LESSON MAKER PRO

Intersection Mission

Graph lines and read the solutions they share.

HIGH SCHOOL · HSA-REI.D

CCSS.Math.Content.HSA-REI.D "Represent and solve equations and inequalities graphically"

NAME _____ DATE _____

WHERE GRAPHS MEET

For a system of linear equations, graph both lines on the same coordinate plane. The ordered pair where the lines cross makes both equations true. Distinct parallel lines have no solution, while equations that make the same line have infinitely many solutions.

WORKED EXAMPLE

Solve by graphing: $y = 3x + 2$ and $y = -2x + 12$

1. Graph $y = 3x + 2$.
2. Graph $y = -2x + 12$ on the same axes.
3. The lines cross at $x = 2$ and $y = 8$.
4. Check: $3(2) + 2 = 8$ and $-2(2) + 12 = 8$.

Answer: (2, 8)

PRACTICE 6 problems

1 Graph the system. State the intersection point. y = x + 4 y = -x + 14

ANSWER _____

2 Graph the system. State the intersection point. y = 4x - 7 y = x + 5

ANSWER _____

3 Graph the system. State the intersection point. x + y = 10 y = 6

ANSWER _____

4 Graph the system. State the intersection point. y = -x + 7 x = 0

ANSWER _____

5 Graph the system. How many solutions does it have? y = 5x + 1 y = 5x - 4

ANSWER _____

6 Graph the system. How many solutions does it have? y = -5x + 10 4y = -20x + 40

ANSWER _____

APPLY IT Show your work

1 Gaming subscription A costs $10 to join plus $4 each month. Subscription B costs $6 each month with no joining fee. Let x be the number of months and y be the total cost. Write and graph an equation for each plan. After how many months do the plans cost the same, and what is that cost?

WORK SPACE

ANSWER _____

2 The art club has $40 for sticker supplies. Let x be the number of sticker sheets bought and y be the dollars left. Each sheet costs $5, so graph y = 40 - 5x. The club must have at least $10 left, so graph y >= 10. What is the greatest whole number of sheets the club can buy?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Graph y <= x + 1 and y >= -x + 9 on the same axes. Describe the overlap, including the x-value where it begins. Explain why the overlap does not exist for smaller x-values.

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ANSWER KEY

Intersection Mission

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Graph the system. State the intersection point. y = x + 4 y = -x + 14	**(5, 9)**
2	Graph the system. State the intersection point. y = 4x - 7 y = x + 5	**(4, 9)**
3	Graph the system. State the intersection point. x + y = 10 y = 6	**(4, 6)**
4	Graph the system. State the intersection point. y = -x + 7 x = 0	**(0, 7)**
5	Graph the system. How many solutions does it have? y = 5x + 1 y = 5x - 4	**No solution**
6	Graph the system. How many solutions does it have? y = -5x + 10 4y = -20x + 40	**Infinitely many solutions**

PART 2 · APPLY IT

1. **After 5 months, both plans cost $30.** Use y = 4x + 10 for plan A and y = 6x for plan B. The graphs intersect at (5, 30).
2. **6 sheets, with $10 left.** The budget line and y = 10 meet at (6, 10). Any greater whole number of sheets leaves less than $10.

CHALLENGE

The boundary lines meet at (4, 5). The overlap is all points at or below y = x + 1 and at or above y = -x + 9. It begins at x = 4 and continues for x >= 4 because, before x = 4, the lower boundary is above the upper boundary.

Accept equivalent coordinate notation and equations written in equivalent forms. For the sticker problem, accept any explanation that identifies 6 as the greatest nonnegative whole-number solution.