Standard #: MAFS.912.A-REI.1.1

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Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

General Information

Subject Area: Mathematics

Grade: 912

Domain-Subdomain: Algebra: Reasoning with Equations & Inequalities

Cluster: Level 3: Strategic Thinking & Complex Reasoning

Cluster: Understand solving equations as a process of reasoning and explain the reasoning. (Algebra 1 - Major Cluster) (Algebra 2 - Major Cluster) -
Clusters should not be sorted from Major to Supporting and then taught in that order. To do so would strip the coherence of the mathematical ideas and miss the opportunity to enhance the major work of the grade with the supporting clusters.

Date Adopted or Revised: 02/14

Content Complexity Rating: Level 3: Strategic Thinking & Complex Reasoning - More Information

Date of Last Rating: 02/14

Status: State Board Approved

Assessed: Yes

Test Item Specifications

N/A

Assessment Limits :
Items will not require the student to recall names of properties from memory.

Calculator :
Neutral

Clarification :
Students will complete an algebraic proof of solving a linear equation.
Students will construct a viable argument to justify a solution method

Stimulus Attributes :
Items should be set in a mathematical context. Items may use function notation.
Items should be linear equations in the form of ax + b = c, a(bx + c) = d, ax + b = cx + d, or a(bx + c) = d(ex + f), where a, b, c, d, e, and f are rational numbers. Equations may be given in forms that are equivalent to these.

Coefficients may be a rational number or a variable that represents any real number.

Items should not require more than four procedural steps to reach a solution.

Response Attributes :
Items may ask the student to complete steps in a viable argument.
Items should not ask the student to provide the solution.

Sample Test Items (1)

Test Item #: Sample Item 1

Question:
Some of the steps in Raya's solution to 2.5(6.25x +0.5) = 11 are shown.

Statement	Reason
1. $2.5(6.25x + 0.5) = 11$	1. Given
2.	2.
3.	3. Subtraction property of equality
4. $x = 0.624$	4. ?

Select the correct reason for line 4 of Raya's solution.

Difficulty: N/A
Type: SHT: Selectable Hot Text

Related Courses

Course Number	Course Title
1200310:	Algebra 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200320:	Algebra 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200330:	Algebra 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200340:	Algebra 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200370:	Algebra 1-A (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200400:	Intensive Mathematics (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200410:	Mathematics for College Success (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200700:	Mathematics for College Readiness (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
7912070:	Access Liberal Arts Mathematics (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 - 2019, 2019 and beyond (current))
7912080:	Access Algebra 1A (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 - 2019, 2019 and beyond (current))
1200315:	Algebra 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200335:	Algebra 2 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2019 (course terminated))
1200375:	Algebra 1-A for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
7912100:	Fundamental Algebraic Skills (Specifically in versions: 2013 - 2015, 2015 - 2017 (course terminated))
1207300:	Liberal Arts Mathematics 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
7912075:	Access Algebra 1 (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 - 2019, 2019 and beyond (current))
7912095:	Access Algebra 2 (Specifically in versions: 2016 - 2018, 2018 - 2019, 2019 and beyond (current))
1200387:	Financial Algebra (Specifically in versions: 2016 and beyond (current))

Related Resources

Assessments

Name	Description
Sample 3 - High School Algebra 1 State Interim Assessment:	This is a State Interim Assessment for 9th-12th grades.
Sample 1 - High School Algebra 1 State Interim Assessment:	This is the State Interim Assessment for high school.

Formative Assessments

Name	Description
Does It Follow?:	Students are asked if one linear equation follows from another that is assumed to be true.
Equation Logic:	Students are given a linear equation and are asked to solve the equation, explaining and justifying each step. Students are then asked to explain how confident they are in their solution.
Justify the Process - 2:	Students are asked to justify each step in the process of solving an equation.
Justify the Process - 1:	Students are asked to justify each step in the process of solving an equation.

Lesson Plans

Name	Description
Looking for the best Employment Option:	Students will reaffirm their knowledge about linear equations. Will be able to apply the concept to real life situations.
Method to My Mathness:	In this lesson, students will complete proof tables to explain the methods to solve equations, such as referring to mathematical properties and processes, to justify their solutions.
Justly Justifying:	Students will review the properties used in solving simple equations through a quiz-quiz-trade activity. As a class, they will then associate these properties with individual steps in solving equations. The students will then participate in a Simultaneous Round Table to practice their justifications. Finish the lesson with a discussion on the different methods that students could use to acquire the correct answer. The following day, students will take a short quiz to ensure that they understood the lesson.

Original Student Tutorial

Name	Description
Justifiable Steps:	Learn how to explain the steps used to solve a simple equation and provide reasons to support those steps with this interactive tutorial.

Problem-Solving Tasks

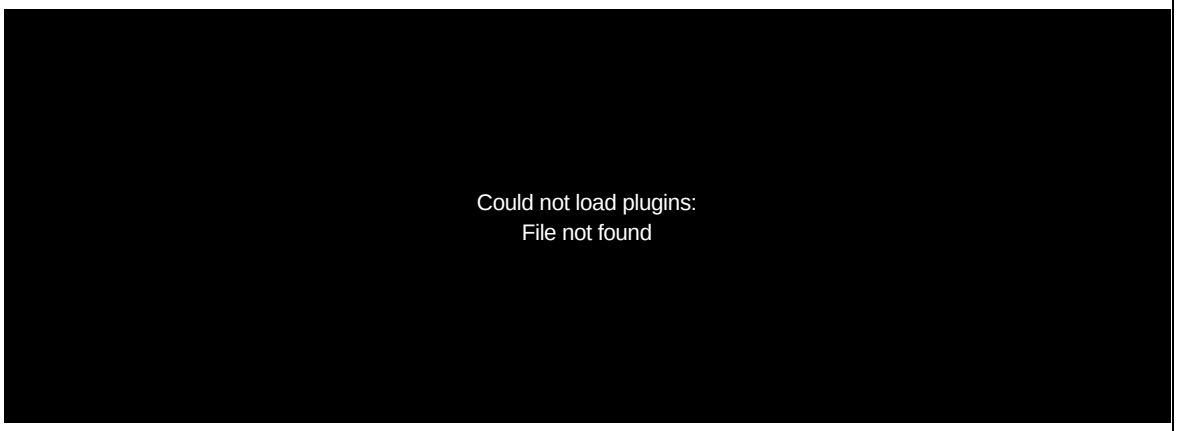
Name	Description
How does the solution change?:	The purpose of this task is to continue a crucial strand of algebraic reasoning begun at the middle school level (e.g, 6.EE.5). By asking students to reason about solutions without explicitly solving them, we get at the heart of understanding what an equation is and what it means for a number to be a solution to an equation. The equations are intentionally very simple; the point of the task is not to test technique in solving equations, but to encourage students to reason about them.
Same Solutions?:	The purpose of this task is to provide an opportunity for students to reason about equivalence of equations. The instruction to give reasons that do not depend on solving the equation is intended to focus attention on the transformation of equations as a deductive step.

Tutorial

Name	Description
Solving a literal equation:	Students will learn to solve a literal equation.

Unit/Lesson Sequence

Name	Description
Sample Algebra 1 Curriculum Plan Using CMAP:	This sample Algebra 1 CMAP is a fully customizable resource and curriculum-planning tool that provides a framework for the Algebra 1 Course. The units and standards are customizable and the CMAP allows instructors to add lessons, worksheets, and other resources as needed. This CMAP also includes rows that automatically filter and display Math Formative Assessments System tasks, E-Learning Original Student Tutorials and Perspectives Videos that are aligned to the standards, available on CPALMS. Learn more about the sample Algebra 1 CMAP, its features and customizability by watching the following video:



Using this CMAP

To view an introduction on the CMAP tool, please click here.

To view the CMAP, click on the "Open Resource Page" button above; be sure you are logged in to your iCPALMS account.

To use this CMAP, click on the "Clone" button once the CMAP opens in the "Open Resource Page." Once the CMAP is cloned, you will be able to see it as a class inside your iCPALMS My Planner (CMAPs) app.

To access your My Planner App and the cloned CMAP, click on the iCPALMS tab in the top menu.

All CMAP tutorials can be found within the iCPALMS Planner App or at the following URL: http://www.cpalms.org/support/tutorials_and_informational_videos.aspx

Student Resources

Original Student Tutorial

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Problem-Solving Tasks

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Same Solutions?:	The purpose of this task is to provide an opportunity for students to reason about equivalence of equations. The instruction to give reasons that do not depend on solving the equation is intended to focus attention on the transformation of equations as a deductive step.

Tutorial

Name	Description
Solving a literal equation:	Students will learn to solve a literal equation.

Parent Resources

Problem-Solving Tasks

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