

Systems of Linear Equations: math practice, Grade 8 – download the PDF

21 problems graded by difficulty (★ easy, ★★ medium, ★★★ hard). Try first, without looking at the solutions!

1 Is it a solution?



Is $(3, 1)$ a solution of the system $x + y = 4$ and $2x - y = 5$? Justify.

2 One equation is not enough

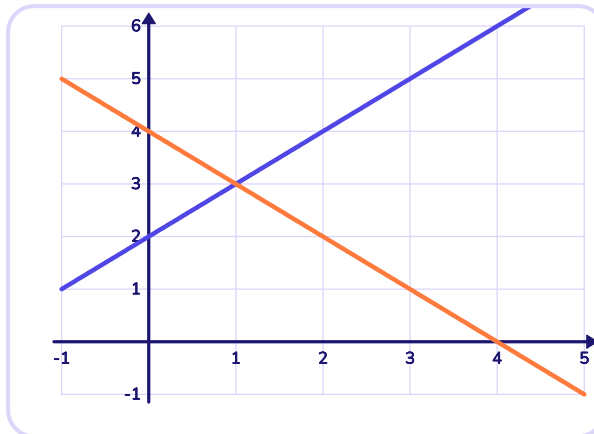


Is $(2, 5)$ a solution of $y = 3x - 1$ and $x + y = 8$?

3 Read the graph



The graph shows lines $p: y = x + 2$ and $q: y = -x + 4$.



Give the solution of the system and check it algebraically.

4 A first substitution



Solve by substitution: $y = 2x$ and $x + y = 12$.

5 A first elimination



Solve by elimination: $x + y = 9$ and $x - y = 3$.

6 Count the solutions



Without solving, say whether each system has one solution, none, or infinitely many.

- a. $y = 4x + 1$ and $y = 4x - 5$
- b. $y = -2x + 3$ and $y = x + 3$
- c. $y = 3x - 2$ and $6x - 2y = 4$

7 Two numbers



The sum of two numbers is 25 and their difference is 7. Find them.

8 Substitute and simplify



Solve: $y = x - 3$ and $3x + 2y = 9$.

9 Isolate first



Solve by substitution: $x + 2y = 11$ and $3x - y = 5$. (Hint: which variable is easy to isolate?)

10 Opposite coefficients



Solve by elimination: $4x + 3y = 18$ and $2x - 3y = 0$.

11 Subtract to eliminate



Solve: $3x + 2y = 7$ and $x + y = 3$.

12 At the fruit stand



Three apples and two oranges cost 6.50 dollars. Two apples and one orange cost 4.00 dollars. Find the price of one apple and one orange.

13 True or false?



True or false: the system $y = -x + 4$ and $2x + 2y = 10$ has exactly one solution. Justify.

14 Choosing a gym



Gym A charges a 30 dollar sign-up fee plus 12 dollars per month. Gym B charges 50 dollars to sign up plus 8 dollars per month. After how many months do the total costs match, and what is that cost?

15 Multiply both equations



Solve: $2x + 3y = 1$ and $3x + 4y = 2$.

16 Parameters



Consider $y = 3x + 2$ and $y = kx + b$.

- For which value of k is there no solution when $b = -5$?
- Which values of k and b give infinitely many solutions?

17 Boat and current



A boat goes 24 miles downstream in 2 hours and returns the 24 miles upstream in 3 hours. Find the speed of the boat in still water and the speed of the current.

18 Nickels and dimes



A jar holds 30 coins, all nickels (5 cents) and dimes (10 cents), worth 2.40 dollars in total. How many nickels and how many dimes?

19 The garden bed



The length of a rectangular garden bed is 3 feet more than twice its width. Its perimeter is 36 feet. Find its dimensions and its area.

20 Trail mix

A store mixes cashews at 6 dollars per pound with almonds at 9 dollars per pound to make 12 pounds of trail mix worth 8 dollars per pound. How many pounds of each?

21 Find the error

To solve $3x + 2y = 14$ and $x + 2y = 6$, a student adds the equations to eliminate y and gets $4x + 4y = 20$.

- Explain why this does not help.
- Solve the system correctly.

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