LESSON MAKER PRO

Constraint Check

Model limits, solve systems, test options.

HIGH SCHOOL · MA.912.AR.9.6

MA.912.AR.9.6 "Given a real-world context, represent constraints as systems of linear equations or inequalities. Interpret solutions to problems as viable or non-viable options."

NAME _____ DATE _____

EVERY CONDITION COUNTS

A solution is viable only if it makes every equation or inequality true. Define variables, write each limit from the context, then solve or test the option.

WORKED EXAMPLE

Solve the system: x+y=18 and 2x+y=25.

1. Subtract x+y=18 from 2x+y=25: x=7.
2. Substitute: 7+y=18.
3. Solve: y=11.

Answer: x=7, y=11

PRACTICE 5 problems

1 Solve: x+y=14 and x-y=4.

ANSWER _____

2 A game booth sells x regular passes for $5 and y premium passes for $9. It sells 15 passes for $95. Write and solve a system.

ANSWER _____

3 Is (8,3) viable for x+y<=13, x>=6, and y>=0?

ANSWER _____

4 Write a system for x albums and y posters. There are at most 17 items, at least 6 are albums, and poster counts cannot be negative.

ANSWER _____

5 Is (9,5) viable for x+y=14, 3x+y<=33, x>=0, and y>=0?

ANSWER _____

APPLY IT Show your work

1 An esports club sells x standard tickets for $5 and y VIP tickets for $9. It must sell exactly 20 tickets and collect at least $132. Write a system. Is (8,12) viable?

WORK SPACE

ANSWER _____

2 For a watch party, x pizza slices cost $3 each, y fruit cups cost $4 each, and z waters cost $1 each. The club needs exactly 24 items and can spend no more than $72. Write a system. Is (8,10,6) viable?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A student council buys x hoodies for $4, y caps for $3, and z stickers for $1. It orders 26 items for exactly $81, with 5 more hoodies than caps. Write and solve a system. Are the results viable item counts?

WORK SPACE AND ANSWER

ANSWER KEY # Constraint Check

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve: x+y=14 and x-y=4.	**x=9, y=5**
2	A game booth sells x regular passes for $5 and y premium passes for $9. It sells 15 passes for $95. Write and solve a system.	**x+y=15, 5x+9y=95; x=10, y=5**
3	Is (8,3) viable for x+y<=13, x>=6, and y>=0?	**Yes**
4	Write a system for x albums and y posters. There are at most 17 items, at least 6 are albums, and poster counts cannot be negative.	**x+y<=17, x>=6, y>=0**
5	Is (9,5) viable for x+y=14, 3x+y<=33, x>=0, and y>=0?	**Yes**

PART 2 · APPLY IT

1. **x+y=20, 5x+9y>=132, x>=0, y>=0; (8,12) is viable.** The option sells 20 tickets and collects $148. Both constraints are met.
2. **x+y+z=24, 3x+4y+z<=72, x>=0, y>=0, z>=0; (8,10,6) is viable.** The option has 24 items and costs $70. It meets the item and budget constraints.

CHALLENGE

x+y+z=26, 4x+3y+z=81, x-y=5; x=13, y=8, z=5. Yes, the results are viable.

Accept equivalent equation order and equivalent inequality forms. For item counts, require nonnegative whole-number solutions and label an option viable only when every constraint is met.