LESSON MAKER PRO

Intersection Detectives

Use substitution and elimination to find where two linear rules meet.

GRADE 8 · 8.FGR.7

8.FGR.7 "Justify and use various strategies to solve systems of linear equations to model and explain realistic phenomena."

NAME _____ DATE _____

CHOOSE A STRATEGY

A solution to a system is an ordered pair that makes both equations true. Use substitution when one equation is easy to rewrite, and use elimination when adding or subtracting can cancel a variable.

WORKED EXAMPLE

Solve the system: $7x + 5y = 131$ and $x - y = 5$.

1. Multiply $x - y = 5$ by 5: $5x - 5y = 25$.
2. Add the equations: $12x = 156$.
3. Divide by 12: $x = 13$.
4. Substitute $x = 13$ into $x - y = 5$ and solve: $y = 8$.

Answer: x = 13, y = 8

PRACTICE 6 problems

1 Solve the system: $x + y = 20$ and $x - y = 2$.

ANSWER _____

2 Solve the system: $y = 2x + 4$ and $y = x + 10$.

ANSWER _____

3 Solve the system: $4x + 3y = 30$ and $2x - 3y = 6$.

ANSWER _____

4 Solve the system: $x/2 + y/3 = 9$ and $x + y = 20$.

ANSWER _____

5 Solve the system: $3x + 4y = 51$ and $x + 4y = 33$.

ANSWER _____

6 Solve the system: $y = -2x + 18$ and $3x + y = 22$.

ANSWER _____

APPLY IT Show your work

1 A gaming lounge has two payment plans. Plan A costs $16 plus $2 for each match played. Plan B costs $10 plus $3 for each match played. After how many matches will the plans cost the same amount? What will that cost be?

WORK SPACE

ANSWER _____

2 Two school clubs are raising money with car washes. Club A starts with $24 in donations and earns $6 per car wash. Club B starts with $42 and earns $3 per car wash. After how many car washes will the clubs have the same total? What will each total be?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Solve the system: $4x + 6y = 56$ and $3x - 2y = 29$. Then explain why elimination is an efficient strategy for this system.

WORK SPACE AND ANSWER

ANSWER KEY

Intersection Detectives

GRADE 8 · 8.FGR.7

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve the system: x + y = 20 and x - y = 2.	**x = 11, y = 9**
2	Solve the system: y = 2x + 4 and y = x + 10.	**x = 6, y = 16**
3	Solve the system: 4x + 3y = 30 and 2x - 3y = 6.	**x = 6, y = 2**
4	Solve the system: x/2 + y/3 = 9 and x + y = 20.	**x = 14, y = 6**
5	Solve the system: 3x + 4y = 51 and x + 4y = 33.	**x = 9, y = 6**
6	Solve the system: y = -2x + 18 and 3x + y = 22.	**x = 4, y = 10**

PART 2 · APPLY IT

1. **After 6 matches, both plans cost $28.** After 6 matches, both plans cost $28. Let x be the number of matches. Solve 16 + 2x = 10 + 3x to get x = 6, then substitute to find the cost.
2. **After 6 car washes, each club has $60.** After 6 car washes, each club has $60. Let x be the number of car washes. Solve 24 + 6x = 42 + 3x to get x = 6, then substitute to find the total.

CHALLENGE

x = 11, y = 2.

Accept answers written as ordered pairs or as separate x and y values. For word problems, accept equivalent equations and a correct matching cost or total.