LESSON MAKER PRO

Where Lines Meet

Compare algebraic answers with tables and graphs.

GRADE 8 · 8A.AF.D.12.b

8A.AF.D.12.b "Contrast solutions to a system of two linear equations in two variables produced by algebraic methods with graphical and tabular methods."

NAME _____ DATE _____

THREE WAYS TO CHECK

Solve a system algebraically to find an exact answer. In a table, look for a row where both equations give the same y-value. On a graph, that answer is where the lines meet.

WORKED EXAMPLE

Solve y = 8 - 2x and y = x - 1. Check the table.

VALUES FOR BOTH EQUATIONS

x	y = 8 - 2x	y = x - 1
1	6	0
2	4	1
3	2	2

1. Set the y-values equal: 8 - 2x = x - 1.
2. Add 2x and 1: 9 = 3x.
3. Divide by 3: x = 3. Then y = 3 - 1 = 2.

Answer: (3, 2). The table confirms that both y-values are 2 when x = 3.

PRACTICE 4 problems

1 Solve y = x + 4 and y = -x + 10 algebraically. Where would the lines meet?

ANSWER _____

2 Solve y = 2x + 5 and y = 2x - 3 algebraically. What would the graph show?

ANSWER _____

3 Solve y = -3x + 6 and 2y = -6x + 12 algebraically. What would the graph show?

ANSWER _____

4 Solve y = 3x - 2 and y = -x + 5 algebraically. Where would the lines meet?

ANSWER _____

APPLY IT Show your work

1 Two gaming plans charge by the hour. Plan A costs $5 plus $3 per hour. Plan B costs $11 plus $2 per hour. When do they cost the same? Solve algebraically and check the table.

PLAN COSTS

Hours	Plan A	Plan B
4	$17	$19
5	$20	$21
6	$23	$23

ANSWER _____

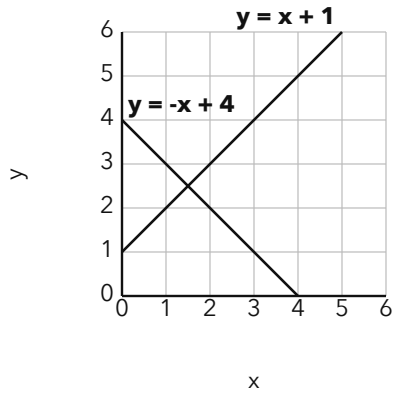
2 At a school event, 2 pizza slices and 3 drinks cost $17. Another order of 3 slices and 2 drinks costs $18. Find each price algebraically. What point would the price equations share on a graph if x is the slice price and y is the drink price?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Find the exact intersection algebraically. Why would a table using only whole-number x-values miss it?



WORK SPACE AND ANSWER

ANSWER KEY

Where Lines Meet

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve y = x + 4 and y = -x + 10 algebraically. Where would the lines meet?	**(3, 7); the lines meet at (3, 7).**
2	Solve y = 2x + 5 and y = 2x - 3 algebraically. What would the graph show?	**No solution; the lines are parallel.**
3	Solve y = -3x + 6 and 2y = -6x + 12 algebraically. What would the graph show?	**Infinitely many solutions; the equations graph as the same line.**
4	Solve y = 3x - 2 and y = -x + 5 algebraically. Where would the lines meet?	**(7/4, 13/4); the lines meet at (7/4, 13/4).**

PART 2 · APPLY IT

1. **After 6 hours, both plans cost $23.** Set 5 + 3h = 11 + 2h to get h = 6. The table shows $23 for both plans at 6 hours.
2. **A slice costs $4 and a drink costs $3. The lines meet at (4, 3).** Use 2x + 3y = 17 and 3x + 2y = 18. Elimination gives y = 3, then x = 4.

CHALLENGE

Setting x + 1 = -x + 4 gives x = 3/2 and y = 5/2. The intersection is (3/2, 5/2); a table of whole-number x-values would omit x = 3/2.

Accept equivalent decimal coordinates for the fractional answers. For the parallel and identical lines, accept any clear description of what the graph shows.