

ELG 6.6: Reason about and solve one-variable equations and inequalities.

Vertical Progression:

4th Grade	<p>4.OA.A Use the four operations with whole numbers to solve problems</p> <ul style="list-style-type: none"> ○ 4.OA.A.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. ○ 4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
5th Grade	<p>5.OA.A Write and interpret numerical expressions.</p> <ul style="list-style-type: none"> ○ 5.OA.1 Use parentheses, brackets, or braces in numerical expressions and evaluate expressions with these symbols. ○ 5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.
6th Grade	<p>ELG 6.6 Reason about and solve one-variable equations and inequalities.</p> <ul style="list-style-type: none"> ○ 6.EE.B.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. ○ 6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. ○ 6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers. ○ 6.EE.B.8 Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
7th Grade	<p>ELG 7.4 Solve real-life and mathematical problems using numerical and algebraic expressions and equations.</p> <ul style="list-style-type: none"> ○ 7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies ○ 7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. ○ 7.EE.B.4.a Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? ○ 7.EE.B.4.a Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.

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Students will demonstrate command of the ELG by:

- Using substitution to determine if a given value is a solution for an equation.
- Using variables to write expressions when solving real-world and mathematical problems.
- Solving equations of the form $x + p = q$ and $px = q$ where all variables represent nonnegative rational numbers.
- Writing simple inequalities for real-world or mathematical problems.
- Representing solutions for simple inequalities on a number line.

Vocabulary:

- equation
- expression
- inequality
- solution
- substitution
- variable

Sample Instructional/Assessment Tasks:

1) Standard(s): 6.EE.B.6, 7

Source: Adapted from **Illustrative Mathematics** <https://www.illustrativemathematics.org/content-standards/6/EE/B/7/tasks/1107>

Item Prompt:

Sierra walks her dog Pepper twice a day, five days a week. Her evening walk is twice as far as her morning walk. At the end of the week she tells her mom, "I walked Pepper for 30 miles this week!"

Write an equation and use it to find the length of her morning walk. Use w for the length of her morning walk.

Correct Answer:

$$5(w + 2w) = 30$$
$$w = 2 \text{ miles}$$

