

Where Lines Meet

Graph each system to find its shared point.

GRADE 8 • MA.8.AR.4.3

MA.8.AR.4.3 "Given a mathematical or real-world context, solve systems of two linear equations by graphing."

NAME _____

DATE _____

FIND THE INTERSECTION

To graph $y = mx + b$, plot b on the y -axis and use m as the rise and run. Graph both lines on the same coordinate grid. The point where the lines cross is the solution to the system.

WORKED EXAMPLE

Graph the system: $y = 7x + 11$ and $y = -3x + 21$

1. Plot $(0, 11)$ and $(1, 18)$, then draw $y = 7x + 11$.
2. Plot $(0, 21)$ and $(1, 18)$, then draw $y = -3x + 21$.
3. The lines cross at $(1, 18)$.

Answer: (1, 18)

PRACTICE 6 problems

1 Graph the system: $y = 2x + 4$ and $y = -x + 10$

ANSWER _____

2 Graph the system: $y = -2x + 8$ and $y = x - 4$

ANSWER _____

3 Graph the system: $y = 4x - 8$ and $y = -2x + 16$

ANSWER _____

4 Graph the system: $y = 5x + 2$ and $y = 2x + 14$

ANSWER _____

5 Graph the system: $y = 2x + 6$ and $y = 2x - 4$

ANSWER _____

6 Graph the system: $y = -4x + 8$ and $2y = -8x + 16$

ANSWER _____

APPLY IT Show your work

- 1** An arcade has two game card deals. Deal A costs \$4 to start plus \$4 for each game. Deal B costs \$16 to start plus \$2 for each game. Graph the two cost equations. For how many games do the deals cost the same, and what is the cost?

WORK SPACE

ANSWER _____

- 2** At a school dance, Photo Package A costs \$8 plus \$2 for each photo. Photo Package B costs \$20 for unlimited photos. Graph the two cost equations. How many photos make the packages cost the same, and what is the cost?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Graph the system: $y = \frac{5}{4}x - 6$ and $y = -\frac{1}{4}x + 12$. State the solution and explain how the graph shows it.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Graph the system: $y = 2x + 4$ and $y = -x + 10$	(2, 8)
2	Graph the system: $y = -2x + 8$ and $y = x - 4$	(4, 0)
3	Graph the system: $y = 4x - 8$ and $y = -2x + 16$	(4, 8)
4	Graph the system: $y = 5x + 2$ and $y = 2x + 14$	(4, 22)
5	Graph the system: $y = 2x + 6$ and $y = 2x - 4$	No solution
6	Graph the system: $y = -4x + 8$ and $2y = -8x + 16$	Infinitely many solutions

PART 2 • APPLY IT

- 6 games, \$28** Let x be the number of games and y be the total cost. Graph $y = 4x + 4$ and $y = 2x + 16$, which intersect at (6, 28).
- 6 photos, \$20** Let x be the number of photos and y be the total cost. Graph $y = 2x + 8$ and $y = 20$, which intersect at (6, 20).

CHALLENGE

The solution is (12, 9). The graph shows this because both lines cross at the point (12, 9).

Accept ordered pairs written as (x, y) or stated in words. For the last two practice items, accept equivalent wording such as parallel lines for no solution and same line for infinitely many solutions.