Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Number of Solutions in Linear Systems

Number of Solutions in Linear Systems | A1-U06-P02

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for one, none, or infinitely many solutions with exact justification.

8 PDFs and a README; 85 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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Name: _____ **Date:** _____ **Class:** _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

An exact graph marks one crossing of two genuine lines and also labels their unequal direction vectors. Is the full system count determined?

Bank label: _____

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Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Decide whether these genuine lines cross, remain distinct, or coincide: $2x + y = 7$ and $x - 2y = -4$. Give exact coefficient evidence.	A student must classify the system before choosing any solving method: $4x + 7y = -2$ and $12x + 21y = -6$. Give exact coefficient evidence.
A student claims $5y = 10$ and $y = -3$ must cross because their constants differ. Correct the count.	Classify this pair of standard-form equations without finding an intersection: $4x - 7y = 2$ and $-8x + 14y = -9$. Give exact coefficient evidence.
Simplify both equations before classifying the system: $2(x + y) - y = 7$ and $x - 3(y - 1) = 4$. Show the normalized pair as evidence.	A solution labels $2x + 3y = 7$ and $4x + 6y = 20$ as the same line because the variable coefficients double. Correct it.

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Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: No solution. Justification: The first equation becomes $8 = 5$, a contradiction. No point on the horizontal line can satisfy it.

Start with $x - 2y = 3$. Construct a second genuine-line equation so the system has infinitely many solutions. Constraint: The second equation must contain both $(3, 0)$ and $(5, 1)$ and differ in appearance. Give the equation and verify the complete line relation.

Your response: _____

Incoming: One valid construction is $-3x + 6y = -9$; with $x - 2y = 3$, it has infinitely many solutions. Justification: The direction cross-product is 0, and the constant checks are both 0; the equations name the same line. Therefore the construction meets the stated count and the additional constraint.

Start with $x + y = 5$. Construct a second genuine-line equation so the system has one solution. Constraint: Both equations must contain $(3, 2)$, and the second direction must differ. Give the equation and verify the complete line relation.

Your response: _____

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Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A student treats $4x - y = 6$ and $6 = 4x - y$ as two different lines because the sides are reversed. Audit the system.

Complete the task, then compare two valid approaches from this topic (compare normalized equations, use slopes/intercepts, or analyze coefficient proportionality) and justify why they agree on the required conclusion. Start with $x = 4$. Construct a second genuine-line equation so the system has one solution. Constraint: Make the second line horizontal while the first is vertical. Give the equation and verify the complete line relation.

Complete the task, then compare two valid approaches from this topic (compare normalized equations, use slopes/intercepts, or analyze coefficient proportionality) and justify why they agree on the required conclusion. Start with $y = 4$. Construct a second genuine-line equation so the system has one solution. Constraint: The second line must be oblique, not another horizontal line. Give the equation and verify the complete line relation.

Choose and justify a method before solving (compare normalized equations, use slopes/intercepts, or analyze coefficient proportionality). Then complete the task: From a graph, slopes 0.333 and 0.334 are both rounded to 0.33, and the system is labeled no solution. Audit the conclusion.

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Full Worked Solutions - excerpt

Worked example

Problem. An exact graph marks one crossing of two genuine lines and also labels their unequal direction vectors. Is the full system count determined?

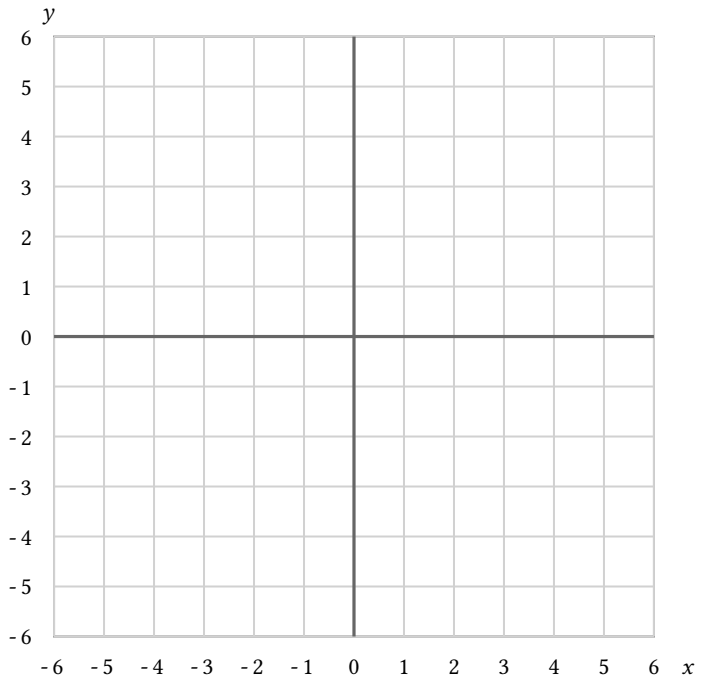
Answer. Yes. The system has one solution. Justification: The marked crossing supplies existence, and unequal directions prevent coincidence or a second meeting. Genuine lines with different directions intersect once.

Explanation and check.

The marked crossing supplies existence, and unequal directions prevent coincidence or a second meeting. Genuine lines with different directions intersect once.

Worked example

Problem. The graphing display uses the rules below: $x = 12$ and $x - y = -15$, in the window x from -6 to 6 and y from -6 to 6. The viewing note says one trace is outside the displayed x-range. Classify the complete system; do not infer from the crop alone.



Answer. The system x = 12; $x - y = -15$ has one solution. Justification: The direction cross-product is -1, not 0, so the genuine lines are nonparallel and meet once. The location of that meeting is not needed for this classification.

Explanation and check.

The direction cross-product is -1, not 0, so the genuine lines are nonparallel and meet once. The location of that meeting is not needed for this classification.