

Where Lines Meet

Find the point that makes both equations true.

GRADE 8 • 8.EE.C.8a

CCSS.Math.Content.8.EE.C.8a "Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously."

NAME _____

DATE _____

INTERSECTION MEANS SOLUTION

A solution to a system is an ordered pair that makes both equations true. On a graph, that ordered pair is where the two lines intersect.

WORKED EXAMPLE

Solve the system: $11x + y = 58$ and $x - y = 2$.

1. Add the equations: $12x = 60$.
2. Divide by 12: $x = 5$.
3. Substitute into $x - y = 2$: $5 - y = 2$, so $y = 3$.

Answer: The lines intersect at (5, 3).

PRACTICE 6 problems

- 1** Solve the system: $y = 4x + 7$ and $y = 8x - 9$.

ANSWER _____

- 2** Solve the system: $x + y = 20$ and $x - y = 8$.

ANSWER _____

- 3** Do the lines $y = x + 6$ and $x + y = 20$ intersect at (7, 13)? Show how you know.

ANSWER _____

- 4** Solve the system: $y = 4x + 7$ and $y = 8x - 17$.

ANSWER _____

- 5** How many solutions does this system have?
 $y = 9x + 7$ and $y = 9x - 14$.

ANSWER _____

- 6** How many solutions does this system have?
 $y = 4x - 7$ and $4y = 16x - 28$.

ANSWER _____

APPLY IT Show your work

1

A music app has two download plans. Plan A costs \$8 for each album. Plan B costs \$4 for each album plus a \$28 membership fee. After how many albums will the plans cost the same amount? What will that cost be?

WORK SPACE

ANSWER _____

2

A game rental shop has two payment choices. Choice A costs \$9 per game plus an \$18 membership fee. Choice B costs \$6 per game plus a \$36 membership fee. For how many rented games will the choices cost the same?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Solve the system, then explain why your ordered pair is the intersection point: $6x + 7y = 92$ and $8x - 7y = -8$.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Solve the system: $y = 4x + 7$ and $y = 8x - 9$.	(4, 23)
2	Solve the system: $x + y = 20$ and $x - y = 8$.	(14, 6)
3	Do the lines $y = x + 6$ and $x + y = 20$ intersect at (7, 13)? Show how you know.	Yes. The point (7, 13) makes both equations true.
4	Solve the system: $y = 4x + 7$ and $y = 8x - 17$.	(6, 31)
5	How many solutions does this system have? $y = 9x + 7$ and $y = 9x - 14$.	No solution. The lines are parallel.
6	How many solutions does this system have? $y = 4x - 7$ and $4y = 16x - 28$.	Infinitely many solutions. Both equations represent the same line.

PART 2 • APPLY IT

- 7 albums, \$56** Set the costs equal: $8x = 4x + 28$. The solution is $x = 7$, and either plan costs \$56.
- 6 games, \$72** Set the costs equal: $9x + 18 = 6x + 36$. Solving gives $x = 6$, and both choices cost \$72.

CHALLENGE

(6, 8). Adding the equations gives $14x = 84$, so $x = 6$. Substituting gives $y = 8$, and (6, 8) makes both equations true.

Accept equivalent algebraic work and ordered pairs written in either clear format. For the solution-count items, accept correct descriptions such as parallel lines for no solution and same line for infinitely many solutions.