

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
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 and exact feasible choices with units.
8 PDFs and a README; 51 buyer pages.

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 $0 \leq i \leq 12$. 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 $x \leq 12$ and $x \leq 20$. 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 $3 \leq x \leq 11$. The lower requirement relaxes to $x \geq 1$. 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.
A 96-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 a 12.5% 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 $0 \leq i \leq 12$. Determine every permitted order size for which J is no more expensive.

Answer. $75 + 4i \leq 30 + 9i$ gives $i \geq 9$; 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. $14 + 6b \leq 14 + 6b$ is true for every nonnegative integer b .

Explanation and check.

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