

Vertical Progression:

<p>6th Grade</p>	<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.
<p>7th Grade</p>	<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. ○ 7.EE.B.4.b Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.
<p>8th Grade</p>	<p>ELG 8.4 Analyze and solve linear equations and pairs of simultaneous linear equations.</p> <ul style="list-style-type: none"> ○ 8.EE.C.7 Solve linear equations in one variable. ○ 8.EE.C.7a Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). ○ 8.EE.C.7b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. ○ 8.EE.C.8 Analyze and solve pairs of simultaneous linear equations. ○ 8.EE.C.8a Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. ○ 8.EE.C.8b Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. ○ 8.EE.C.8c Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.
<p>Algebra 1</p>	<p>ELG.MA.HS.A.8 Understand solving equations as a process of reasoning and explain the reasoning.</p> <ul style="list-style-type: none"> ○ A-REI.A.1 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.

ELG 8.4: Analyze and solve linear equations and pairs of simultaneous linear equations.

ELG.MA.HS.A.9 Solve equations and inequalities in one variable.

- **A-REI.B.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

ELG.MA.HS.A.10 Solve systems of equations.

- **A-REI.C.6** Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

Students will demonstrate command of the ELG by:

- Solving linear equations in one variable with one solution, no solutions, and an infinite number of solutions.
- Solving linear equations with rational number coefficients.
- Solving systems of two linear equations algebraically.
- Solving systems of two linear equations graphically.
- Using algebra or graphs to determine if systems of two linear equations have one solution, no solution, or an infinite number of solutions.
- Writing and using systems of linear equations to solve real-world problems.

Vocabulary:

- coefficient
- distributive Property
- equivalent expressions
- infinitely many solutions
- inverse operations
- like terms
- rational number
- system of equations

Sample Instructional/Assessment Tasks:

1) Standard(s): 8.EE.C.7

Source: <https://www.illustrativemathematics.org/content-standards/8/EE/C/7/tasks/550>

Item Prompt:

Without solving them, say whether these equations have a positive solution, a negative solution, a zero solution, or no solution. If the equation has a solution, determine what it is.

1. $3x = 5$
2. $5z + 7 = 3$
3. $7 - 5w = 3$
4. $4a = 9a$
5. $y = y + 1$

ELG 8.4: Analyze and solve linear equations and pairs of simultaneous linear equations.

Correct Answer(s)

1. Positive solution; $x=5/3$
2. Negative solution; $z=-4/5$
3. Positive solution; $w=4/5$
4. Zero solution; $a = 0$
5. No solution.

2) Standard(s): 8.EE.8

Source: PARCC 8th Grade EOY Practice Test www.parcconline.org

Item Prompt:

A school is selling t-shirts and sweatshirts for a fund-raiser. The table shows the number of t-shirts and the number of sweatshirts in each of three recent orders. The total cost of orders A and B are given. Each t-shirt has the same cost, and each sweatshirt has the same cost.

Order	Number of T-shirts	Number of Sweatshirts	Total Cost of Order (dollars)
A	2	2	38
B	3	1	35
C	1	2	?

The system of equations shown can be used to represent this situation.

$$\begin{cases} 2x + 2y = 38 \\ 3x + y = 35 \end{cases}$$

Part A

What is the cost of 1 t-shirt and 1 sweatshirt? Enter your answer in the box.

ELG 8.4: Analyze and solve linear equations and pairs of simultaneous linear equations.

Part B

Select a choice from each drop-down menu to correctly complete the statement.

In the system of equations, x represents

Choose ...

- the number of t-shirts in the order
- the number of sweatshirts in the order
- the cost, in dollars, of each t-shirt
- the cost, in dollars, of each sweatshirt

and y represents

Choose ...

- the number of t-shirts in the order
- the number of sweatshirts in the order
- the cost, in dollars, of each t-shirt
- the cost, in dollars, of each sweatshirt

Part C

If the system of equations is graphed in a coordinate plane, what are the coordinates (x, y) of the intersection of the two lines?

(,)

Part D

What is the total cost, in dollars, of order C?

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Correct Answer(s):

- A. \$19
- B. x represents the # of t-shirts in the order, y represents the # of sweatshirts in the order
- C. (8,11)
- D. \$30