LESSON MAKER PRO

Where Lines Meet

Solve systems on graphs, with equations, and in real situations.

HIGH SCHOOL · A2.A.1.7

A2.A.1.7 "Represent and evaluate mathematical models using systems of linear equations with a maximum of three variables. Graphing calculators or other appropriate technology may be used."

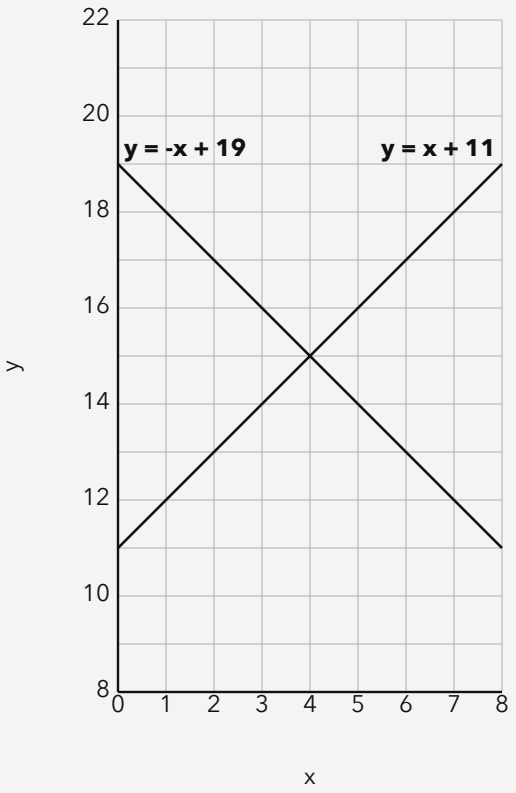
NAME _____ DATE _____

THE BIG IDEA

A solution to a system makes every equation true. On a graph, it is the point where the lines meet. For a real situation, choose variables, write an equation for each fact, and explain what the solution means.

WORKED EXAMPLE

What is the solution of the graphed system? Check the point in both equations.

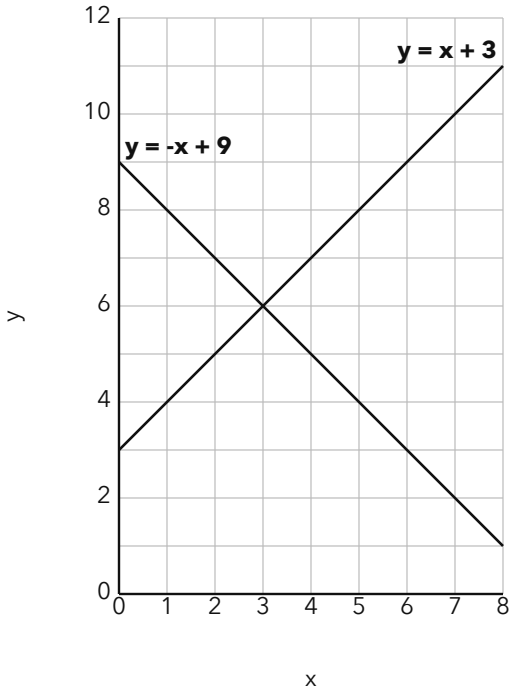


1. Read the intersection: (4, 15).
2. Check the first line: 4 + 11 = 15.
3. Check the second line: -4 + 19 = 15.

Answer: (4, 15)

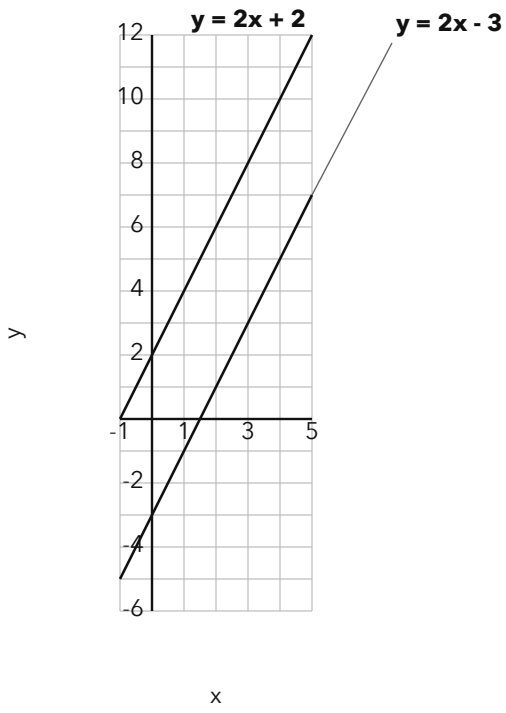
PRACTICE 6 problems

1 What is the solution of the graphed system?



ANSWER _____

2 How many solutions does the graphed system have? Explain using the graph.



ANSWER _____

_____

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

ANSWER _____

4 Solve the system: x + 2y = 17 and x - y = 2.

ANSWER _____

5 Solve for (x, y, z): x + y + z = 16, x + y = 8, and y + z = 14.

ANSWER _____

6 Stickers cost $3 each, and patches cost $8 each. A customer buys 6 items for $33. Let s be the number of stickers and p be the number of patches. Write a system, then find s and p.

ANSWER _____

_____

APPLY IT Show your work

1 A student club sells individual livestream passes for $8 and group passes for $12. It sells 14 passes and collects $132. Write a system and find how many passes of each type it sold.

WORK SPACE

ANSWER _____

2 At a movie night, popcorn costs $6, drinks cost $3, and candy bars cost $2. A group buys 12 items for $42, including twice as many drinks as candy bars. Write a system and find how many of each item the group buys.

WORK SPACE

ANSWER _____

CHALLENGE One step up

An art club sells small, medium, and large prints. Two small prints, one medium print, and one large print cost $34. One small print, two medium prints, and one large print cost $37. One small print, one medium print, and two large prints cost $41. Write a system and find the price of each size. Show how you know your prices fit all three orders.

WORK SPACE AND ANSWER

ANSWER KEY # Where Lines Meet

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	What is the solution of the graphed system?	**(3, 6)**
2	How many solutions does the graphed system have? Explain using the graph.	**No solutions. The lines are parallel, so they never meet.**
3	Solve the system: x + y = 8 and x - y = 2.	**(5, 3)**
4	Solve the system: x + 2y = 17 and x - y = 2.	**(7, 5)**
5	Solve for (x, y, z): x + y + z = 16, x + y = 8, and y + z = 14.	**(2, 6, 8)**
6	Stickers cost $3 each, and patches cost $8 each. A customer buys 6 items for $33. Let s be the number of stickers and p be the number of patches. Write a system, then find s and p.	**s + p = 6 and 3s + 8p = 33; s = 3, p = 3.**

PART 2 · APPLY IT

1. **Let i be individual passes and g be group passes. i + g = 14 and 8i + 12g = 132; the club sold 9 individual passes and 5 group passes.** Substitute i = 14 - g into the revenue equation to get 112 + 4g = 132. Thus g = 5 and i = 9.
2. **Let p be popcorns, d be drinks, and c be candy bars. p + d + c = 12, 6p + 3d + 2c = 42, and d = 2c; the group buys 3 popcorns, 6 drinks, and 3 candy bars.** Use d = 2c to get p + 3c = 12 and 6p + 8c = 42. Solving gives c = 3, d = 6, and p = 3.

CHALLENGE

Let s, m, and l be the prices of small, medium, and large prints. 2s + m + l = 34, s + 2m + l = 37, and s + m + 2l = 41. The prices are s = $6, m = $9, and l = $13. Check: 12 + 9 + 13 = 34, 6 + 18 + 13 = 37, and 6 + 9 + 26 = 41.

Accept equivalent systems with clearly defined variables. For the graph questions, students should identify a shared point or explain why no shared point exists.