LESSON MAKER PRO

Where Lines Meet

Estimate intersections, then solve the systems.

HIGH SCHOOL · A.REI.6

A.REI.6 "Estimate solutions graphically and determine algebraic solutions to linear systems, focusing on pairs of linear equations in two variables."

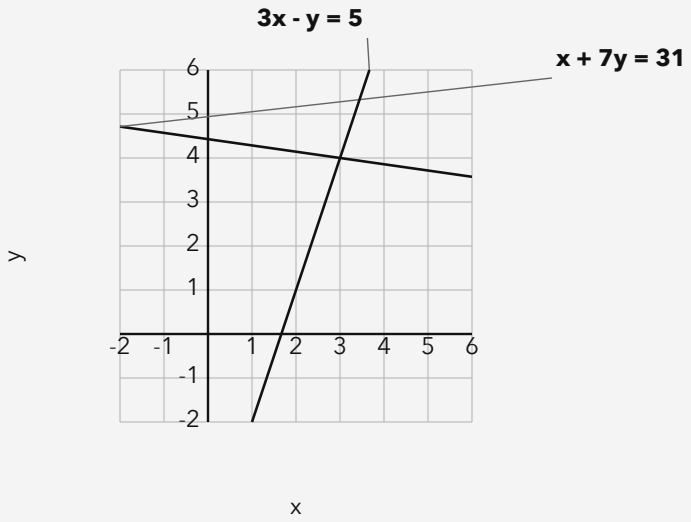
NAME _____ DATE _____

TWO WAYS TO FIND A SOLUTION

The solution to a system is a point that lies on both lines. Use a graph to estimate where the lines meet, then use substitution or elimination to find the exact point. Check that your point makes both equations true.

WORKED EXAMPLE

Estimate the solution from the graph, then solve $x + 7y = 31$ and $3x - y = 5$ algebraically.

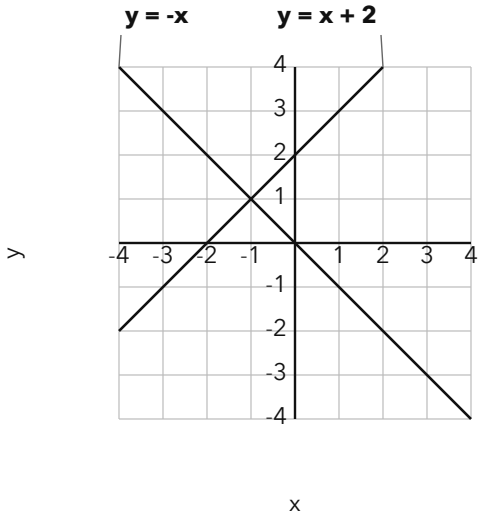


1. The lines appear to meet near (3, 4).
2. Multiply $3x - y = 5$ by 7: $21x - 7y = 35$.
3. Add $x + 7y = 31$: $22x = 66$, so $x = 3$.
4. Substitute: $3 + 7y = 31$, so $y = 4$.

Answer: (3, 4)

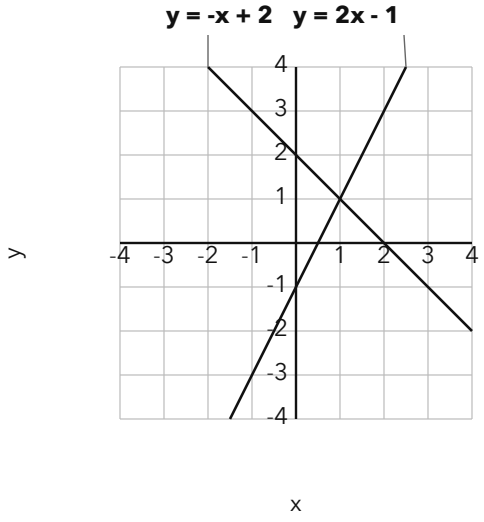
PRACTICE 6 problems

1 Estimate where the lines meet. Then solve the system algebraically to check your estimate.



ANSWER _____

2 Estimate where the lines meet. Then solve the system algebraically to check your estimate.



ANSWER _____

3 Solve the system: x + y = 8 and x - y = 2.

ANSWER _____

4 Solve the system: 2x + y = 4 and x - y = -1.

ANSWER _____

5 Solve the system: y = 4x - 6 and y = -2x + 6.

ANSWER _____

6 Solve the system: 4x - 2y = 8 and 2x + y = 9.

ANSWER _____

APPLY IT Show your work

1 Two movie rental plans charge a monthly fee plus a cost for each movie. Plan A charges $8 per month and $2 per movie. Plan B charges $4 per month and $4 per movie. For how many movies in one month do the plans cost the same? What is that cost? Write and solve a system.

WORK SPACE

ANSWER _____

2 At a school event, 2 smoothies and 4 wraps cost $28. Another order of 4 smoothies and 2 wraps costs $26. What is the price of one smoothie and one wrap? Write and solve a system.

WORK SPACE

ANSWER _____

CHALLENGE One step up

The system $x + 2y = 4$ and $2x + 4y = 12$ has no solution, one solution, or infinitely many solutions. Which is it? Explain using algebra, then describe what its graph would show.

WORK SPACE AND ANSWER

ANSWER KEY

Where Lines Meet

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Estimate where the lines meet. Then solve the system algebraically to check your estimate.	**Estimate: (-1, 1). Algebra: x + 2 = -x, so x = -1 and y = 1.**
2	Estimate where the lines meet. Then solve the system algebraically to check your estimate.	**Estimate: (1, 1). Algebra: 2x - 1 = -x + 2, so x = 1 and y = 1.**
3	Solve the system: x + y = 8 and x - y = 2.	**(5, 3)**
4	Solve the system: 2x + y = 4 and x - y = -1.	**(1, 2)**
5	Solve the system: y = 4x - 6 and y = -2x + 6.	**(2, 2)**
6	Solve the system: 4x - 2y = 8 and 2x + y = 9.	**(13/4, 5/2)**

PART 2 · APPLY IT

1. **2 movies; $12 for either plan** Let x be movies and y be total cost in dollars. Solve y = 8 + 2x and y = 4 + 4x to get x = 2 and y = 12.
2. **Smoothie: $4; wrap: $5** Let x be the smoothie price and y be the wrap price. Solve 2x + 4y = 28 and 4x + 2y = 26 to get x = 4 and y = 5.

CHALLENGE

No solution. Dividing the second equation by 2 gives x + 2y = 6, which cannot be true at the same time as x + 2y = 4. The graph would show two distinct parallel lines.

Accept either order of the equations and any valid algebraic method. For the graph problems, accept estimates near the exact intersection if the algebraic solution is correct.