

Just in Time Quick Check

Standard of Learning 8.PFA.5

Strand: Patterns, Functions, and Algebra

Standard of Learning 8.PFA.5

The student will write and solve multistep linear inequalities in one variable, including problems in context that require the solution of a multistep linear inequality in one variable.

Students will demonstrate the following Knowledge and Skills:

- a) Apply properties of real numbers and properties of inequality to solve multistep linear inequalities (up to four steps) in one variable with the variable on one or both sides of the inequality. Coefficients and numeric terms will be rational. Inequalities may contain expressions that need to be expanded (using the distributive property) or require combining like terms to solve.
- b) Represent solutions to inequalities algebraically and graphically using a number line.
- c) Write multistep linear inequalities in one variable to represent a verbal situation, including those in context.
- d) Create a verbal situation in context given a multistep linear inequality in one variable.
- e) Solve problems in context that require the solution of a multistep linear inequality in one variable.
- f) Identify a numerical value(s) that is part of the solution set of a given inequality.
- g) Interpret algebraic solutions in context to linear inequalities in one variable.

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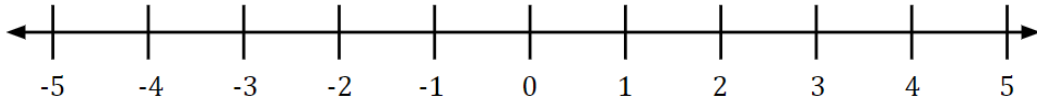
Just in Time Quick Check Teacher Notes

Supporting and Prerequisite SOL: 7.PFA.4

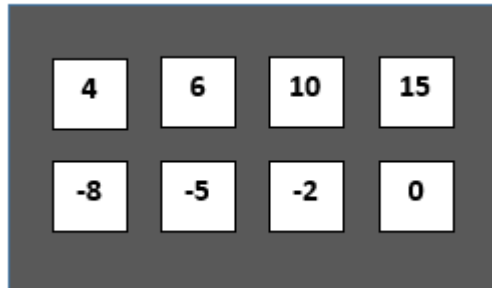
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1. Solve the inequality and graph the solution set on the number line.

$$-6.5x + 3 < 19 - 2.5x$$



2. Identify each value of x that makes the inequality true: $10x - 8 > 2(4x + 2)$



3. Write an algebraic inequality statement from the sentence below.

The product of negative five and a number is greater than twice the sum of the same number and three.

4. Solve: $\frac{1}{2}(4x + 8) > x + 3$.

5. A coach wants each athlete on the track team to run at least 6 miles during a training session. Angela is on the track team and has already run 2 miles and will run laps of 0.8 miles each. Let x represent the number of laps Angela must run. Write and solve an inequality to find how many laps Angela must run to meet the goal.

6. Which of the following values of x does **not** satisfy the inequality?

$$3x + 2 \leq 11$$

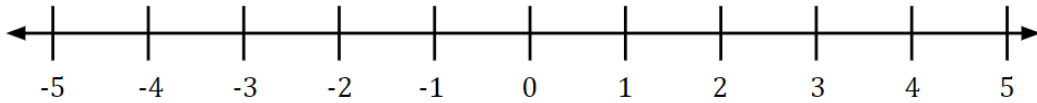
- a) $x = 2.9$
- b) $x = 3$
- c) $x = 3.1$
- d) $x = \frac{3}{2}$

8.PFA.5 Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

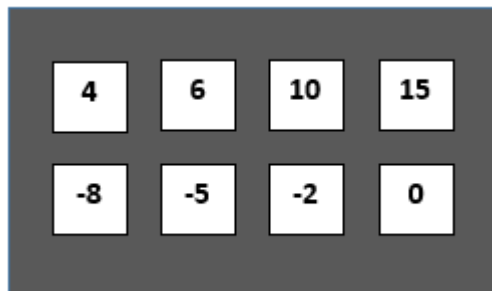
1. Solve the inequality and graph the solution set on the number line.

$$-6.5x + 3 < 19 - 2.5x$$



A common error students may make is failing to reverse the inequality symbol, resulting in an incorrect solution of $x < -4$. This may indicate that students do not understand that when both sides of an inequality are divided or multiplied by a negative number, the inequality symbol must be reversed. These students may benefit from exploring a numerical inequality, such as $4 < 8$ and exploring what happens to this relationship as negative numbers are added, subtracted, multiplied, and divided to both the 4 and the 8.

2. Identify each value of x that makes the inequality true: $10x - 8 > 2(4x + 2)$



A common error students may make is to identify the value of 6 as part of the solution set of the simplified statement, $x > 6$. This may indicate that students do not understand that greater than does not include the boundary point as part of the solution. Students may benefit from graphing the solution set before selecting answers. In addition, students may benefit from class discussions about possible solutions to inequalities and whether a boundary point should be considered as part of the solution set.

3. Write an algebraic inequality statement from the sentence below.

The product of negative five and a number is greater than twice the sum of the same number and three.

A common error students may make is to write the right side of the inequality statement as $2x + 3$. This may indicate that students do not recognize the meaning that twice the sum of the same number and three implies the use of the distributive property and requires grouping symbols. Students may benefit from additional practice with translating verbal sentences into algebraic statements where the distributive property is a focus. Teachers may also want to provide students with examples of algebraic expressions, equations, and inequalities involving the distributive property and ask students to write a verbal representation of the algebraic form.

4. Solve: $\frac{1}{2}(4x + 8) > x + 3$.

A common error students may make is to forget to distribute $\frac{1}{2}$ to both $4x$ and 8 . Additionally, students may incorrectly combine like terms by mixing variable terms with constants. Teachers can help by using visual aids such as area models to illustrate distribution, provide practice with distributing fractions, and reinforce rules for combining like terms.

5. A coach wants each athlete on the track team to run at least 6 miles during a training session. Angela is on the track team and has already run 2 miles and will run laps of 0.8 miles each. Let x represent the number of laps Angela must run. Write and solve an inequality to find how many laps Angela must run to meet the goal.

A common error that students may make is associating “run at least” with “less than” and incorrectly writing $0.8x + 2 < 6$ or $0.8x + 2 \leq 6$. Students may benefit from additional practice translating inequalities where a variety of phrases are used to represent inequality symbols.

6. Which of the following values of x does **not** satisfy the inequality?

$$3x + 2 \leq 11$$

- a) $x = 2.9$
- b) $x = 3$
- c) $x = 3.1$
- d) $x = \frac{3}{2}$

A common error students may make is thinking “ \leq ” means less than only, excluding boundary points. Teachers can help by using number lines to visually show that “ \leq ” includes the endpoint and practice questions that reinforces students’ understanding of solving inequalities. Additionally, students may make calculations errors when checking their solutions or they may guess which solutions work without substituting values into the inequality. Teachers can help by emphasizing the importance of students checking their solutions algebraically and providing students with practice evaluating expressions.