LESSON MAKER PRO

Where Graphs Meet

Find solutions at graph intersections.

HIGH SCHOOL · A1P.AF.F.18

A1P.AF.F.18 "Solve systems consisting of linear and/or quadratic equations in two variables graphically, using technology where appropriate."

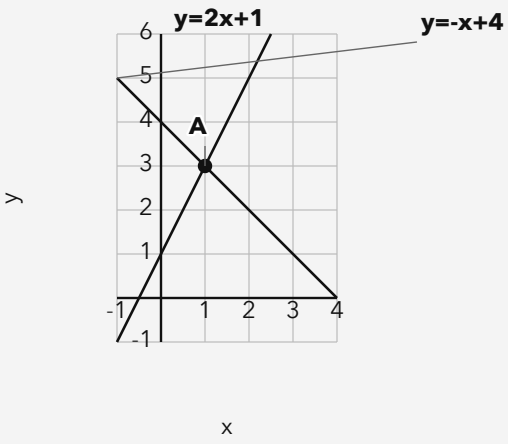
NAME _____ DATE _____

THE BIG IDEA

A solution to a system is a point on both graphs. Plot a few points for each equation, then read every place the graphs meet. If they never meet, the system has no solution.

WORKED EXAMPLE

Find the intersection of y=2x+1 and y=-x+4.



1. For y=2x+1, plot (0,1) and (1,3).
2. For y=-x+4, plot (0,4) and (1,3).
3. Both lines pass through A at (1,3).

Answer: (1,3)

PRACTICE 4 problems

1 Find every intersection of y=x+4 and y=-2x+1.

ANSWER _____

2 Find every intersection of $y=x^2$ and y=4.

ANSWER _____

3 Do $y=x^2+5$ and y=3 intersect?

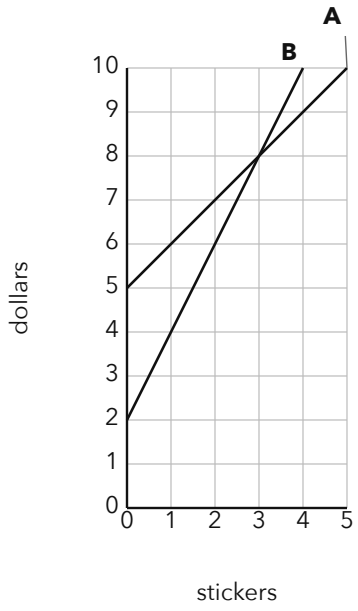
ANSWER _____

4 Find every intersection of $y=x^2+4$ and y=4x.

ANSWER _____

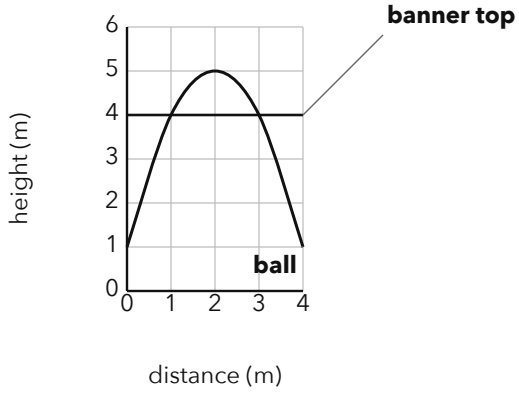
APPLY IT Show your work

1 A club compares sticker costs. Printer A costs y=x+5 dollars for x stickers. Printer B costs y=2x+2 dollars. Use the graph to find when the costs match. Give the number of stickers and the cost.



ANSWER _____

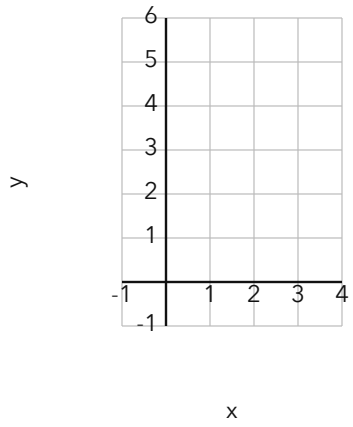
2 A tossed ball follows $y=-x^2+4x+1$, where x is horizontal distance in meters and y is height in meters. The top of a banner is at y=4. Use the graph to find both distances where the ball is that high.



ANSWER _____

CHALLENGE One step up

Sketch $y=x^2-2x+1$ and $y=-x^2+4x+1$ on the grid. Find every intersection and explain how your graph shows there are two.



WORK SPACE AND ANSWER

ANSWER KEY

Where Graphs Meet

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find every intersection of y=x+4 and y=-2x+1.	**(-1,3)**
2	Find every intersection of $y=x^2$ and y=4.	**(-2,4) and (2,4)**
3	Do $y=x^2+5$ and y=3 intersect?	**No, they have no intersection.**
4	Find every intersection of $y=x^2+4$ and y=4x.	**(2,8)**

PART 2 · APPLY IT

1. **3 stickers, $8** The lines cross at (3,8). The x-coordinate gives the number of stickers, and the y-coordinate gives the cost.
2. **1 meter and 3 meters** The ball's curve crosses the banner-height line at (1,4) and (3,4).

CHALLENGE

The intersections are (0,1) and (3,4). The sketched curves cross at two points.

Accept solutions in either order. For the challenge, accept a sketch that clearly shows both intersections, even if the curves are not perfectly smooth.