

Algebra 1
Linear Word Problems to Systems Models | Algebra 1 | 6-Topic Bundle

6-topic bundle | 576 problems | Four activity formats

01 Writing Linear Equations from Word Problems

[View individual product and its full preview](#)

02 Checking Linear Models and Contextual Solutions

[View individual product and its full preview](#)

03 Linear Models from Initial Value and Rate

[View individual product and its full preview](#)

04 Evaluating Linear Models in Context

[View individual product and its full preview](#)

05 Solving Systems by Substitution

[View individual product and its full preview](#)

06 Systems of Equations Word Problems

[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.

48 PDFs and 6 READMEs; 338 buyer PDF pages across the 6 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.

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.

Algebra 1

Writing Linear Equations from Word Problems

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: _____

Algebra 1

Writing Linear Equations from Word Problems

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. 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.

Algebra 1

Writing Linear Equations
from Word Problems

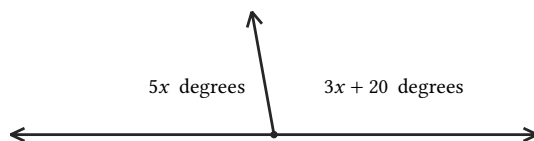
Name: _____ Date: _____ Class: _____

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.



Writing Linear Equations from Word Problems

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.

Algebra 1
Checking Linear Models and Contextual Solutions

Checking Linear Models and Contextual Solutions | A1-U02-P12

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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08	Terms of Use & License	included

Topic focus
Across 96 tasks this topic asks for justified interpretation.
8 PDFs and a README; 49 buyer pages.

Algebra 1

Checking Linear Models and Contextual Solutions

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 table lists a \$12 entry fee and \$0.45 per mile for m miles. A student proposes $\frac{C}{m} = 12 + 0.45$. Use the units to decide whether this is a total-cost model and state the correct equation. _____ Bank label: _____	For n equally spaced fence posts, a supplied formula gives spacing $r = \frac{360}{n-1}$ feet. The site permits at most 31 posts. Determine n's full contextual domain. _____ Bank label: _____
A30-item split defines category counts x and $30-x$. One summary says A exceeds B by 8; another says B exceeds A by 4. Classify the information. _____ Bank label: _____	Solving $3.75b + 9 = 54$ gives $b = 12$ bottles. Orders must contain complete cartons of 8 bottles. Is 12 a feasible order size? _____ Bank label: _____
A student proposes 23 and 24 for two consecutive integers whose sum is 47. Verify both 'consecutive' and the sum. _____ Bank label: _____	A calculation shows 58 items needed, 9 per pack, and $\frac{58}{9} = 6.444\dots$. A student chooses 6 packs by nearest-number rounding. Audit the decision and quantify the shortage or surplus after repair. _____ Bank label: _____
On a180-km route, one equation returns $x = 68$ for distance traveled and another returns $r = 112$ for distance remaining. Determine whether they conflict. _____ Bank label: _____	A map table gives 7.5 cm and a scale of 4 km per map centimeter. Someone writes $d = \frac{7.5}{4}$ km. Use unit cancellation to choose the correct operation and distance. _____ Bank label: _____

Algebra 1

Checking Linear Models and Contextual 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: Report 3.7 meters. A transit card balance follows $B = 85 - 6.40r$, where r counts rides and the rider cannot spend beyond the initial balance. Give the feasible domain for r. Your response: _____	Incoming: r is an integer with $0 \leq r \leq 13$. During a ten-dose treatment, d records how many doses a patient has completed, including observations before the first and after the last dose. List the domain. Your response: _____
Incoming: No. The feasible values are 4, 5, 6, and 7. A supplied equation gives cable length $x = 3.746$ meters. The measurement is to be reported to the nearest tenth of a meter. What should be reported? Your response: _____	Incoming: Display $83.5 \frac{km}{h}$. A temperature equation is valid only from 6:30<i>a.m.</i> through 3:00<i>p.m.</i> Let t measure hours since 6:30<i>a.m.</i> Translate the clock-time window into a domain for t. Your response: _____
Incoming: Report approximately 121 square centimeters. A theater sold 260 tickets in all. Let a be the number of adult tickets. State the contextual domain for a without using any price information. Your response: _____	Incoming: $-120 \leq h \leq 450$. For the supplied revenue equation $7s + 4(36 - s) = 198$, s counts \$7 seats and $36 - s$ counts \$4 seats. Identify every domain restriction imposed by those two counts. Your response: _____

Algebra 1

Checking Linear Models and Contextual 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.

A calculation $d = 48(2.5) = 120$ is numerically correct but reports '120 hours.' Diagnose and correct the answer unit.

A pump runs at 1.8 liters per minute for 50 seconds. A technician records 90 liters. Audit the time unit and calculate the volume.

A solution to the exact equation $5n = 38$ says, 'n=7.6', so the answer is 8 boxes.' Diagnose the final step.

A \$120 service receives a 7.5% fee. A calculation uses $F = 120 + 7.5(120)$. Identify the interpretation error and find F .

Checking Linear Models and Contextual Solutions

Full Worked Solutions - excerpt

Worked example

Problem. A table lists a \$ 12 entry fee and \$ 0.45 per mile for m miles. A student proposes $\frac{C}{m} = 12 + 0.45$. Use the units to decide whether this is a total-cost model and state the correct equation.

Answer. The proposal mixes dollars per mile with dollars; total cost is $C = 12 + 0.45m$ dollars.

Explanation and check.

Dividing total C by m changes its unit to dollars per mile, while the right side adds a dollar amount to a rate. Keeping the fixed total and multiplying the rate by miles gives compatible dollar terms.

Worked example

Problem. For n equally spaced fence posts, a supplied formula gives spacing $r = \frac{360}{n-1}$ feet. The site permits at most 31 posts. Determine n 's full contextual domain.

Answer. n is an integer with $2 \leq n \leq 31$.

Explanation and check.

A post count is integral. At least two posts are needed to create a spacing, which also keeps $n - 1$ nonzero; the site supplies the upper bound 31.

Algebra 1
Linear Models from Initial Value and Rate

Linear Models from Initial Value and Rate | A1-U05-P16

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
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Topic focus
Across 96 tasks this topic asks for an exact affine rule, domain, interpretation, or corrected model.
8 PDFs and a README; 50 buyer pages.

Algebra 1

Linear Models from Initial Value and Rate

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.

At use count 18, 250 grams remain and 15 grams are used per count. Construct an anchored linear model and then rewrite it to identify $Q(0)$. Do not treat the value at $t = 18$ as the intercept. _____ Bank label: _____	At week 40, a fund is 1000 dollars and then changes -22 dollars per week. Construct an anchored linear model and then rewrite it to identify $Q(0)$. Do not treat the value at $t = 40$ as the intercept. _____ Bank label: _____
A vertical coordinate starts at 3 units and changes by $-\frac{7}{3}$ units per step. Let t be the number of steps. Construct $Q(t)$ in units; identify the value at $t = 0$ and preserve the sign of the supplied rate. _____ Bank label: _____	At $t = -8$ relative to calibration, a signal is 12 and rises $\frac{5}{2}$ per time unit. Construct an anchored linear model and then rewrite it to identify $Q(0)$. Do not treat the value at $t = -8$ as the intercept. _____ Bank label: _____
An inventory starts at 100 and processes at most 8 whole orders. Use the supplied initial-rate rule $Q(t) = 100 - 12t$. State the valid domain for t in orders, combining input type with the process limit. _____ Bank label: _____	For the contextual model $Q(t) = 4 - \frac{1}{3}t$ on domain $-6 \leq t \leq 0$, explain the intercept and slope in the original units and say whether $Q(0)$ is observed or extrapolated. Q is a historical offset and $t = 0$ is the end of the observation window. _____ Bank label: _____
A process has initial value 9 miles and rate 45 miles per hour. Express its model using meters and input measured in seconds; output counts multiply by $\frac{201168}{125}$ and input counts by 3600. _____ Bank label: _____	For the contextual model $Q(t) = 31 + 5t$ on domain $t \geq 7$, explain the intercept and slope in the original units and say whether $Q(0)$ is observed or extrapolated. Q is a quantity measured from a baseline date, but observations start seven periods later. _____ Bank label: _____

Algebra 1

Linear Models from Initial Value and Rate

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. A value without its unit is not a complete answer.

A temperature deviation rises from -10 to a cutoff of 8. Use the supplied initial-rate rule $Q(t) = -10 + \frac{9}{4}t$. State the valid domain for t in hours, combining input type with the process limit. _____ _____	A signed elevation is -5 meters at time zero and falls 2 meters per kilometer traveled. Let t be the number of kilometers. Construct $Q(t)$ in meters; identify the value at $t = 0$ and preserve the sign of the supplied rate. _____ _____
A process has initial value 2 liters and rate 6 liters per package. Express its model using liters and input measured in items; output counts multiply by 1 and input counts by 3. _____ _____	A process has initial value $\frac{13}{6}$ gallons and rate $-\frac{17}{9}$ gallons per hour. Express its model using quarts and input measured in minutes; output counts multiply by 4 and input counts by 60. _____ _____
A process has initial value 12 liters and rate 5 liters per hour. Express its model using milliliters and input measured in minutes; output counts multiply by 1000 and input counts by 60. _____ _____	At $t = \frac{3}{2}$ days, a total is 9 and grows 4 units per day. Construct an anchored linear model and then rewrite it to identify $Q(0)$. Do not treat the value at $t = \frac{3}{2}$ as the intercept. _____ _____

Algebra 1

Linear Models from Initial Value and Rate

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: At $t = 4$, $A = 18$ and $B = 17$. Both initial value and rate change, so neither parameter alone explains the output gap. For the contextual model $Q(t) = -5 - 4t$ on domain $-2 \leq t \leq 6$, explain the intercept and slope in the original units and say whether $Q(0)$ is observed or extrapolated. Q is position relative to a marker and $t = 0$ is a chosen clock reference. Your response: _____	Incoming: In $Q(t) = -5 - 4t$, -5 is observed at the chosen zero; -4 is the signed output change per one input unit. Context: Q is position relative to a marker and $t = 0$ is a chosen clock reference. Models $A(t) = 18 - \frac{1}{2}t$ and $B(t) = 18 - \frac{3}{4}t$ have the same starting value. Explain how the changed rate affects later outputs and compare them at $t = 10$. Your response: _____
Incoming: In $Q(t) = 72 - 9t$, 72 is observed at the chosen zero; -9 is the signed output change per one input unit. Context: Q is percentage points remaining, not a multiplicative percent change. Compare the redesigned affine models $A(t) = -10 + 7t$ and $B(t) = 5 + 3t$. Separate the start change from the rate change before checking $t = 4$. Your response: _____	Incoming: At $t = 6$, $A = 100$ and $B = 120$. Both initial value and rate change, so neither parameter alone explains the output gap. For the contextual model $Q(t) = 500 + 20t$ on domain $0 \leq t \leq 6$, explain the intercept and slope in the original units and say whether $Q(0)$ is observed or extrapolated. Q includes a fixed setup contribution plus production over hours. Your response: _____
Incoming: At $t = 7$, $A = 44$ and $B = 65$. The models start together, and their rate difference changes the gap with t. For the contextual model $Q(t) = 90$ on domain $0 \leq t \leq 12$, explain the intercept and slope in the original units and say whether $Q(0)$ is observed or extrapolated. Q is a fixed sensor reading and t is hours. Your response: _____	Incoming: $Q(t) = 0 + \frac{7}{3}(t - 12)$, equivalently $Q(t) = -28 + \frac{7}{3}t$; therefore $Q(0) = -28$. A process has initial value 0 items and rate 300 items per hour. Express its model using items and input measured in minutes; output counts multiply by 1 and input counts by 60. Your response: _____

Algebra 1

Linear Models from Initial Value and Rate

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.

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Compare the redesigned affine models $A(t) = 500 + 20t$ and $B(t) = 450 + 25t$. Separate the start change from the rate change before checking $t = 4$.

Choose an efficient method, explain why it fits the given representation, and then complete the task exactly. Both parameters differ in $A(t) = 8 + \frac{3}{2}t$ and $B(t) = 12 + \frac{1}{2}t$. Compare the exact rational starts and rates, then evaluate each at $t = 6$.

Models $A(t) = 10 + 3t$ and $B(t) = 16 + 3t$ share one rate. Isolate the effect of changing the initial value, then check the fixed gap at $t = 4$.

Models $A(t) = 6 + 12t$ and $B(t) = 9 + 12t$ share one rate. Isolate the effect of changing the initial value, then check the fixed gap at $t = \frac{5}{2}$.

Linear Models from Initial Value and Rate

Full Worked Solutions - excerpt

Worked example

Problem. At use count 18, 250 grams remain and 15 grams are used per count. Construct an anchored linear model and then rewrite it to identify $Q(0)$. Do not treat the value at $t = 18$ as the intercept.

Answer. $Q(t) = 250 - 15(t - 18)$, equivalently $Q(t) = 520 - 15t$; therefore $Q(0) = 520$.

Explanation and check.

Start from the reference form using $(t - 18)$ and rate -15 . Expanding gives the initial value

$$250 - (-15)(18) = 520$$

Worked example

Problem. At week 40, a fund is 1000 dollars and then changes -22 dollars per week. Construct an anchored linear model and then rewrite it to identify $Q(0)$. Do not treat the value at $t = 40$ as the intercept.

Answer. $Q(t) = 1000 - 22(t - 40)$, equivalently $Q(t) = 1880 - 22t$; therefore $Q(0) = 1880$.

Explanation and check.

Start from the reference form using $(t - 40)$ and rate -22 . Expanding gives the initial value

$$1000 - (-22)(40) = 1880$$

Algebra 1
Evaluating Linear Models in Context

Evaluating Linear Models in Context | A1-U05-P17

96 problems · Four activity formats

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Topic focus
Across 96 tasks this topic asks for an exact prediction with a context-qualified conclusion.
8 PDFs and a README; 50 buyer pages.

Algebra 1

Evaluating Linear Models
in Context

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 newly appended row has input 4 and output $\frac{47}{6}$. Test it against $Q(t) = -\frac{5}{2} + \frac{7}{3}t$ with absolute tolerance $\frac{1}{2}$, and say what an out-of-band result establishes. _____ Bank label: _____	A supporting table covers inputs -8 through -1, and the rule's domain is $-10 \leq t \leq 3$. Locate $t = -5$ relative to the evidence and classify this within-span prediction. _____ Bank label: _____
For the supplied rule $Q(t) = \frac{11}{3} + \frac{13}{7}t$, evaluate at $t = 14$ and compare with observed value 29. Use $\text{observed-predicted} \leq \frac{2}{3}$ as the consistency rule. _____ Bank label: _____	A supporting table covers inputs 0 through 18, and the rule's domain is $0 \leq t \leq 20$. Locate $t = 11$ relative to the evidence and classify this within-span prediction. _____ Bank label: _____
The supplied model is $Q(t) = 18 + 7t$ on t in $\{0, 1, \dots, 12\}$. At what t, measured in batches, does Q reach 60? Solve and verify that the predicted input is admissible. _____ Bank label: _____	For the forecast $Q(t) = 18 + 5t$ at $t = 12$, the intercept changes by 7 and the rate changes by -1. Combine the two effects exactly and state the net prediction change. _____ Bank label: _____
The supplied model is $Q(t) = 25 + 11t$ on t in $\{0, 1, \dots, 10\}$. At what t, measured in days, does Q reach 102? Solve and verify that the predicted input is admissible. _____ Bank label: _____	The supplied forecast is $Q(t) = \frac{9}{2} + \frac{7}{3}t$. At $t = 3$ it is being used under this condition: completed packages must be whole. Compute the output and decide whether the contextual interpretation is feasible; identify the decisive condition. _____ Bank label: _____

Algebra 1

**Evaluating Linear Models
in Context**

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.

Evidence in a table stops at the span $[0, 7]$, and the model itself is restricted to $0 \leq t \leq 12$. Assess the proposed forecast input 16 against both limits.

Audit this forecast statement: A rule gives distance in miles with t in hours. A student evaluates it correctly but reports the result as miles per hour. Identify the first unjustified step and write a repaired, qualified conclusion.

The first and last tabulated inputs are 9 and 27. For domain $0 \leq t \leq 35$, classify use of the rule exactly at $t = 27$ and distinguish an endpoint from beyond-range use.

A student states a conclusion from the visible representation without preserving all stated associations, constraints, or units. Diagnose the specific reasoning error, then complete the original task: Audit this forecast statement: A rate 2.46 is rounded to 2 before multiplying by 18, and the final forecast is reported to the nearest tenth. Identify the first unjustified step and write a repaired, qualified conclusion.

Evaluating Linear Models in Context

Full Worked Solutions - excerpt

Worked example

Problem. A newly appended row has input 4 and output $\frac{47}{6}$. Test it against $Q(t) = -\frac{5}{2} + \frac{7}{3}t$ with absolute tolerance $\frac{1}{2}$, and say what an out-of-band result establishes.

Answer. The model predicts $\frac{41}{6}$; residual observed-predicted is 1, whose absolute value is 1. That is outside the tolerance $\frac{1}{2}$, so the observation is not consistent with the model at this tolerance. This comparison alone does not establish a cause.

Explanation and check.

Prediction $\frac{41}{6}$ and observation $\frac{47}{6}$ have absolute gap 1, larger than allowed tolerance $\frac{1}{2}$.

Worked example

Problem. A supporting table covers inputs -8 through -1 , and the rule's domain is $-10 \leq t \leq 3$. Locate $t = -5$ relative to the evidence and classify this within-span prediction.

Answer. This is interpolation: -5 lies strictly between observed inputs -8 and -1 . It is inside the declared model domain, but the classification alone does not guarantee empirical accuracy; continued linear behavior is an assumption wherever direct observations are absent.

Explanation and check.

The requested input lies between -8 and -1 , so the prediction uses the model within the observed span.

Algebra 1
Solving Systems by Substitution

Solving Systems by Substitution | A1-U06-P03

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Topic focus
Across 96 tasks this topic asks for first invalid step, correction, and ordered pair, ordered pair, complete solution set and missing coordinate and k.
8 PDFs and a README; 57 buyer pages.

Algebra 1

Solving Systems
by Substitution

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.

Substitution in the system $y = 2x + 4$ and $5y = 10x + 21$ collapses to $0 = 1$. Interpret the collapsed equation. State the complete solution set and justify it using the original system. _____ Bank label: _____	It is known that $y = 2$. The pair satisfies $5x + 5y = 0$ and $kx + 5y = 24$. Recover the missing coordinate and determine k. Explain how each equation is used. _____ Bank label: _____
Solve the system $y = x - 2$ and $2x - y = 7$ by substitution. Then verify the ordered pair in both original equations. _____ Bank label: _____	Neither variable is displayed alone in the system $x + 5y = 25$ and $4x + 4y = 20$. Isolate x from the first equation, use substitution to solve, and check the result in both equations. _____ Bank label: _____
Both equations give y in terms of x: $y = (x - 1) + 11$ and $y = -2x + 1$. Equate the two expressions, then find both coordinates of the solution. _____ Bank label: _____	Solve the system $x = -y - 12$ and $2x + 6y = -52$ by substitution. Then verify the ordered pair in both original equations. _____ Bank label: _____
Neither variable is displayed alone in the system $6x - y = 17$ and $-4x + 6y = -38$. Isolate x from the first equation, use substitution to solve, and check the result in both equations. _____ Bank label: _____	Both equations give y in terms of x: $y = 2x - 4$ and $y = x - 5$. Equate the two expressions, then find both coordinates of the solution. _____ Bank label: _____

Algebra 1

Solving Systems
by Substitution

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.

The data table gives $x = -5$. The pair satisfies $2x + 3y = -28$ and $4x + 3y = k$. Recover the missing coordinate and determine k. Explain how each equation is used. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th style="width: 50%;">given coordinate</th><th style="width: 50%;">value</th></tr> <tr> <td>x</td><td>-5</td></tr> </table>	given coordinate	value	x	-5	The data table gives $x = 3$. The pair satisfies $2x + 2y = 18$ and $kx + 2y = -3$. Recover the missing coordinate and determine k. Explain how each equation is used. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th style="width: 50%;">given coordinate</th><th style="width: 50%;">value</th></tr> <tr> <td>x</td><td>3</td></tr> </table>	given coordinate	value	x	3
given coordinate	value								
x	-5								
given coordinate	value								
x	3								
The data table gives $x = 2$. The pair satisfies $2x + 6y = 34$ and $5x + 3y + k = 23$. Recover the missing coordinate and determine k. Explain how each equation is used. <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th style="width: 50%;">given coordinate</th><th style="width: 50%;">value</th></tr> <tr> <td>x</td><td>2</td></tr> </table>	given coordinate	value	x	2	Substitution in the system $y = -x$ and $3y = -3x + 1$ collapses to $0 = 1$. Interpret the collapsed equation. State the complete solution set and justify it using the original system.				
given coordinate	value								
x	2								
Substitution in the system $y = 2x + 3$ and $4y = 8x + 12$ collapses to $0 = 0$. Interpret the collapsed equation. State the complete solution set and justify it using the original system.	For the system $y = -2x + 6$ and $4x + 3y = 10$, a student writes: "Substitute: $4x + 3 \cdot -2x + 6 = 10$." Identify the first invalid step, repair it, solve the system, and verify the ordered pair.								

Algebra 1

Solving Systems
by Substitution

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: $(-1, -7)$ Neither variable is displayed alone in the system $-x + 3y = 1$ and $2x + 7y = -15$. Isolate x from the first equation, use substitution to solve, and check the result in both equations. Your response: _____	Incoming: $(-3, -2)$ Neither variable is displayed alone in the system $3x - y = -6$ and $-3x + 4y = -3$. Isolate x from the first equation, use substitution to solve, and check the result in both equations. Your response: _____
Incoming: $(-4, -4)$ Substitution in the system $y = -2x - 2$ and $3y = -6x - 4$ collapses to $0 = 2$. Interpret the collapsed equation. State the complete solution set and justify it using the original system. Your response: _____	Incoming: No solution It is known that $y = -3$. The pair satisfies $3x + 4y = -21$ and $kx + 3y = 0$. Recover the missing coordinate and determine k. Explain how each equation is used. Your response: _____
Incoming: $(0, 3)$ Neither variable is displayed alone in the system $-x + 4y = 1$ and $-2x + 6y = 2$. Isolate x from the first equation, use substitution to solve, and check the result in both equations. Your response: _____	Incoming: $(-1, 0)$ Both equations give y in terms of x: $y = x + 2$ and $y = 2x + 4$. Equate the two expressions, then find both coordinates of the solution. Your response: _____

Algebra 1

Solving Systems by Substitution

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.

Substitution in the system $y = -3x - 5$ and $2y = -6x - 10$ collapses to $0 = 0$. A student concludes that every point in the coordinate plane works. State the complete solution set and justify it using the original system. Compare these two claims about the displayed collapsed equation: *A* says that it alone completely describes the solution set in the coordinate plane; *B* says that the solution set must satisfy both the collapsed statement and the retained original equation. Decide which reasoning is valid, explain the difference, and give the complete solution set. If the collapsed statement is false, explain why both descriptions produce an empty set.

For the system $y = -2x - 16$ and $2x + 3y = -28$, a student writes: "Substitute: $2x + 3 \cdot -2x - 16 = -28$." Identify the first invalid step, repair it, solve the system, and verify the ordered pair.

Solving Systems by Substitution

Full Worked Solutions - excerpt

Worked example

Problem. Solve the system $y = x - 2$ and $2x - y = 7$ by substitution. Then verify the ordered pair in both original equations.

Answer. $(5, 3)$

Explanation and check.

Use the isolated relation $y = x - 2$; substitution gives $x = 5$, so $x = 5$. Back-substitution gives the other coordinate, $(5, 3)$. Substituting that pair into both original equations verifies both equalities.

Worked example

Problem. Solve the system $x = 3y$ and $-2x + 5y = 2$ by substitution. Then verify the ordered pair in both original equations.

Answer. $(-6, -2)$

Explanation and check.

Use the isolated relation $x = 3y$; substitution gives $-y = 2$, so $y = -2$. Back-substitution gives the other coordinate, $(-6, -2)$. Substituting that pair into both original equations verifies both equalities.

Algebra 1
Systems of Equations Word Problems

Systems of Equations Word Problems | A1-U06-P06

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 algebraic check, contextual verdict, and rounding analysis, equations, rates or insufficiency, and verification, balance equations, source amounts, and feasibility, equations, quantities or insufficiency, and admissibility, semantic error, corrected variables/equations, and verification and exact shared input/output or no crossing, with domain assessment.

8 PDFs and a README; 74 buyer pages.

Algebra 1

Systems of Equations
Word Problems

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 record shows 12 total adult tickets and student tickets. Each adult ticket contributes 3 dollars, and each student ticket contributes 5 dollars; the combined contribution is 56 dollars. Define x and y with units, write the two equality constraints, determine the quantities if possible, and assess whether the result is admissible. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

Bank label: _____

Unknown component contributions x and y are constant across measurements. Measurement 1 has X -multiplicity 1 and Y -multiplicity 2 for total 19; Measurement 2 has multiplicities 2 and 2 for total 26. Build the weighted-sum system from the table, determine x and y if identifiable, and check every measured total. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

measurement	X multiplicity	Y multiplicity	measured total
1	1	2	19
2	2	2	26

Bank label: _____

A record shows 21 total standard tasks and bonus tasks. Each standard task contributes 6 credits, and each bonus task contributes 11 credits; the combined contribution is 191 credits. Define x and y with units, write the two equality constraints, determine the quantities if possible, and assess whether the result is admissible. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

Bank label: _____

A technician must make 14 liters of a mixture with $\frac{485}{14}\%$ active ingredient using Source A at 15% and Source B at 40%. Let x and y be liters from A and B. Use the table data to write total-volume and active-component equations, solve exactly, and decide whether the mixture is physically feasible. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

source	concentration	amount liters	active liters
A	$\frac{3}{20}$	x	$\frac{3}{20}x$
B	$\frac{2}{5}$	y	$\frac{2}{5}y$
target	$\frac{97}{280}$	14	$\frac{97}{20}$

Bank label: _____

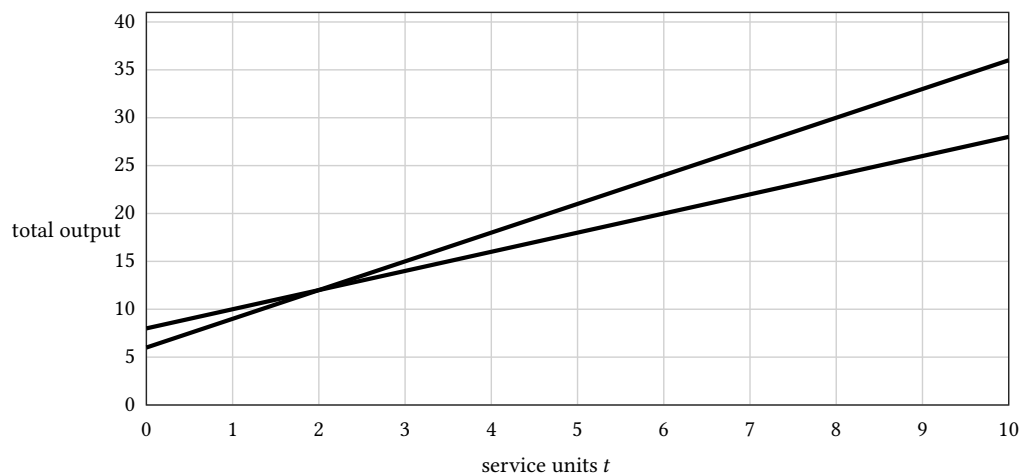
Algebra 1

Systems of Equations Word Problems

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. A value without its unit is not a complete answer.

Plan A has output $A(t) = 8 + 2t$ and Plan B has output $B(t) = 6 + 3t$, where t is a nonnegative number of service units. Build the equality model, determine any shared input and output exactly, and decide whether it is a meaningful break-even point. Use the exact graph rules and scale in the provided data.



Algebra 1

Systems of Equations
Word Problems

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: $x = 14$ and $y = 16$; the pair is admissible as item counts.

Two drones leave the same marker in opposite directions at constant speeds x and y kilometers per hour. In Trial 1, drone X flies for 3 hours and drone Y for 6 hours, placing them 75 kilometers apart. In Trial 2, their flight times are 3 hours and 1 hour and their separation is 20 kilometers. Build the two rate-time equations from the table, determine both speeds, and verify both separations. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

observation	X hours	Y hours	separation km
1	3	6	75
2	3	1	20

Your response: _____

Incoming: $x = 8$ units/hour and $y = 1$ unit/hour.

A record shows 18 total small boxes and large boxes. Each small box contributes 5 kilograms, and each large box contributes 9 kilograms; the combined contribution is 138 kilograms. Define x and y with units, write the two equality constraints, determine the quantities if possible, and assess whether the result is admissible. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

Your response: _____

Incoming: $x = 4$ and $y = 12$; the pair is admissible as item counts.

Two constant production rates x and y are measured in units per hour. Observation 1 runs process X for 4 hours and process Y for 4 hours, producing 48 units total. Observation 2 uses 5 hours and 2 hours respectively and produces 48 units. Build the two rate-time equations from the table, determine both rates if the observations identify them, and verify against both totals. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

observation	X hours	Y hours	total units
1	4	4	48
2	5	2	48

Your response: _____

Incoming: $x = 9$ and $y = 5$; the result is admissible. It comes from $x + y = 14$ and $x - y = 4$.

Unknown component contributions x and y are constant across measurements. Measurement 1 has X -multiplicity 3 and Y -multiplicity 6 for total 24; Measurement 2 has multiplicities 3 and 4 for total 18. Build the weighted-sum system from the table, determine x and y if identifiable, and check every measured total. For the response cell, record the exact algebraic pair (x, y) , using the units defined in this question. Still provide the full model, checks and contextual admissibility assessment in your work.

measurement	X multiplicity	Y multiplicity	measured total
1	3	6	24
2	3	4	18

Your response: _____

Algebra 1

Systems of Equations Word Problems

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 model uses x and y under this domain requirement: nonnegative whole-number item counts. The stored equations are $x + y = 10$ and $2x + 3y = \frac{57}{2}$, and an algebraic solver reports $(\frac{3}{2}, \frac{17}{2})$. Assess the pair in context, explain whether rounding is allowed, and verify the original equalities. Compare algebraic validity with contextual admissibility, and justify the rounding conclusion using the actual equalities and stated domain.

Context: x and y count two item types; there are 22 items total, valued at 3 and 5 credits each, with combined value 92 credits. A student proposes $3x + 5y = 22$ and $3x + 5y = 92$. Identify the first semantic mismatch before solving, state the corrected two-equation model with variable units, and verify that the repaired model represents the context.

Context: x and y count two item types; there are 6 items total, valued at 4 and 6 credits each, with combined value 34 credits. A student proposes $4x + 6y = 6$ and $4x + 6y = 34$. Identify the first semantic mismatch before solving, state the corrected two-equation model with variable units, and verify that the repaired model represents the context.

One measurement of two unknown per-unit contributions gives $2x + 4y = 54$. A second measurement must use nonnegative integer multiplicities and be compatible with the same contributions. Compare candidates A: $4x + 8y = 108$, B: $2x + 4y = 56$, and C: $5x + 4y = 63$. Select the observation that uniquely identifies x and y , and explain why the other two fail without using a determinant formula.

Systems of Equations Word Problems

Full Worked Solutions - excerpt

Worked example

Problem. For two account balances in dollars, the conditions are: x is 6 more than y , and the stated total condition is $x + y = 18$ when x and y use the units named in context. Translate the comparison with the correct reference quantity, solve the two equality constraints, and assess whether both quantities are admissible.

Answer. $x = 12$ and $y = 6$; the result is admissible. It comes from $x + y = 18$ and $x - y = 6$.

Explanation and check.

The total condition is $x + y = 18$. The relationship 'x is 6 more than y' becomes $x - y = 6$. Solving the two independent equations gives $x = 12$ and $y = 6$. Both quantities satisfy the stated relationship and domain.

Worked example

Problem. For two collections of items, the conditions are: x is 4 times as large as y , and the stated total condition is $x + y = 10$ when x and y use the units named in context. Translate the comparison with the correct reference quantity, solve the two equality constraints, and assess whether both quantities are admissible.

Answer. $x = 8$ and $y = 2$; the result is admissible. It comes from $x + y = 10$ and $x - 4y = 0$.

Explanation and check.

The total condition is $x + y = 10$. The relationship 'x is 4 times as large as y' becomes $x - 4y = 0$. Solving the two independent equations gives $x = 8$ and $y = 2$. Both quantities satisfy the stated relationship and domain.