LESSON MAKER PRO

Which Options Work?

Solve a constraint, then check the limit.

GRADE 8 · 8A.AF.E.15

8A.AF.E.15 "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

Use an equation to find when two amounts are equal. Use an inequality for a limit, then check whether your answer fits that limit.

WORKED EXAMPLE

Each plan has a start fee and a cost per item. At how many items do the plans cost the same? Is that possible if you can buy at most 10 items?

SHOPPING PLANS

Plan	Start fee ($)	Per item ($)
A	13	11
B	37	3

1. Set the costs equal: 13 + 11x = 37 + 3x.
2. Subtract to get 8x = 24.
3. Solve: x = 3. Check: 3 <= 10.

Answer: 3 items, viable.

PRACTICE 4 problems

1 Find x when 2x + 18 = 5x + 12.

ANSWER _____

2 Find x when 14 + x = 2 + 4x. Is it viable if x must be at least 5?

ANSWER _____

3 If x is a whole number, what is the greatest x that satisfies 2x + 20 <= 32?

ANSWER _____

4 What is the least whole-number x that satisfies 22 + 4x >= 50?

ANSWER _____

APPLY IT Show your work

1 A game shop rents a controller for $28 plus $2 per day. Another shop charges $16 plus $4 per day. After how many days do the costs match? Does that fit a 7-day break?

WORK SPACE

ANSWER _____

2 Dance tickets cost $5 each. After paying a $45 DJ fee, the club needs at least $30 left. It can sell at most 18 tickets. Write two inequalities and list the possible whole-number ticket sales.

WORK SPACE

ANSWER _____

CHALLENGE One step up

You sell sticker packs for $6 each and pay an $18 booth fee. You need at least $36 profit but can sell at most 12 packs. Write two inequalities and list every viable whole-number value of x.

WORK SPACE AND ANSWER

ANSWER KEY

Which Options Work?

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find x when 2x + 18 = 5x + 12.	**x = 2**
2	Find x when 14 + x = 2 + 4x. Is it viable if x must be at least 5?	**x = 4; not viable because 4 < 5.**
3	If x is a whole number, what is the greatest x that satisfies 2x + 20 <= 32?	**x = 6**
4	What is the least whole-number x that satisfies 22 + 4x >= 50?	**x = 7**

PART 2 · APPLY IT

1. **6 days; yes.** Solve 28 + 2x = 16 + 4x to get x = 6. Six days fits within 7 days.
2. **5x - 45 >= 30 and x <= 18; x = 15, 16, 17, or 18.** The money goal gives x >= 15. Combine it with x <= 18.

CHALLENGE

6x - 18 >= 36 and x <= 12; x = 9, 10, 11, or 12.

Accept equivalent inequalities. For the word problems and challenge, x represents a whole-number count.