Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Linear Equations: Cases, Fractions & Formulas | Algebra 1 | 3-Topic Bundle

3-topic bundle | 288 problems | Four activity formats

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01 **Linear Equations: One, None, or All Real Solutions**

View individual product and its full preview

02 **Linear Equations with Fractions and Decimals**

View individual product and its full preview

03 **Literal Equations**

View individual product and its full preview

In every topic

Answer Bank Challenge	24 tasks
Grid Rounds	24 tasks
Match & Move	24 cards
Error Analysis & Strategy	24 tasks
Quick Answer Key and Full Worked Solutions	included
Teacher / Parent Use Guide and Terms of Use	included

Product previews

The following preview pages show the cover, all four activity formats, and worked examples for each included resource, in the listed order.

24 PDFs and 3 READMEs; 151 buyer PDF pages across the 3 products.

Preview pages are not included in the buyer page count. Check the list against resources you already own.

This is a fixed collection of the listed products. Purchase includes the existing individual resource files. To open a product's online preview, follow its title link and select View Preview.

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Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Linear Equations: One, None, or All Real Solutions

Multi-Step Equations: One, No, or Infinitely Many Solutions | A1-U02-P08

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for constructed equation and coefficient-constant verification, first error, corrected class, and solution-set meaning, local forms, solution class, complete set, and justification, parameter conditions and all corresponding solution classes, permitted edit or impossibility proof and resulting class and real classification, domain intersection, and actual set.

8 PDFs and a README; 50 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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Algebra 1

Linear Equations: One, None, or All Real Solutions

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

Solve each question and match the whole requested response. If two bank entries express the same result, either label is accepted; labels may be reused. Give exact values and any requested reasoning.

Classify $-2(4x-3)+5=4(-2x+1)+7$ after carrying every outer factor through its group. Give the full solution set. Bank label: _____	The equation $2x+7=2x+11$ is considered only for x in $\{-3,1,5\}$. Find the actual set after both algebra and domain restriction. Bank label: _____
Break the current degeneracy in $-2x+9=-2x+9$ using only the left x-coefficient so the result has one real solution. Verify the new class. Bank label: _____	Find when $(k+\frac{9}{4})x+\frac{11}{8}=(-\frac{3}{5})x+\frac{11}{8}$ becomes an identity. Also state the solution class for every remaining k. Bank label: _____
Analyze the cancellation in $-6x-5+3x+8=-x+4-2x-8$. Explain what remains and classify every possible value of x. Bank label: _____	For $6x+1=2x+13$, the allowed domain is $[0,4]$. Determine the actual solution set and show whether the algebraic root is admitted. Bank label: _____
Partition all real values of k by the number of solutions of $(k-\frac{7}{8})x+\frac{13}{10}=(\frac{5}{6})x-\frac{4}{7}$. Identify the exceptional coefficient condition first. Bank label: _____	Reduce $2(-5x+6)+3=5(-x-1)+35$ to $\mathrm{A}x+B=\mathrm{C}x+D$, compare both totals, and report the entire solution set. Bank label: _____

Algebra 1

Linear Equations: One, None, or All Real Solutions

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

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.

Classify the reduced equation $3x = 0$. Explain why a zero value for x is different from having no solutions.	Partition all real values of k by the number of solutions of $(k + 1)x + 4 = 5x + 4$. Identify the exceptional coefficient condition first.
In $3(2x - 1) + 5 = 2(3x + 1) + 4$, expose the final coefficient and constant comparison. Use the residual statement to decide one, none, or all.	The equation $3x + 5 = x + 13$ currently has one real solution; solution set $\{4\}$. Change only the right x-coefficient to obtain no solution, or prove it cannot be done.
For $(k - 2)x + 7 = 3x + 9$, determine which k, if any, causes coefficient cancellation and classify both that case and its complement.	Read $-4x = -8$ as a final reduced form. State the complete real solution set and justify the division used.

Algebra 1

Linear Equations: One, None, or All Real Solutions

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

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: one real solution; solution set $\{-\frac{4}{9}\}$ For $(-\frac{5}{3})x + \frac{7}{6} = (\frac{1}{3})x - \frac{5}{6}$, the allowed domain is $\{-2, 1, \frac{5}{3}\}$. Determine the actual solution set and show whether the algebraic root is admitted. Your response: _____	**Incoming:** $\{1\}$ Construct a two-sided linear equation whose only solution is $x = 4$. You must use unequal nonzero x-coefficients and constants on both sides. Verify it. Your response: _____
Incoming: one real solution; solution set $\{\frac{5}{3}\}$ Read $(\frac{15}{7})x = -\frac{20}{21}$ as a final reduced form. State the complete real solution set and justify the division used. Your response: _____	**Incoming:** $(-4, 2)$ Construct a two-sided equation with no solution. Begin with left side $5x + 4$ and use outer factor 1 on the grouped right side. Match the final x-coefficients but force unequal constants. Your response: _____
Incoming: $(\frac{7}{4})x - \frac{5}{6} = (\frac{7}{8})(2x + \frac{3}{5}) - \frac{163}{120}$ Solve $(\frac{3}{2})x + \frac{5}{4} = (\frac{3}{2})x + \frac{5}{4}$ only over the declared finite domain $\{-\frac{1}{2}, \frac{2}{3}, \frac{7}{4}\}$. Intersect the real solution class with the allowed values. Your response: _____	**Incoming:** $-2x + 7 = 4x + 25$ Solve $3x + 5 = 3x + 5$ only over the declared finite domain $\{-2, 0, 4\}$. Intersect the real solution class with the allowed values. Your response: _____

Algebra 1

Linear Equations: One, None, or All Real Solutions

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

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.

For the explicitly linear equation $3x + 5 = 3x + 5$, the table shows equality at distinct inputs $x = -2$ and $x = 4$. Evaluate the claim that the equation holds for all real x, using only justified implications.

Audit this work for $3x + 5 = x + 5$: 'The constants cancel, so $x = 0$. Therefore there are no solutions.' Identify the first conceptual error and give the correct complete solution set.

For $2x + 1 = 2x + 4$, the table reports $x = 0$, left$= 1$, and right$= 4$. Does this evidence support the claim that the equation is an identity? Give the strongest warranted conclusion.

A student classifies $4x + 7 = 4x + 7$ using: 'Everything cancels to $0 = 0$, so the only solution is $x = 0$.' Diagnose the meaning of $0 = 0$ and correct the conclusion.

Linear Equations: One, None, or All Real Solutions

Full Worked Solutions - excerpt

Worked example

Problem. Classify $5x - 3 = 2x + 9$ over the restricted domain $\{-4, 0, 3\}$; an algebraic root outside that set must be excluded.

Answer. empty solution set

Explanation and check.

Over the reals the equation has one real solution; solution set $\{4\}$. Intersecting that set with $\{-4, 0, 3\}$ gives empty solution set.

Worked example

Problem. Intersect the real solution set of $7x - 2 = 7x - 2$ with the interval $[-3, 5]$. Report the resulting set exactly.

Answer. $[-3, 5]$

Explanation and check.

Over the reals the equation has all real numbers. Intersecting that set with $[-3, 5]$ gives $[-3, 5]$.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Linear Equations with Fractions and Decimals

Solving Linear Equations with Fractional Coefficients | A1-U02-P09

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for both routes, compared intermediate equations, and justification of equal solution sets, common multiplier, fully scaled equation, exact solution, and check, common multiplier, preserved numerator groups, exact solution, and verification, exact root, rounded result, and changed-equation verdict, first error, fully corrected scaled equation, and solution and method choice, structural justification, exact solution, and check.

8 PDFs and a README; 51 buyer pages.

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Algebra 1

Linear Equations with Fractions and Decimals

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.

Find a common multiplier for the unrelated denominators in $(\frac{3}{4})x + \frac{2}{5} = (\frac{1}{6})x + \frac{41}{15}$, apply it to every term on both sides, and solve. Bank label: _____	Clear the constant denominators in $-(\frac{5}{6})x + \frac{7}{8} = (\frac{1}{4})x + \frac{33}{8}$ while preserving all negative signs. State the exact solution. Bank label: _____
Use the shared factors among the denominators of $(\frac{7}{10})x - \frac{3}{5} = -(\frac{2}{15})x + \frac{22}{5}$ to choose an efficient clearing multiplier. Solve exactly. Bank label: _____	Find a common multiplier for the unrelated denominators in $(\frac{2}{9})x + \frac{5}{6} = (\frac{7}{12})x + \frac{41}{18}$, apply it to every term on both sides, and solve. Bank label: _____
Clear denominators in $(\frac{5}{14})x + 3 = (\frac{1}{7})x + \frac{33}{7}$; remember that the visible integer term must receive the same multiplier. Find x. Bank label: _____	Use the shared factors among the denominators of $(\frac{9}{16})x - \frac{5}{12} = (\frac{3}{8})x + \frac{43}{48}$ to choose an efficient clearing multiplier. Solve exactly. Bank label: _____
Find a common multiplier for the unrelated denominators in $(\frac{11}{18})x + \frac{7}{20} = -(\frac{5}{12})x - \frac{431}{90}$, apply it to every term on both sides, and solve. Bank label: _____	Find a common multiplier for the unrelated denominators in $(\frac{7}{24})x + \frac{11}{14} = (\frac{5}{16})x + \frac{67}{112}$, apply it to every term on both sides, and solve. Bank label: _____

Algebra 1

Linear Equations with Fractions and Decimals

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

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.

Compare $(\frac{1}{2})x + \frac{3}{4} = (\frac{1}{3})x + \frac{5}{6}$ with $6x + 9 = 4x + 10$. Recover the least positive multiplier that clears every denominator and verify all four terms.	Construct a rational equation that becomes $3x + 5 = x + 13$ when every term is multiplied by 12. Use the resulting denominator set and verify equivalence.
Compare $-(\frac{2}{5})x + \frac{7}{10} = (\frac{3}{4})x - \frac{1}{2}$ with $-8x + 14 = 15x - 10$. Recover the least positive multiplier that clears every denominator and verify all four terms.	A coefficient in $-(\frac{2}{3})x + \frac{1}{2} = (\frac{1}{4})x + \frac{13}{4}$ is replaced by its displayed decimal approximation. Quantify the resulting root change rather than assuming equivalence.
Reverse the nonzero scale -6 on $-2x + 7 = 4x - 8$ to design a rational equation. Preserve signs term by term and prove the solution set is unchanged.	The equation $(\frac{3}{8})x - \frac{5}{6} = (\frac{1}{4})x + \frac{7}{12}$ was scaled to $18x - 40 = 12x + 28$. Recover the common multiplier and decide whether it is least or merely valid.

Algebra 1

Linear Equations with Fractions and Decimals

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

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: $\frac{23}{12}$ Find a common multiplier for the unrelated denominators in $(\frac{23}{45})x + \frac{31}{56} = -(\frac{17}{30})x + \frac{8767}{2520}$, apply it to every term on both sides, and solve. Your response: _____	**Incoming:** $\frac{19}{7}$ For $-(\frac{29}{48})x - \frac{35}{54} = (\frac{11}{20})x + \frac{46139}{17280}$, justify a nonzero common multiplier, write the full integer-coefficient equation it creates, and solve exactly. Your response: _____
Incoming: $-\frac{17}{6}$ Choose a common denominator for all grouped fractions in $\frac{19x+7}{32} + \frac{-9x-13}{21} = \frac{6x-\frac{85357}{1344}}{26} + \frac{23}{12}$. Show the intact groups after scaling, then solve. Your response: _____	**Incoming:** $-\frac{29}{9}$ Choose a common denominator for all grouped fractions in $\frac{9x+25}{40} + \frac{-11x+16}{33} = \frac{5x-\frac{82789}{1760}}{36} + \frac{31}{16}$. Show the intact groups after scaling, then solve. Your response: _____
Incoming: $-\frac{17}{9}$ For $(\frac{17}{36})x - \frac{25}{42} = -(\frac{11}{27})x + \frac{1279}{756}$, justify a nonzero common multiplier, write the full integer-coefficient equation it creates, and solve exactly. Your response: _____	**Incoming:** 3 Clear the constant denominators in $-(\frac{2}{3})x + 1 = (\frac{1}{3})x + 3$ while preserving all negative signs. State the exact solution. Your response: _____

Algebra 1

Linear Equations with Fractions and Decimals

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

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.

For $\frac{3x+5}{4} = 7$, choose between immediate inverse operations and clearing every denominator. Select the more efficient valid route and solve.

Compare the exact equation $(\frac{1}{3})x + 2 = (\frac{1}{5})x + \frac{38}{15}$ with the version using a rounded coefficient. Solve both exactly as written and decide whether their roots agree.

Audit the claimed clearing step $(\frac{1}{2})x + 3 = (\frac{1}{4})x + 5 \to 6x + 3 = 3x + 60$. Find the first term that failed to receive the common multiplier and repair the equation.

Which method avoids unnecessary expansion in $\frac{-2x+7}{5} = -3$: direct rational isolation or a common scale? Justify and find x.

Linear Equations with Fractions and Decimals

Full Worked Solutions - excerpt

Worked example

Problem. Find a common multiplier for the unrelated denominators in $(\frac{3}{4})x + \frac{2}{5} = (\frac{1}{6})x + \frac{41}{15}$, apply it to every term on both sides, and solve.

Answer. 4

Explanation and check.

Multiplying every term of $(\frac{3}{4})x + \frac{2}{5} = (\frac{1}{6})x + \frac{41}{15}$ by 60 gives $45x + 24 = 10x + 164$. Its coefficient difference is 35, so $x = 4$; substitution verifies the original rational equation.

Worked example

Problem. Clear the constant denominators in $-(\frac{5}{6})x + \frac{7}{8} = (\frac{1}{4})x + \frac{33}{8}$ while preserving all negative signs. State the exact solution.

Answer. -3

Explanation and check.

Multiplying every term of $-(\frac{5}{6})x + \frac{7}{8} = (\frac{1}{4})x + \frac{33}{8}$ by 24 gives $-20x + 21 = 6x + 99$. Its coefficient difference is -26, so $x = -3$; substitution verifies the original rational equation.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Literal Equations

Literal Equations | A1-U02-P10

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for factored target coefficient, isolated form, and nonzero condition, first error, corrected form, and all conditions, isolated form and every denominator/divisor condition, isolated form or complete compatibility class, regular isolated form and both exceptional compatibility classes and useful solved form, units, and assumptions.

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Algebra 1

Literal Equations

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.

In $Y-(a+b)=(-q)v$, keep the summed symbolic coefficient or shift grouped while solving for v. State the exact divisor restriction. Bank label: _____	For a laboratory reading, rearrange the conversion formula $F=(\frac{9}{5})C+32$ for the requested input F in degrees Fahrenheit. Preserve its scale condition. Bank label: _____
Isolate s in $M=(5k)s+u-v$. Undo the shift before the symbolic scale and state the condition required for division. Bank label: _____	For a short-term loan, which solved form of $I=Prt$ directly finds t in years? Rearrange it and state the operating assumption. Bank label: _____
Solve $(-2p)h+c+d=B$ for h. Track the negative symbolic coefficient and state when the final quotient is defined. Bank label: _____	For a fabric conversion, rearrange the conversion formula $y=kx+b$ for the requested input x in yards. Preserve its scale condition. Bank label: _____
Rearrange $B=\frac{c}{(d)n}$ for n, treating the product in the denominator as a whole. List every factor that must be nonzero. Bank label: _____	A surveyed parcel requires dimension b in meters. Isolate it from $A=\frac{bh}{2}$ and state why the divisor must be nonzero. Bank label: _____

Algebra 1

Literal Equations

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

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.

Isolate x in $y = (a)x + b$. Undo the shift before the symbolic scale and state the condition required for division.	For $Q = (m)t + c$, compare A: $t = \frac{Q-(c)}{m}$ with B: $t = \frac{Q}{m} - \frac{c}{m}$. Decide whether the fractional forms are symbolically equivalent and state their domain.
Rearrange $(m)t + c = Q$ for t, regardless of which side contains it. Give the solved form and its nonzero assumption.	For a rectangle garden, which solved form of $P = 2L + 2W$ directly finds L in meters? Rearrange it and state the operating assumption.
Solve $v = d - (k)u$ for u. Track the negative symbolic coefficient and state when the final quotient is defined.	Use the mean formula $A = \frac{x+y+z}{3}$ to recover the missing component x of three quiz scores. Give the useful solved form in points.

Algebra 1

Literal Equations

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

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: $m = \rho V$; units grams; condition $V \neq 0$

In $G - (c + d) = (a - b)n$, keep the summed symbolic coefficient or shift grouped while solving for n. State the exact divisor restriction.

Your response: _____

Incoming: $L = \dfrac{P - 2W}{2}$; units feet; condition $2 \neq 0$

In $N - (g + h) = (3a - b)u$, keep the summed symbolic coefficient or shift grouped while solving for u. State the exact divisor restriction.

Your response: _____

Incoming: $b = \dfrac{2A}{h}$; units feet; condition $h \neq 0$

Solve the literal equation $\frac{m+a+b}{c} + \frac{d}{e} = H$ for m. Use a common symbolic scale and state every original exclusion.

Your response: _____

START

Analyze $(a - (b))x = c$ under condition $a - (b) = 0$ and $c \neq 0$. Do not call failed division an answer; state the complete x-set.

Your response: _____

Incoming: $f = a\left(C - \left(-\dfrac{b}{c}\right)\right)$; conditions $a \neq 0,\ c \neq 0$

Isolate h in $E = (2a)h + (3b)h + c$. Combine its separate coefficients, factor once, and state the vanishing-coefficient condition.

Your response: _____

Incoming: r = $\frac{d}{t}$; units units per hour; condition $t \neq 0$

Rearrange $(m + 2n)f + v + w = U$ for f, regardless of which side contains it. Give the solved form and its nonzero assumption.

Your response: _____

Algebra 1

Literal Equations

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

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.

Audit this rearrangement of $y = (a)x + b$: $x = \frac{y}{a} - (b)$. Identify the first invalid division and give the corrected condition-aware form.

Check the target factoring in the proposed work $Q = (m)t + (n)t + c \to t = \frac{Q-(c)}{m-(n)}$. Repair the first coefficient error and state the divisor restriction.

For $v = \frac{(k)u+h}{j}$, a student writes $u = (j)\frac{v}{k} - (h)$. Diagnose the lost grouping, restore the complete numerator, and list original exclusions.

Audit this rearrangement of $B = (c + d)n + e$: $n = \frac{B}{c+d} - (e)$. Identify the first invalid division and give the corrected condition-aware form.

Literal Equations

Full Worked Solutions - excerpt

Worked example

Problem. Isolate v in $(h-(k))v=s$ for the nondegenerate parameter case, naming the exact combined coefficient condition.

Answer. v = $\frac{s}{h-(k)}$; condition $h-(k)\neq 0$

Explanation and check.

In $(h-(k))v=s$, the decisive target coefficient is $h-(k)$. The combined coefficient is nonzero, so division gives $v=\frac{s}{h-(k)}$.

Worked example

Problem. Solve $v=d-(k)u$ for u. Track the negative symbolic coefficient and state when the final quotient is defined.

Answer. u = $\frac{d-v}{k}$; condition $k\neq 0$

Explanation and check.

From $v=d-(k)u$, remove the complete shift on both sides, leaving the target multiplied by k. Division by that whole factor gives $u=\frac{d-v}{k}$, valid when $k\neq 0$.