

Algebra 1
Writing Linear Equations from Word Problems

Modeling with Linear Equations (Mixture and Applications) | A1-U02-P11

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for all correct equations and a term-to-context justification, average equation and missing value, conservation equation and component amount, context, variable meaning and units, solved interpretation, and feasibility check, equality equation and matching input and equation and original reference amount.
8 PDFs and a README; 58 buyer pages.

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Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

A quantitative relationship is described by these labeled values: A25-liter blend uses 80% and 30% solutions and contains 12.5 liters of active ingredient. Let x be liters of the 80% solution. Account for both component weights without treating their counts as independent; then solve and check the total. _____ Bank label: _____	A quantitative relationship is described by these labeled values: A12-kilogram mixture uses powders labeled 0.06 g/g and 20 g/kg and contains 400 g of active material. Let x be kilograms of the first powder. First reconcile the concentration units, then use the fixed total to write and solve one equation for x. _____ Bank label: _____
A lab has 50 grams of salt. Each identical batch uses 2.75 grams, and 28 grams remain. Build a one-variable equation for this total. Explain the sign of the rate before interpreting the root. _____ Bank label: _____	A tank starts with 94 liters and drains 7 liters each minute until 45 liters remain. Define the unknown, translate the fixed and repeated contributions into one equation, solve, and attach the requested unit. _____ Bank label: _____
Four sample masses average 12.5 grams. Three masses are 10.5, 13, and 11.5 grams. Write one average equation and determine the unknown observation or common group average. _____ Bank label: _____	A quantitative relationship is described by these labeled values: An account balance becomes \$270 after an 8% increase. Identify which quantity the rate is applied to, construct the equation, and solve for the base. _____ Bank label: _____
Five batches average 12.4 liters and three batches average x liters. The combined eight-batch average is 13 liters. Translate the mean into a total for the stated count, then solve for the missing contribution. _____ Bank label: _____	A price is reduced 20% and then increased 25% of the reduced price; the final price is \$100. Let x denote the correct reference base. Write and solve an equation that keeps the percent tied to that base. _____ 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. A value without its unit is not a complete answer.

Equation: $5x + 2(x - 4) = 62$. Required interpretation: x and $x - 4$ are positive measured lengths. Construct and solve a real situation matching the complete equation, making the fixed term, rate, and total explicit. 	A quantitative relationship is described by these labeled values: Six route counts average 7. Five counts are 3, 5, 8, 11, and 9. Translate the mean into a total for the stated count, then solve for the missing contribution.
Two teams have 91 volunteers; the smaller team has 13 fewer than the larger team. Write a single equation that preserves the stated part relationship. Find every part, not only the reference value. 	Equation: $0.75p = 48$. Required interpretation: p is an original price in dollars. Construct and solve a real situation matching the complete equation, making the fixed term, rate, and total explicit.
A48-kilogram alloy order uses materials costing \$30 or \$18 per kilogram for \$1,080. Let x be kilograms of the \$30 material. Build a one-variable conservation model for the two unequal contributions. Determine the amount named by x. 	A quantitative relationship is described by these labeled values: Two angles forming a line are labeled $7x - 12$ degrees and $2x + 3$ degrees. Construct the additive constraint represented here; solve and check that the component measures form the stated whole.

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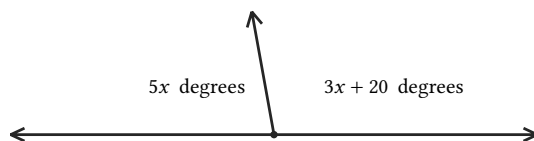
Name: _____ Date: _____ Class: _____

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.

A student copies the numerical values into an equation in the order they appear without defining the unknown or checking units. Diagnose the specific reasoning error, then complete the original task: A data table summarizes the quantities as follows: Two reservoirs each start at 15 liters and both drain 2 liters per minute. Construct the equality and decide whether the descriptions match once, never, or for every admissible input. State the relevant domain.

Reservoir	Initial volume (L)	Drain rate (L/min)
A	15	2
B	15	2

A student treats every stated measure as an independent addend and ignores the geometric relationship. Diagnose the specific reasoning error, then complete the original task: A labeled diagram gives this information: A straight angle is divided into parts measuring $5x$ degrees and $3x + 20$ degrees. Translate the labeled parts into the appropriate perimeter or angle relation and solve for the shared variable.



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Full Worked Solutions - excerpt

Worked example

Problem. A quantitative relationship is described by these labeled values: A 25-liter blend uses 80% and 30% solutions and contains 12.5 liters of active ingredient. Let x be liters of the 80% solution. Account for both component weights without treating their counts as independent; then solve and check the total.

Answer. 10 liters of the 80% solution

Explanation and check.

Because the combined quantity is fixed, the second component is the total minus x . Weighting both parts gives $0.80x + 0.30(25 - x) = 12.5$. Solving yields $x = 10$ liters of 80% solution; the complementary amount and both weighted contributions reproduce the given total.

Worked example

Problem. A quantitative relationship is described by these labeled values: A 12-kilogram mixture uses powders labeled 0.06 g/g and 20 g/kg and contains 400 g of active material. Let x be kilograms of the first powder. First reconcile the concentration units, then use the fixed total to write and solve one equation for x .

Answer. 4 kilograms of the first powder

Explanation and check.

Put both concentrations in units compatible with the chosen component amount: $0.06 \text{ g/g} = 60 \text{ g/kg}$. The conserved mixture then gives $60x + 20(12 - x) = 400$, so $x = 4$ kilograms of first powder. The complementary amount makes the active-material total check.