

Solving Systems of Linear Equations

Grade 8 math · Worksheet · Standards: 8.EE.C.8a, 8.EE.C.8b, 8.EE.C.8c

Name: _____ Date: _____ Class: _____

These 20 problems follow Standards 8.EE.C.8a, 8.EE.C.8b and 8.EE.C.8c. They treat solutions as intersection points, solve systems by graphing, substitution and elimination, and recognize systems with no solution or infinitely many.

Move from checking pairs to real situations such as tickets, rentals and trail meetings. Always check the pair in both original equations.

Standards: 8.EE.C.8a, 8.EE.C.8b, 8.EE.C.8c · **Level:** Grade 8

Problem 1 Is it a solution? (easy)

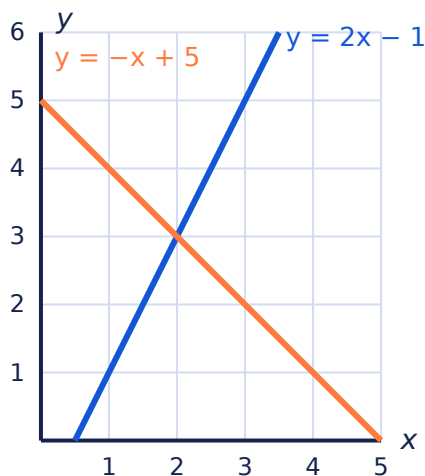
Decide whether each ordered pair is a solution of the system.

$$\begin{aligned}x + y &= 5 \\ 2x - y &= 4\end{aligned}$$

(a) (3, 2) (b) (4, 1)

Problem 2 Read the intersection (easy)

Use the graph to find the solution of the system $y = 2x - 1$ and $y = -x + 5$.



Two lines on a grid.

Problem 3 Substitution, warm-up (easy)

Solve by substitution:

$$\begin{aligned}y &= 2x \\ x + y &= 12\end{aligned}$$

Problem 4 Elimination, warm-up (easy)

Solve by elimination:

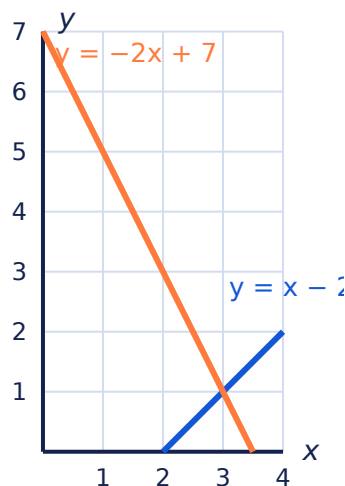
$$\begin{aligned}x + y &= 9 \\ x - y &= 3\end{aligned}$$

Problem 5 Equal expressions (easy)

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

Problem 6 Estimate and verify (easy)

The lines $y = x - 2$ and $y = -2x + 7$ are graphed. Estimate the solution and verify it in both equations.



Two lines.

Problem 7 Substitute an expression (medium)

Solve by substitution:

$$\begin{aligned}x + 2y &= 11 \\ x &= 3y - 4\end{aligned}$$

Problem 8 Add to eliminate (medium)

Solve by elimination:

$$3x + 2y = 16$$

$$x - 2y = 0$$

Problem 9 Multiply, then eliminate (medium)

Solve by elimination:

$$2x + 3y = 13$$

$$4x - y = 5$$

Problem 10 Scale one equation (medium)

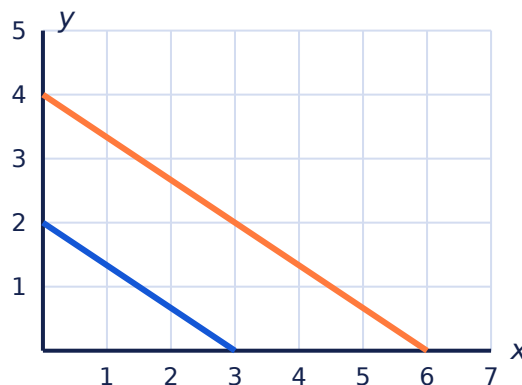
Solve by elimination:

$$x + 4y = 21$$

$$3x + 2y = 13$$

Problem 11 Parallel lines (medium)

Look at the graph of $2x + 3y = 6$ and $2x + 3y = 12$. How many solutions does the system have? Explain by comparing slopes.



Two lines on a grid.

Problem 12 Same line (medium)

Determine how many ordered pairs satisfy both equations of this system, and justify your answer.

$$y = 5x - 4$$

$$10x - 2y = 8$$

Problem 13 Classify without solving (medium)

Without solving, say whether each system has one solution, none or infinitely many: (a) $y = 3x + 1$ and $y = 3x - 4$ (b) $y = -x + 2$ and $y = 2x + 2$ (c) $2x + y = 4$ and $4x + 2y = 8$

Problem 14 Two lines, one point (medium)

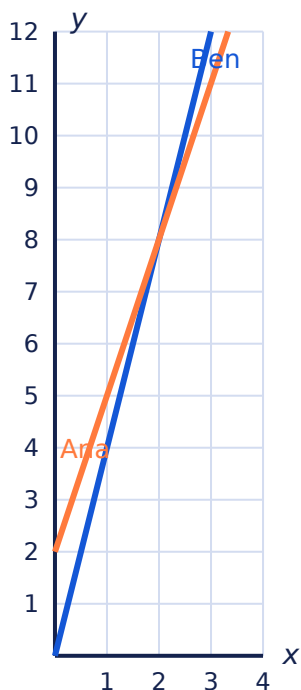
Solve the system $y = -2x + 9$ and $y = 3x - 6$.

Problem 15 Bake sale (hard)

At a school bake sale, muffins cost \$2 and brownies cost \$3.50. Students sold 40 items for \$95 in total. How many muffins (x) and how many brownies (y) were sold?

Problem 16 Trail meet-up (hard)

Ana starts 2 miles up a trail and walks away at 3 miles per hour. Ben starts at the trailhead and walks the same way at 4 miles per hour. The graph shows both, with hours on the x -axis and miles on the y -axis. Write a system, find when Ben catches Ana, and how far they are from the trailhead.



Distance from the trailhead.

Problem 17 Concert tickets (hard)

Adult tickets cost \$12 and child tickets cost \$7. A total of 150 tickets were sold for \$1,330. How many of each were sold?

Problem 18 Rectangle dimensions (hard)

A rectangle has a perimeter of 56 feet. Its length is 1 foot more than twice its width. Find the length and width.

Problem 19 Build a system (hard)

Write a system of two linear equations whose only solution is $(4, -1)$. Verify your system.

Problem 20 Car rental (hard)

Company A charges \$35 per day plus \$0.20 per mile. Company B charges \$20 per day plus \$0.35 per mile. At how many miles do the daily costs match? Which company is cheaper for 250 miles?