LESSON MAKER PRO

Which Plans Work?

Solve the system, then check the plan.

HIGH SCHOOL · A1P.AF.D.13

A1P.AF.D.13 "Represent constraints by equations and/or inequalities, and solve systems of equations and/or inequalities, interpreting solutions as viable or nonviable options in a modeling context. Limit to contexts arising from linear, quadratic..."

NAME _____ DATE _____

SOLVE AND CHECK

Let x and y represent two quantities. Write equations for exact totals and inequalities for limits. After solving, check every limit and make sure item counts are nonnegative whole numbers.

WORKED EXAMPLE

Buy exactly 4 items for exactly $36. Let x be the number of A items and y the number of B items. How many of each can you buy?

ITEM PRICES

Item	Price
A	$7
B	$11

1. Write x + y = 4 and 7x + 11y = 36.
2. Substitute x = 4 - y: 7(4 - y) + 11y = 36, so 4y = 8.
3. Then y = 2 and x = 2.

Answer: 2 A items and 2 B items. Both counts are whole and nonnegative.

PRACTICE 4 problems

1 Solve x + y = 8 and 3x + 5y = 30. Give (x, y).

ANSWER _____

2 Solve x + y = 9 and 3x + 8y = 41. Can x and y count items?

ANSWER _____

3 Write constraints for at most 12 items costing at most $54, with x items at $3 each and y items at $6 each. Is (6, 5) viable?

ANSWER _____

4 Solve x + y = 10 and 6x + 3y = 63. Can x and y count items?

ANSWER _____

APPLY IT Show your work

1 A concert booth sold 15 stickers and pins. Stickers cost $3, pins cost $5, and sales totaled $61. How many of each were sold?

WORK SPACE

ANSWER _____

2 An esports team needs exactly 8 game passes. Basic passes cost $6 and premium passes cost $10. Can the team spend exactly $50? Explain.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A team sells $5 and $8 tickets. It can sell at most 20 tickets and needs at least $130. If it sells 10 $5 tickets, what is the least number of $8 tickets it must sell? Explain.

WORK SPACE AND ANSWER

ANSWER KEY

Which Plans Work?

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve x + y = 8 and 3x + 5y = 30. Give (x, y).	**(5, 3)**
2	Solve x + y = 9 and 3x + 8y = 41. Can x and y count items?	**x = 31/5, y = 14/5. No, neither count is a whole number.**
3	Write constraints for at most 12 items costing at most $54, with x items at $3 each and y items at $6 each. Is (6, 5) viable?	**x + y ≤ 12, 3x + 6y ≤ 54, with x and y nonnegative whole numbers. Yes: 11 items cost $48.**
4	Solve x + y = 10 and 6x + 3y = 63. Can x and y count items?	**x = 11, y = -1. No, an item count cannot be negative.**

PART 2 · APPLY IT

1. **7 stickers and 8 pins.** Let x be stickers and y be pins. Solve x + y = 15 and 3x + 5y = 61 to get x = 7 and y = 8; both counts are viable.
2. **No. The equations give 15/2 basic passes and 1/2 premium pass, which are not whole passes.** Solve x + y = 8 and 6x + 10y = 50. The solution x = 15/2, y = 1/2 meets both totals but is not viable for pass counts.

CHALLENGE

10 $8 tickets. The $5 tickets earn $50, so the team needs at least $80 more, or 10 $8 tickets. That makes 20 tickets and $130, meeting both limits.

Accept equivalent equations and inequalities. For item or pass counts, students must check that solutions are nonnegative whole numbers.