

# Line Meeting Test

*Classify solutions from two linear graphs.*

**GRADE 8 • MA.8.AR.4.2**

**MA.8.AR.4.2** "Given a system of two linear equations represented graphically on the same coordinate plane, determine whether there is one solution, no solution or infinitely many solutions."

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## HOW LINES MEET

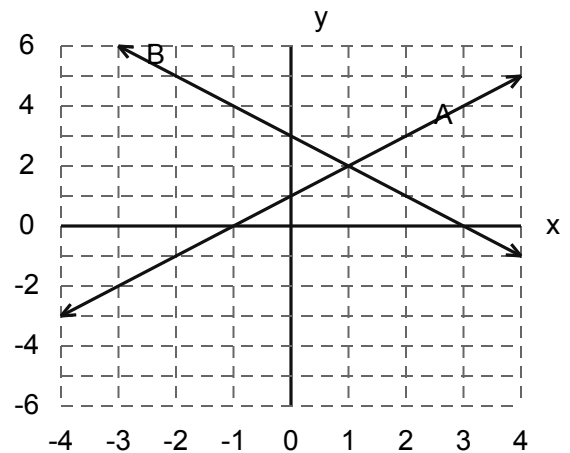
A solution is an ordered pair on both graphs. Crossing lines have one solution; distinct parallel lines have none; coincident lines have infinitely many. When graphs coincide, both letters label the same trace. Use the supplied graphs and explain what you see.

### WORKED EXAMPLE

Lines A and B are graphed. Determine the number of solutions and identify their shared point.

1. Trace both labeled lines.
2. They cross at (1,2).
3. Exactly one point lies on both graphs.

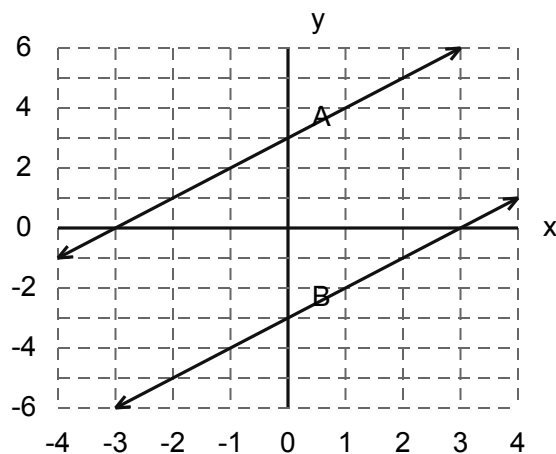
**Answer: One solution: (1,2).**



**PRACTICE** 4 problems

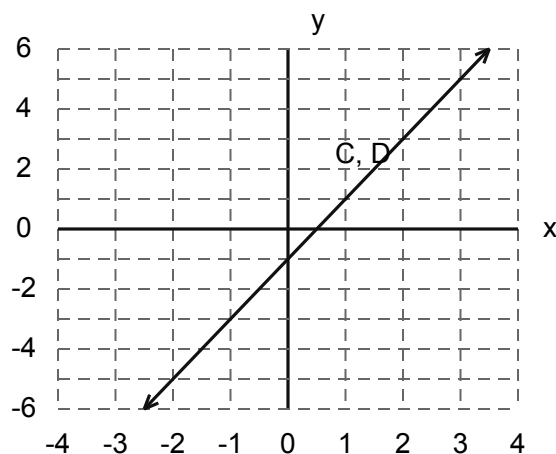
- 1** Use graphs A and B. Determine the number of solutions and explain.

**ANSWER** \_\_\_\_\_  
\_\_\_\_\_



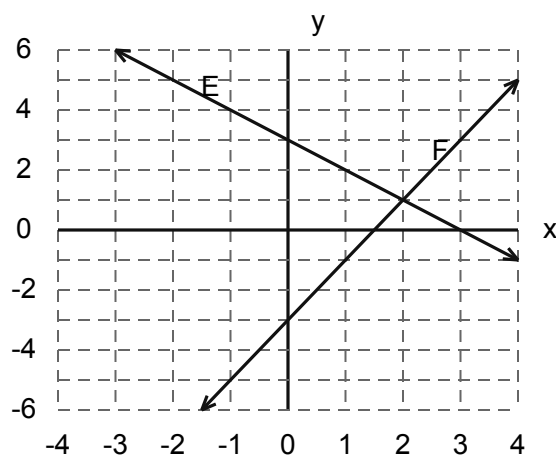
- 2** Use graphs C and D. Both labels refer to the same visible trace. Determine the number of solutions and explain.

**ANSWER** \_\_\_\_\_  
\_\_\_\_\_



- 3** Use graphs E and F. Determine the number of solutions and identify the shared point.

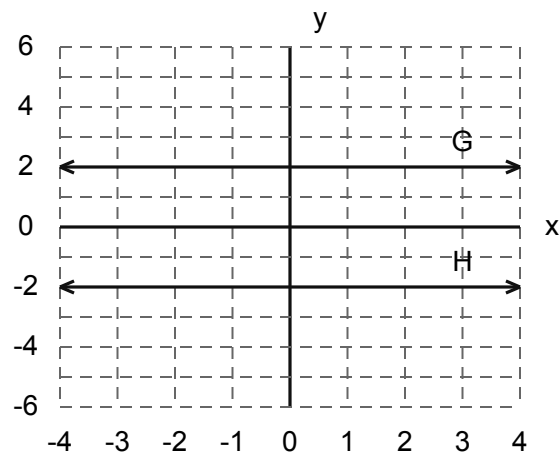
**ANSWER** \_\_\_\_\_  
\_\_\_\_\_



- 4** Use graphs G and H. Determine the number of solutions and explain.

**ANSWER** \_\_\_\_\_

\_\_\_\_\_



### APPLY IT Show your work

- 1** Two bike rentals charge by time. The graph shows cost  $y$  in dollars for  $x$  hours. Do the plans ever cost the same? Give the number of shared points and interpret any intersection.

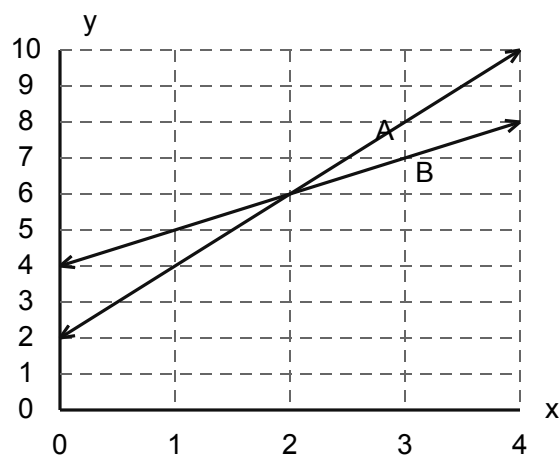
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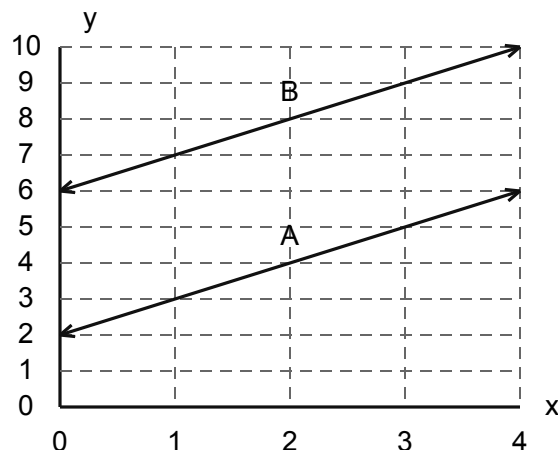
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**2**

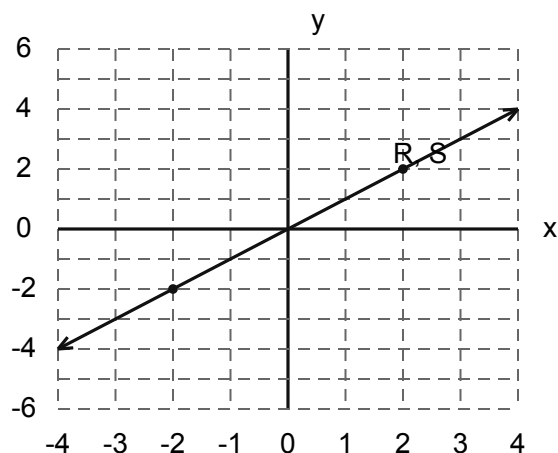
Two pools fill at steady rates. The graphs show water depth  $y$  in centimeters after  $x$  minutes. Are their depths ever equal in this model? Explain from the graphs.



## CHALLENGE One step up

Lines R and S share the visible trace. A student says there are only two solutions because only two marked points are shown. Explain the error and state the number of solutions.

WORK SPACE AND ANSWER



Require graphical evidence: one crossing, distinct parallel traces, or one trace shared by both named graphs. Marked points do not limit a continuous line. Contexts use continuous time and displayed models. No algebraic solution method is required.

**PRACTICE 1**

**No solution. The two distinct lines are parallel.**

**PRACTICE 2**

**Infinitely many solutions. Every point on the shared line lies on both graphs.**

**PRACTICE 3**

**One solution: (2,1). To check the graph, E passes through (0,3) and (3,0); F passes through (0,-3) and (3,3). Both lines pass through (2,1).**

**PRACTICE 4**

**No solution. The distinct horizontal lines never meet.**

**APPLY IT 1**

One shared point, (2,6): both plans cost 6 dollars for a 2-hour rental.  
Read where the two cost graphs cross. Different rates make them cross once.

**APPLY IT 2**

No solution: the depth graphs are parallel and separate.  
Their depth difference stays the same because their rates match but their initial depths differ.

**CHALLENGE**

**Infinitely many solutions. The two marked points are examples; every point along the shared line satisfies both equations.**