Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Inequality Models & Feasible Regions | Algebra 1 | 3-Topic Bundle

3-topic bundle | 288 problems | Four activity formats

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01 Writing Inequalities from Word Problems

View individual product and its full preview

02 Inequality Word Problems: Plans and Constraints

View individual product and its full preview

03 Graphing Linear Inequalities and Systems

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; 290 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

Writing Inequalities from Word Problems

Writing Linear Inequalities from Context | A1-U03-P01

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 inequality interpretation with boundary justification and method choice with justification, followed by inequality interpretation with boundary justification.

8 PDFs and a README; 53 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

Writing Inequalities 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 student remains eligible only while the absence count a has not reached 5. Write the direct comparison.

Bank label: _____

Give an equivalent comparison to $m \le 0$ that begins with 0.

Bank label: _____

A review is assigned when q, the number of missed questions, is 12 or fewer. Write the inequality.

Bank label: _____

Test $q = \frac{1}{2}$, $q = \frac{3}{4}$, and $q = 1$ against $q > \frac{3}{4}$.

Proposed value
$\frac{1}{2}$
$\frac{3}{4}$
1

Bank label: _____

A lift may carry its full 900-kilogram rating but nothing heavier. Write the constraint for load w.

Bank label: _____

Express $8 < x$ with x first.

Bank label: _____

Test $y = -0.1$, $y = 0$, and $y = 0.1$ in $y > 0$.

Proposed value
-0.1
0
0.1

Bank label: _____

If k is an integer and $k \ge -3$, identify the boundary's status and the least possible k.

Bank label: _____

Algebra 1

Writing Inequalities 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.

Under $x \geq 4$ with real x, determine whether the boundary is a member and identify the least value.

Which is the stronger upper restriction, $x \leq 3$ or $x \leq 7$? Give a value showing why the weaker one does not imply the stronger.

For the signed-change condition $c \leq 0$, decide whether -7, 0, and 3 qualify.

Proposed value
-7
0
3

Are the permitted sets for $x \geq 2$ and $x \leq 6$ nested? Support the answer with one witness for each failed implication.

For a nonnegative integer count n subject to $n < 0$, decide whether a greatest or least feasible value exists.

Determine whether $t = 4.5$ and $t = 5$ satisfy $0.4t + 1 \geq 3$.

Proposed value
4.5
5

Algebra 1

Writing Inequalities from 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: $T > -3$.

A specification says, 'A reading of -5 is no greater than the signed change c.' Express the permitted c-values with c on the left and explain equality.

Your response: _____

Incoming: $c \geq -5$, with -5 included.

A signed change c is required to be at most -4. State the inequality and do not replace the negative bound with a magnitude.

Your response: _____

Incoming: $t \geq 12$.

A temperature T exceeds -3 degrees Celsius. State the inequality, keeping the negative boundary.

Your response: _____

Incoming: $-6 \geq c$.

A reservation permits a maximum of 9 guests. Write a direct bound for g, the guest count.

Your response: _____

Incoming: $L > 6.2$.

Rewrite $0 \geq h$ with h as the subject on the left.

Your response: _____

Incoming: $s \geq 86$.

Rewrite $x < 7$ with 7 on the left while preserving exactly the same permitted x-values.

Your response: _____

Algebra 1

Writing Inequalities 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.

Choose the most reliable method, briefly justify the choice, and then complete the original task. Original task: For $p \le 250$, determine the status of $p = 0$, $p = 250$, and $p = 251$.

Proposed value
0
250
251

Label	Proposed method
A	Substitute each proposed value into the original comparison and evaluate both sides.
B	Compare only the absolute values and ignore the comparison symbol.
C	Decide only from how close each value is to the boundary.

For real x, compare $x > 2$ and $x \ge 2.5$. Which condition is stronger, and what value separates them?

Writing Inequalities from Word Problems

Full Worked Solutions - excerpt

Worked example

Problem. A student remains eligible only while the absence count a has not reached 5. Write the direct comparison.

Answer. $a < 5$.

Explanation and check.

Counts 0 through 4 have not reached five; equality at five fails.

Worked example

Problem. Give an equivalent comparison to $m \leq 0$ that begins with 0.

Answer. $0 \geq m$.

Explanation and check.

Zero being greater than or equal to m says exactly that m is at most zero.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Inequality Word Problems: Plans and Constraints

Comparing Options with Inequalities (Applications) | A1-U03-P09

96 problems · Four activity formats

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

Topic focus

Across 96 tasks this topic asks for inequality and exact feasible choices with units.

8 PDFs and a README; 51 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

Inequality Word Problems: Plans and Constraints

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.

Vendor J charges \$75 plus \$4 per item; Vendor K charges \$30 plus \$9 per item, and the order may contain at most 12 items. Let i denote number of items. Here, i is an integer with $0 \le i \le 12$. Determine every permitted order size for which J is no more expensive. Bank label: _____	Two machines each take 6 minutes per batch and both require 14 minutes of setup. Let b denote number of batches. Here, b is a nonnegative integer. For which batch counts is Machine A no slower than Machine B? Bank label: _____
A decision satisfies $x \le 12$ and $x \le 20$. The second cap is tightened to 9. Let x denote nonnegative real decision. Here, x is a nonnegative real number. Describe the new feasible set and the switch in the active constraint. Bank label: _____	A printer balance includes a \$10 credit. Each poster costs \$6. At least 4 posters are required and net charges must be under \$50. Let p denote number of posters. Here, p is a nonnegative integer. Model the signed credit, strict budget, and count floor together. Bank label: _____
A real quantity must satisfy $3 \le x \le 11$. The lower requirement relaxes to $x \ge 1$. Let x denote feasible quantity. Here, x is a real number. Describe the change and name the unchanged active side. Bank label: _____	A count initially satisfies $n < 8.2$. A tighter limit changes it to $n < 8$. Let n denote nonnegative count. Here, n is a nonnegative integer. Quantify the effect of crossing the integer boundary. Bank label: _____
A parcel is accepted if it weighs under 750 grams or at least 1.2 kg but no more than 2 kg. Let w denote parcel mass in kilograms. Here, w is a nonnegative real number. Convert units and model both acceptance routes. Bank label: _____	A shelter has 440 meals and serves 36 per day. It wants at least 80 meals in reserve. Let d denote number of service days. Here, d is a nonnegative integer. Model the reserve and find the day cap. Bank label: _____

Algebra 1

Inequality Word Problems: Plans and Constraints

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.

Each craft uses 2.5 meters of cord. At least 8 crafts are needed, and only 30 meters of cord is available. Let c denote number of crafts. Here, c is a nonnegative integer. Model both production and resource limits.	An integer n from 0 through N qualifies when $n < L$ or $n \geq U$, where $0 \leq L \leq U \leq N$. Let n denote qualifying count. Here, n is an integer in $[0, N]$. Give the exact discrete union, including strict rounding at L.
$A96-$square-meter hall reserves 24 square meters for a display. Each table needs 6 square meters. Let t denote number of tables. Here, t is a nonnegative integer. Represent the floor-space limit and interpret its solution.	A shift begins with 120 completed parts and produces 35 each hour. The quota is at least 400 parts. Let h denote whole production hours. Here, h is a nonnegative integer. Model the quota and determine the first qualifying hour.
A $\$2,000$ event budget pays a fixed \$350 rental. Each meal costs \$24 plus $a12.5\%$ service charge on that meal. Let m denote number of meals. Here, m is a nonnegative integer. Include the per-meal service charge and find the meal cap.	A musician has practiced 55 minutes this week and adds 25 minutes per session. The requirement is 180 minutes. Let s denote number of sessions. Here, s is a nonnegative integer. Write the cumulative-time constraint and find the minimum session count.

Algebra 1

Inequality Word Problems: Plans and Constraints

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: The minimum is p = 5. Plan L costs \$18 plus \$5 per GB. Plan M costs \$30 plus \$3 per GB. Let g denote data used in GB. Here, g is a nonnegative real number. Determine the data amounts for which Plan M is no more expensive. Your response: _____	**Incoming:** $30 + 3g \leq 18 + 5g$, so $g \geq 6$ GB. A contest accepts team sizes of at most 3 or at least 8, with a maximum of 10. Let n denote team size. Here, n is a positive integer with $n \leq 10$. List all sizes admitted by either route. Your response: _____
Incoming: The greatest count is t = 15. A solved production condition is $p \geq 4.2$. Let p denote number of batches. Here, p is a nonnegative integer. Find the least feasible batch count and test the previous integer. Your response: _____	**Incoming:** The minimum is k = −1. A solved seating condition is $s < 12$. Let s denote number of students. Here, s is a nonnegative integer. Determine the greatest permitted count. Your response: _____
Incoming: $48 + 6(3)c \geq 210$, so $c \geq 9$; nine cases are needed. Garage C charges \$7 plus \$2.50 per hour; Garage D charges \$4 plus \$3.25 per hour. Let h denote parked hours. Here, h is a nonnegative real number. Find the durations when Garage C is no more costly. Your response: _____	**Incoming:** The minimum is r = 1. A solved visit requirement is $v > 6$. Let v denote number of visits. Here, v is a nonnegative integer. Identify the least feasible v. Your response: _____

Algebra 1

Inequality Word Problems: Plans and Constraints

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 budget model yields $n \leq 7.6$ for the number of tables. A planner reports 7.6 tables. Let n denote number of tables. Here, n is a nonnegative integer. Diagnose the interpretation and state the valid maximum.

A decision satisfies $x \leq 12$ and $x \leq 20$. The second cap is tightened from 20 to 15. Let x denote nonnegative real decision. Here, x is a nonnegative real number. Determine whether the feasible set changes and identify the controlling rule.

Route East takes 18 minutes plus 4 minutes per traffic zone. Route West takes 30 minutes plus 2 minutes per zone. Let z denote number of traffic zones. Here, z is a nonnegative integer. When is Route West no slower than Route East?

A service costs \$18 plus \$5 per use and the budget is \$63. The proposal is $5u \leq 63$. Let u denote number of uses. Here, u is a nonnegative integer. Audit the model and resulting count limit.

Inequality Word Problems: Plans and Constraints

Full Worked Solutions - excerpt

Worked example

Problem. Vendor J charges \$75 plus \$4 per item; Vendor K charges \$30 plus \$9 per item, and the order may contain at most 12 items. Let i denote number of items. Here, i is an integer with $0 \le i \le 12$. Determine every permitted order size for which J is no more expensive.

Answer. $75 + 4i \le 30 + 9i$ gives $i \ge 9$; with the domain, i is $9, 10, 11$, or 12.

Explanation and check.

The comparison supplies a lower bound and the order rule supplies the active upper bound.

Worked example

Problem. Two machines each take 6 minutes per batch and both require 14 minutes of setup. Let b denote number of batches. Here, b is a nonnegative integer. For which batch counts is Machine A no slower than Machine B?

Answer. $14 + 6b \le 14 + 6b$ is true for every nonnegative integer b.

Explanation and check.

The two time models are identical, so every allowed input is a tie.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Graphing Linear Inequalities and Systems

Graphing Linear Inequalities and Systems | A1-U06-COMB-P07-P08

96 problems · Four activity formats

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

Topic focus

Across 96 tasks this topic asks for exact boundary, membership or shading decision, and justification and system, common feasible region, and exact justification.

8 PDFs and a README; 186 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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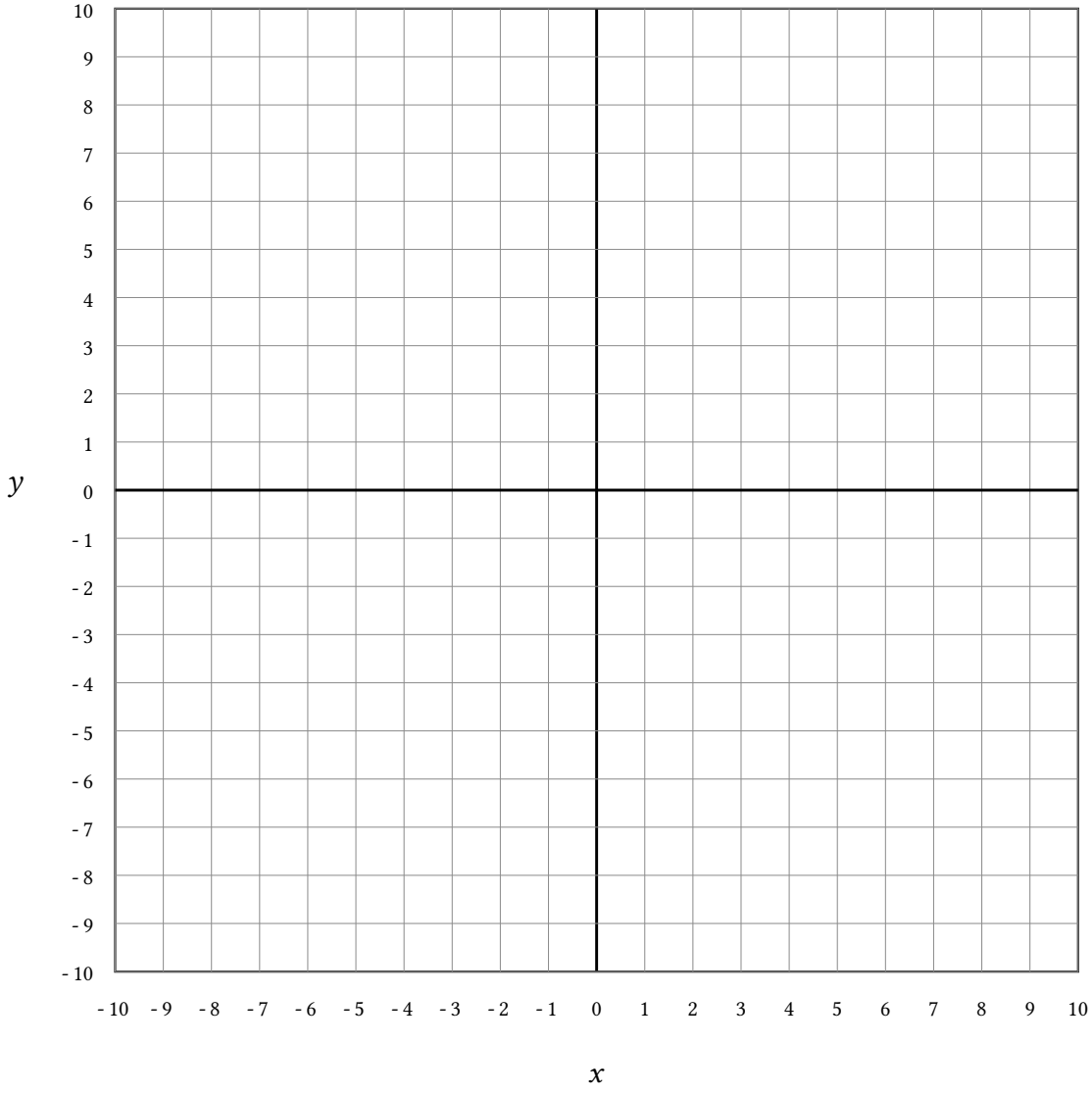
Algebra 1

Graphing Linear Inequalities and Systems

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.

Graph $x - 2y \leq -4$ as one half-plane. Rearrange only as helpful, explicitly track any relation reversal, then give the exact boundary, edge style, and shaded side shown by a decisive off-line test point. For the response cell, record the exact boundary, solid or dashed edge, and shaded side. Still draw or interpret the full required graph and justify every requested part.



Algebra 1

Graphing Linear Inequalities and Systems

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.

For the single inequality $x + y \le -5$, test points $P = (-2, -3), Q = (-3, -4)$, and $R = (-1, -2)$. Complete the substitution table, list every included point, and distinguish boundary equality from interior membership.

Point	x	y	Exact substitutions	Membership / boundary / domain
P	-2	-3	_____	_____
Q	-3	-4	_____	_____
R	-1	-2	_____	_____

For the single inequality $2x + 3y \le -1$, test points $P = (-2, 1), Q = (-4, -2)$, and $R = (0, 4)$. Complete the substitution table, list every included point, and distinguish boundary equality from interior membership.

Point	x	y	Exact substitutions	Membership / boundary / domain
P	-2	1	_____	_____
Q	-4	-2	_____	_____
R	0	4	_____	_____

For the single inequality $3x + y \le -4$, test points $P = (-2, 2), Q = (-5, 1)$, and $R = (1, 3)$. Complete the substitution table, list every included point, and distinguish boundary equality from interior membership.

Point	x	y	Exact substitutions	Membership / boundary / domain
P	-2	2	_____	_____
Q	-5	1	_____	_____
R	1	3	_____	_____

For the single inequality $x + 3y < 6$, test points $P = (-2, \frac{8}{3}), Q = (-3, -\frac{1}{3})$, and $R = (-1, \frac{17}{3})$. Complete the substitution table, list every included point, and distinguish boundary equality from interior membership.

Point	x	y	Exact substitutions	Membership / boundary / domain
P	-2	$\frac{8}{3}$	_____	_____
Q	-3	$-\frac{1}{3}$	_____	_____
R	-1	$\frac{17}{3}$	_____	_____

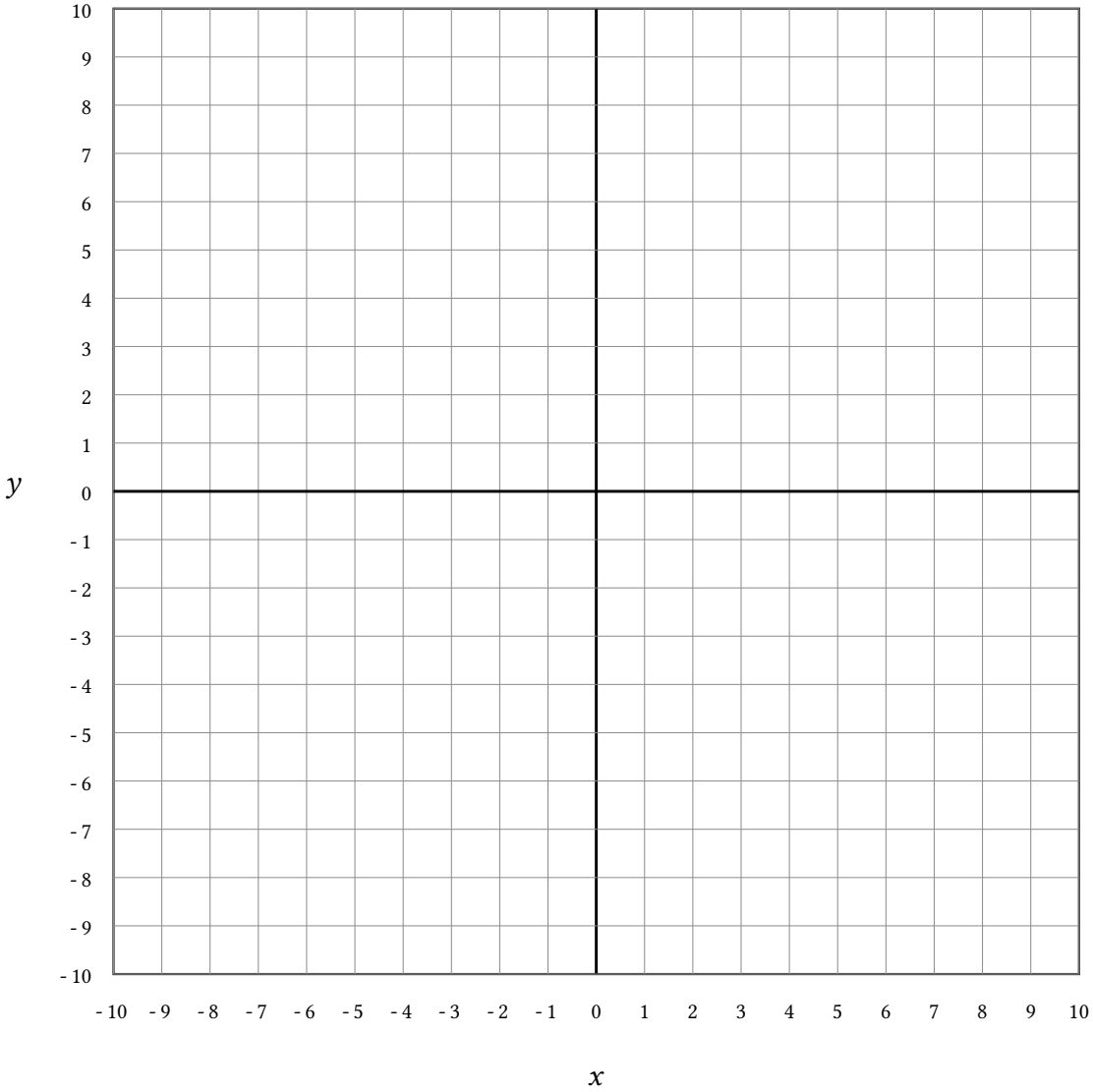
Algebra 1

Graphing Linear Inequalities and Systems

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.

Graph $2x - 3y \geq -11$ as one half-plane. Rearrange only as helpful, explicitly track any relation reversal, then give the exact boundary, edge style, and shaded side shown by a decisive off-line test point. For the response cell, record the exact boundary, solid or dashed edge, and shaded side. Still draw or interpret the full required graph and justify every requested part.



Algebra 1

Graphing Linear Inequalities and Systems

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 $x + y \leq 0$, candidates A, B, and C are listed in the provided graph data. Select a decisive test point for the shading direction, or explain why none is decisive and supply one. A point on the boundary is not an acceptable side test.

Candidate	x	y
A	0	0
B	1	0
C	1	-1

For $3x + y \leq 5$, candidates A, B, and C are listed in the graph payload. Select a decisive test point for the shading direction, or explain why none is decisive and supply one. A point on the boundary is not an acceptable side test.

Candidate	x	y
A	$\frac{5}{3}$	0
B	0	0
C	0	5

Graphing Linear Inequalities and Systems

Full Worked Solutions - excerpt

Worked example

Problem. Classify the full solution set of $x \geq -1$; $x \leq 2$ as bounded, unbounded, empty, a line, or a single point. Prove the classification from the inequalities rather than from the visible graph window.

Answer. For $x \geq -1$; $x \leq 2$, the feasible region is an unbounded strip: x is bounded but y is unrestricted in both directions.

Explanation and check.

For $x \geq -1$; $x \leq 2$, read the parallel and enclosing bounds globally. Here, x is bounded but y is unrestricted in both directions. A witness is $(0, 0)$, which satisfies every constraint. This conclusion does not depend on the plotted window.

Worked example

Problem. Classify the full solution set of $x \geq -1$; $x \leq -1$ as bounded, unbounded, empty, a line, or a single point. Prove the classification from the inequalities rather than from the visible graph window.

Answer. For $x \geq -1$; $x \leq -1$, the feasible region is a line: both inclusive bounds force x to one value while y remains free.

Explanation and check.

For $x \geq -1$; $x \leq -1$, read the parallel and enclosing bounds globally. Here, both inclusive bounds force x to one value while y remains free. A witness is $(-1, 0)$, which satisfies every constraint. This conclusion does not depend on the plotted window.