which of the following values are in the solution set for the inequality $\frac{2}{3}(9 - 15x) < 8x$? Show your work/thinking.

$$\left\{ -1, \frac{1}{3}, 1, 2\frac{1}{2} \right\}$$

- 4) Solve the inequality. Show your work/thinking. Write your answer in set notation.

$$8x - 7 + 10x > 2(4 + 9x)$$

SOL A.5a - Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

- 1) Solve the inequality and graph the solution set on the number line. Show your work/thinking

$$15 \leq 3(8x - 4) - 9x$$

A common mistake students may make is shading the number line in the wrong direction because the variable is on the right side of the inequality. Students sometimes erroneously believe that the direction the inequality symbol points is the direction the number line should be shaded. Teachers may help students fix this misconception by providing additional practice with variables on the right side of the inequality. Teachers may want to start with very simple inequalities such as comparing the graphs of $x > 3$ and $3 > x$. Selecting “test” points from the shaded region to substitute into the original inequality to verify the solution is another way students can check their work. Students can also use Desmos to confirm their graphed solution. If there is a difference between their graph and the one Desmos displays, students should be encouraged to find the reason for the discrepancy and explain how to correct the error.

- 2) Solve the inequality and graph the solution set on the number line. Show your work/thinking.

$$8 - 2(3x + 9) < 4x - 5$$

A common mistake students make on this question is neglecting to reverse the inequality symbol when they divide both sides by a negative number. This could indicate that students do not understand why the inequality symbol must be reversed with multiplying or dividing an inequality by a negative number. Having students complete a short investigation of the properties of inequality may help them understand why the inequality sign is reversed in those situations. Teachers may also ask students to type each step of their work into Desmos. When they perform a step correctly, the resulting graph will match the original. If a mistake is made, the two graphs will not be identical. This allows students to find their errors as they work through the problem rather than waiting until the end.

- 3) Which of the following values are in the solution set for the inequality $\frac{2}{3}(9 - 15x) < 8x$? Show your work/thinking.

$$\left\{ -1, \quad \frac{1}{3}, \quad 1, \quad 2\frac{1}{2} \right\}$$

A common mistake students make on this question is including $\frac{1}{3}$ as an element of the solution set. This could indicate that students think that the value they identify when they solve an inequality (the endpoint of the graphical representation of the solution set) is always a solution for the inequality. Teachers may want to encourage students to graph the inequality on a number line so they can see that the endpoint is an open circle or on Desmos so they can see that the vertical line that passes through the endpoint is dashed.

- 4) Solve the inequality. Show your work/thinking. Write your answer in set notation.

$$8x - 7 + 10x > 2(4 + 9x)$$

A common mistake students make on this problem is not correctly identifying the empty set or no solution as the result. This could indicate that students are unsure what it means when the simplified inequality has only constant terms. It would be beneficial for teachers to emphasize that students should read the resulting inequality to determine if the statement is true or false. Encouraging students to test a value for x to verify their response may also be beneficial. Graphing the inequality on Desmos may allow students to see that no part of the coordinate plane is shaded. However, students should be cautious because graphing an inequality such as $8x + 1 \geq 8x + 1$ also appears unshaded, so graphing should only serve as a checking tool in this instance.